

# ISMINA 2021

Proceedings of the 5th International Conference  
on Sports, Health, and Physical Education

Semarang, Central Java, Indonesia  
28-29 April 2021

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# **Proceedings of the 5th International Conference on Sports, Health, and Physical Education**

28-29 April 2021, Semarang, Central Java, Indonesia

*ISMINA 2021*

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## Preface

We are delighted to introduce the proceedings of the second edition of the 2021 European Alliance for Innovation (EAI) the 5<sup>th</sup> International Conference on Sports, Health, and Physical Education (ISMINA 2021) with the theme “Transformation on Sports, Health and Physical Education Facing the Global Pandemic”. This conference has brought researchers, developers, and practitioners around the world.

ISMINA 2021 Proceedings contains 77 articles. Consisting of 35 sports-themed articles, 27 health-themed articles, and 15 physical education-themed articles. The 5<sup>th</sup> ISMINA 2021 collaborates with APPORI and several leading Indonesian universities in the fields of physical education, sports, and health education. The 5<sup>th</sup> ISMINA 2021 aims to gather all knowledge and transformation to face the global pandemic in the fields of physical education, health, and sports.

We would like to express our gratitude and appreciation for all the reviewers who helped us maintain the high quality of manuscripts included in the proceedings published by EUDL. We are very grateful to the International/National advisory committee, session chairs, students’ volunteers, and administrative assistants who selflessly contributed to the success of this Conference. Also, we are thankful to all the authors who submitted papers, because of which the conference became a story of success. We would also like to extend our thanks to the members of the organizing team for their hard work.

On the day of completion of this journey, we are delighted to present the proceedings of the 5<sup>th</sup> ISMINA International Conference 2021 to the authors and delegates of the event with a high level of satisfaction and aspiration. We hope that you will find it useful, exciting, and inspiring. We appreciate that the authors may want to maximize the popularity of their papers and we will try our best to support them in their endeavors.

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# Contents

## Sports

Resilience Status on Young Athletic Athletes in Response to Covid-19 Pandemic <i>Adiska Rani Ditya Candra, Hermahayu Hermahayu</i>	1
Mental Health vs Mental Toughness in Athlete <i>Rayinda Faizah</i>	8
Traditional Games as Fundamental Physical Activity to Improve Locomotor Skills <i>Fajar Awang Irawan, Sutaryono Sutaryono, Dhias Fajar Widya Permana</i>	14
Feature Sport News, Before and During Pandemic Covid 19 <i>Fatona Suraya, Adhi Wijayanto Basuki, Sugiarto Sugiarto, Danti Putri Subagyo</i>	23
The Formulation of Vertical Jump Height Measurement As The Basis for Developing Leg Power Test Instrument <i>Sri Haryono, Sugiyanto Sugiyanto, Agus Kristiyanto, Risa Suryana</i>	36
Motivation Level and Mobile Technology Role Toward Yosim Pancar Dance Training in Pandemic Covid-19 Era <i>Heppy Hein Wanggai, Firmansyah Dlis, James Tangkudung</i>	42
Biomotor Profile of Basketball Athletes Aged Under 16 Years <i>Fakhri Fajrin Kurniawan, Nur Khoiriyah</i>	48
Development of Physical Test Application Model <i>Iyakrus Iyakrus, Tono Sugihartono, Hartati Hartati, Meirizal Usra, Arizky Arizky</i>	53
Analysis of Technical Forehand Boys Athlete Junior UNNES Tennis Club <i>Rivan Saghita Pratama, Sri Haryono, Limpad Nurrachmad</i>	58
Central Java Shooting Sports Training Center Management In the 2020 Pandemic <i>Mugiyo Hartono</i>	64
Availability of Sports Facilities in Semarang City <i>Tommy Soenyoto, Agus Darmawan, Dwi Tiga Putri, Adi Adi</i>	73
The Relationship Between Arm Muscle Strength and Grip Strength on Throwing Distance <i>Gustiana Mega Anggita, Hari Amirullah Rachman, Mohammad Arif Ali, Sugiarto Sugiarto, Siti Baitul Mukarromah</i>	83
The Training Performance Of Sub Elit Adolescent Archery Athletes Before And During Covid-19 Pandemic <i>Fani Ravena, Ajeng Sindi Tirtasari, Irmantara Subagio, Azizati Rochmania, Kunjung Ashadi</i>	89

The Level Of Knowledge And Prevention Of Overtraining In The Province Level Basketball Team	102
<i>Siti Rahmawati Ardila, Muhammad Fadhlurrohman Akmal, Gigih Siantoro, Donny Ardi Kusuma, Abdul Hafidz, Kunjung Ashadi</i>	
Paragliding Ground Handling Training Model With a Combination of Belayer, Anchoring and Simple Towing in Above Normal Wind Condition	115
<i>Sahri Sahri, Sugiharto Sugiharto, Nanang Indardi, Nur Amin, Aristiyanto Aristiyanto, Alya Ega Suciana, Wahyu Indra Wijaya</i>	
The Effect of High Intensity Interval Training in Improving Aerobic Capacity	122
<i>Nining Widyah Kusnanik, Fajrin Fajrin, Stephen Bird, Fransisca Januarumi, Sudarso Sudarso, Alizah Imanda Puteri, Albertus Fenanlampir</i>	
Was it Right New York Knicks Coach's Decision to Recruit a Point Guard?	127
<i>Anggit Wicaksono, Margono Margono</i>	
The Sports Scientist Challenge	133
<i>Made Pramono</i>	
The Effectiveness of Periodization of Linear Exercises on the Lop Skills of Young Badminton Players	139
<i>Suratman Suratman, Wahadi Wahadi</i>	
The Effect of Icky Shuffle and Diagonal Quick Slalom Exercises Using the Ladder Drill Method on Agility	145
<i>Sabat Syah Bandang, Purwono Sidik Permono</i>	
The Power Structure Relationship Handball Athletes using Sociometry	152
<i>Wiga Nurlatifa Romadhoni, Nasuka Nasuka, Purwono Sidik Permono</i>	
Sport Volunteering in the 11th ASEAN School Games 2019: Implementation and Constraints	159
<i>Irana Mery Alviana, Limpad Nurrachmad, Said Junaidi</i>	
The Potential of Sport Development with Quality Control Physical Education Program	166
<i>Said Junaidi, Fajar Awang Irawan, Sri Sumartiningsih, Agus Darmawan</i>	
Effect of Sponsor-Event Fit on Company's Decision to Sponsor Sport Event	171
<i>Billy Castyana, Mugiyo Hartono, Rizqi Teguh Iskandar</i>	
Determinants of Pulmonary Function Parameters: A Cross-Sectional Study Among Elite Athletes in Central Java, Indonesia	176
<i>Mahalul Azam, Sri Ratna Rahayu, Rumini Rumini, Yuni Wijayanti, Arulita Ika Fibriana, Soedjatmiko Soedjatmiko, Heny Setyawati, Muhamad Zakki Saefurrohim, Moch. Thoriq Assegaf Al Ayubi, Novaro Adeneur Tafriend</i>	
Skills Analysis on the Set-Upper Movement in Volleyball	182
<i>Agung Wahyudi, Supriyono Supriyono, Agus Pujiyanto, Imam Santosa, Maryadi Maryadi</i>	
The Effectiveness of Attack with Epee Weapon in Fencing Competition in Kendal Regency Year 2020	186
<i>Rubianto Hadi, Kriswantoro Kriswantoro, Moch. Senoadji Karjadi</i>	
The Effect Of Aerobic Exercise On Body Weight and Body Fat Percentage	194
<i>Anjani Betty Afriani, Silvia Christin Ginting, Gustiana Mega Anggita</i>	

The Physical Fitness Analysis of Handball Female Athletes of Central Java <i>Shamarah Hanin Khanza, Muchlisin Muchlisin, Anggit Wicaksono</i>	200
The Comparison of Strategies for Physiological Recovery Coach and Province Level Fencing Athlete during the Pandemic Covid-19 <i>Anisa Nur Fadilah, Nor Syafikah, Rini Ismalasari, Azizati Rochmania, Abdul Hafidz, Kunjung Ashadi</i>	204
The Comparison of Sleep's Quantity and Quality Elite Volleyball Male Athletes at Various Level of Events <i>Erlin Nika Saputri, Muhammad Labib Siena Ar Rasyid, Machfud Irsyada, Tutur Jatmiko, Kunjung Ashadi</i>	215
Development of Virtual Artistic Gymnastics-Based Competitions in Central Java <i>Agus Darmawan, Tommy Soenyoto, Dwi Tiga Putri, Agus Pujiyanto</i>	228
Athletes' Emotional Determinants Accordingly Reflected in Their Personal Lives <i>Heny Setyawati, Nur Haziyani binti Mohamad Khalid, Didik Rinan Sumekto, Tandiyo Rahayu, Agus Darmawan, Dwi Tiga Putri, Risky Vidiana Sari, Thania Kusumaningtyas, Laksmana Pandu Pratama, Tharisa Dea Florentina</i>	233
Effect Short-term Aquarobics Exercise on Cholesterol Levels <i>Siti Baitul Mukarromah, Sugiarto Sugiarto, Mohammad Arif Ali, Gustiana Mega Anggita, Anies Setiowati, Ronny Lesmana</i>	246
Facilities Management of Samapta Sports Center in Magelang City <i>Khoiril Anam, Nur Ahmad Taufikurrahman</i>	253
<b>Health</b>	
Characteristics of the Home Environment Elementary School Students in the Filariasis Endemic Area, Pekalongan City <i>Sofwan Indarjo, Agus Suwandono, Sulistiyani Sulistiyani, Zahroh Shaluhiyah</i>	262
Relationship of Energy and Nutrients Adequacy with Nutritional Status on Young Football Athletes in Central Java <i>Nur Fauzi, Dewi Pusparini, Supri Hartini, Akhmad Samsu Dukha, Nurul Hidayatun Nasiha, Yanesti Nuravianda Lestari, Mardiana Mardiana</i>	268
Biomarkers of Oxidative Stress for Human Health: Experiment of Different Swimming Exercise on Male Wistar Rats <i>Agus Hariyanto, Anindya Mar'atus Sholikhah, Yetty Septiani Mustar</i>	276
Qualitative Study of Social Support for Occupational Safety and Health in the Informal Sector of Limestone Processing in Gunungkidul, Indonesia <i>Sukismanto Sukismanto, Hartono Hartono, Sumardiyono Sumardiyono, Tri Rejeki Andayani</i>	284
Effectiveness of Aerobic Exercises in Obesity Cases Pertamina MOR IV Semarang Employees <i>Hadi Hadi, Fajar Awang Irawan, Syahru Romadhoni, Tommy Soenyoto, Dhias Fajar Widya Permana, Mirza Arif Ma'dum</i>	294
The Effectiveness of Vitamin C as an Antioxidant Against the Pulse of Recovery After Physical Activity in the New Normal <i>Andi Miftahul Jannah, BM Wara Kushartanti</i>	300



Body Mass Index Profile of Physical Education Teacher Candidates <i>Syafaruddin Syafaruddin, Wahyu Indra Bayu, Soleh Solahuddin, Ahmad Richard Victorian</i>	308
Environmental Management Action (EMA) To Fight Dengue Hemorrhagic Fever In Coastal Areas <i>Nur Siyam, Widya Hary Cahyati</i>	314
Clinical Characteristics and Positivity Rate of COVID-19 in Semarang, Central Java, Indonesia <i>Maulina Istighfaroh, Lukman Fauzi</i>	322
The Benefits and Uses of Red Dragon Fruit in Food Consumption <i>Widya Hary Cahyati, Natalia Desy Putriningtyas</i>	332
Devising and Testing Revised Validity and Reliability of Strategic Knowledge, Efficient Behaviour, and Affective Value in Outdoor Evaluation Questionnaire <i>Alvin Raj Santhanadass, Gunathevan Elumalai, Yudik Prasetyo, Jaffry Zakaria</i>	340
Implementation of Health Education for The Prevention of Covid 19 In Magelang Regency <i>Alfiana Ainun Nisa, Riyadho Santiko Adi</i>	349
Duration of Diabetes Mellitus and Mild Cognitive Impairment among People with Type 2 Diabetes Mellitus in Semarang City, Indonesia <i>Lukman Fauzi, Lindra Anggorowati, Almira Dianti</i>	356
Healthy Lifestyle During The Pandemic Through Sport Activities <i>Faradina Safira Andriyanti, Fatikha Sofia Iqlima</i>	362
Optimization of Practicum Guidelines for Biomedic and Epidemiological Laboratories Based On Information Systems <i>Mustafa Daru Affandi, Sofwan Indarjo</i>	373
Adolescent Knowledge of Anemia <i>Yuliaji Siswanto, Faridah Aini, Raharjo Apriyatmoko</i>	380
Development of Prediction Methods Nutritional Status Athletes Using Fat-Free Mass Indicator <i>Mardiana Mardiana, Yanesti Nuravianda Lestari</i>	386
Condom Use and HIV Testing on Female Sex Workers <i>Muhammad Azinar, Alfiana Ainun Nisa, Arulita Ika Fibriana</i>	392
Rice Bran Based Vitabran Sports Vitality Booster <i>Oktia Woro Kasmini Handayani, Arif Rahmad Kurnia</i>	400
Factors Associated with Stunted Children <i>Bertakalswa Hermawati, Oktia Woro Kasmini Handayani, Dhevy Fajriyatul Umma, Adinda Yustika Seftiani</i>	405
Community Groups Cares for Aids for Optimization of High-Risk Population Outreach in Regions Pried io HIV/AIDS Transmission <i>Arulita Ika Fibriana, Bambang Budi Raharjo, Muhammad Azinar</i>	411
Non-Communicable Diseases in Indonesia: Prevalence and Risk Factor <i>Resafina Melinda Sadomo, Lukman Fauzi</i>	416

An Overview of Nutritional Knowledge about Anemia Among Students of Universitas Negeri Semarang <i>Levia Arkananta Sarjono, Milda Hasna, Natalia Desy Putriningtyas</i>	422
Child marriage: the unspoken consequence of COVID-19 <i>Efa Nugroho, Najib Najib, Mugia Bayu Rahardja</i>	428
Animal Distribution Patterns as a Potential Possible Origin of Covid-19 in Semarang City <i>Dyah Mahendrasari Sukendra, Bambang Wahyono, Fitri Indrawati, Yunita Dyah Puspita Santik, Nur Siyam</i>	436
The Effectiveness of Ice Massage Therapy for Low Back Pain Patients <i>Anugrahani Tiara Rizki, Naufal Yudi Pratama, Gustiana Mega Anggita</i>	443
Effect Differences of Fermented and Non-Fermented Red Dragon Fruit Peel on Blood Glucose Levels of Hypercholesterolemic Wistar Rats <i>Natalia Desy Putriningtyas, Mardiana Mardiana, Siti Wahyuningsih</i>	450
<b>Physical Education</b>	
Improvement of The Competency of Physical Education Teachers at Elementary School in Assessing Student Learning Outcomes in Mijen District, Semarang City <i>Sulaiman Sulaiman, Tri Nurharsono, Cahyo Yuwono, Agung Wahyudi</i>	457
Development of Learning Media Android-Based for Physical Education with the Topic of Illicit Drugs in Facing the New Normal Era <i>Bilma Adhiono, Eddy Purnomo</i>	462
Digital Literacy of Doctoral Program Student in Sports Education, Semarang State University <i>Sri Wicahyani, Soegiyanto K. S, Dwi Cahyo Kartiko, Septian Williyanto</i>	474
Assistance Of Students In The Framework Of Global Hinness Through Community Games And Traditional Sports <i>Moch. Purnomo, Dian Ayu Larasati, Corry Liana</i>	484
Profile Of Phycisal Activity, Physical Fitness, and BMI Students of Senior High School in Surabaya <i>Irmantara Subagio, Setiyo Hartoto</i>	491
Response of Parents Towards Parental Class as A Collaborative Model in Physical Education <i>Slamet Santoso, Tandiyo Rahayu, Tjetjep Rohendi Rohidi, Mugiyo Hartono</i>	502
The Role of Teachers In Reducing Hyperactive Behavior of Children with Special Needs Is Reviewed from The Characteristics of Speed And Balance <i>Gatot Jariono, Nurhidayat Nurhidayat, Eko Sudarmanto, Ardhian Tomy Kurniawan, Chandra Triadi, Maimunah Nur Anisa</i>	509
Effectiveness of Private Vocational School Lesson Learning In Pandemic Covid-19 <i>Deddy Whinata Kardiyanto, Andri Asrul Setiyawan</i>	519
Relationship Between Physical Activities and Emotional Mental Health on High School Students in 2018 <i>Deddy Whinata Kardiyanto, Taufik Ismail</i>	527

The Analysis Of The Online Physical Education Learning During The Pandemic In The Outmost Area <i>Maharani Fatima Gandasari, Ella Anugrarista, Erna Yantiningasih</i>	535
Adaptive Physical Education Learning During Pandemic in School for Children with Special Needs <i>Dwi Gansar Santi Wijayanti, Wahyu Ragil Kurniawan, Zaky Ilham Kurniawan, Dian Arum</i>	545
The Relationship between Sports Students Exchange Experience and English Learning Motivation of Unnes and UITM Students <i>Setya Rahayu, Fatona Suraya, Ani Mazlina Dewi Mohamed, Soegiyanto Soegiyanto, Mawarni Mohamed, Ikhwan Budi, Danti Putri Subagyo, Imam Syihabudin, Rahmat Septianto</i>	556
A Study of Conceptual Development on Internet-Based Academic Service (Internship Program Related) as A Manifestation of UNNES the Conservation University <i>Mohammad Arif Ali, Sugiarto Sugiarto, Gustiana Mega Anggita, Siti Baitul Mukarromah, Yuli Dewi Lestari, Dewi Marfu'ah Kurniawati, Isna Lailatuz Zahroh, Teddy Firdyansyah, Yazid Rizki Khamdani</i>	561
Traditional Railway Games on Physical Education and Sports Learning with a Teaching Personal and Social Responsibility Approach of Lower Graders at Elementary School <i>Hermawan Pamot Raharjo, Agus Pujiyanto, Mohamad Annas</i>	566
Students' Sport Activities During Covid-19 Pandemic Situation <i>Tri Rustiadi</i>	581

# Resilience Status on Young Athletic Athletes in Response to Covid-19 Pandemic

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**Abstract.** This study aims to examine the resilience status of Junior Athletic Athletes during Covid-19 Pandemic. The drastic changes have an impact on the growth and development of sports achievement. The program is still running with the Covid-19 Pandemic, but there are a lot of restrictions which cause concern for athletes and the emergence of performance problems. The results of this study indicate that Long-Term Sports Center Program (PSOJP) athletic athletes have an excellent resilience status of 20%, 20% have a fairly good category and 60% are in a very good category. The recommendations of this study are aimed at coaches, even though the athletes have a fairly good resilience status, there is a need for assistance and strategies for athletes to be able to increase psychological resilience and be ready to survive in difficult conditions.

**Keywords:** Resilience status, young athletes, long-term athlete, covid-19

## 1. Introduction

Resilience is a combination or combination of several contributing psychological factors. Many studies have explained the main factors in influencing the contribution and development of resilience in a person. Resilience can be defined as a process of adaptation to someone from adversity, trauma, tragedy, threats or even things that become significant sources of stress. For example, family problems, relationship problems, serious health problems, financial stress, situations that are difficult to accept and many others. In other words, resilience is bouncing back from a difficult situation [1].

Resilience is defined as a process that is based on the positive role of differences in individual responses to stress and difficulties so as to enable the individual to become resilient [2,3]. The same thing was conveyed in previous studies, namely resilience refers to the identification of characteristics in an individual that allows him to be resilient [4]. Closely related to sports, especially competitive sports, many things can happen and make these athletes experience difficulties, stress and even tend not to survive. Especially for student or student athletes, some are able to survive but others may not.

Several things are related to high training load and academic studies such as, selection of exercise schedules, the selection process, biological changes during puberty, personal conflicts, and stress from the sports environment that can potentially cause stress [5]. During the training process, athletes are also vulnerable to various difficult situations that cause stress, athletes may experience injuries, training loads that are too heavy so they experience fatigue, which of course will cause a decrease in sports performance. The demand for winning a competition also triggers stress, which means that athletes must be able to adapt

positively to survive to grow into a ready and resilient person [6–8] Attempts and successes in achieving resilience have been noted in previous studies that traits of a sports environment such as interpersonal relationships, and positive coach behavior supporting gymnasts through challenges can encourage athletes to overcome failure. The results of this study state that gymnastics athletes can develop resilience as well as skills, self-efficacy, and self-esteem through positive behaviors given by the coach and are considered the right path for future coaching practices [9].

The pandemic crisis initially affected various sectors of life, especially the health sector, on the other hand, there are the economic, education, industrial, tourism, social, employment, and of course sports sectors [10–12]. More clearly, Paoli explained a very clear impact on the sports sector, namely the application of motion restrictions (lockdown) to make athletes normally stop their training activities and reduce the volume and intensity of training for several periods, and result in the closure of sports venues and athletes [13]. These situations are what make the athlete experience very drastic changes in the training period according to the race and match schedule, a decrease in performance due to a decrease in training intensity and volume. However, on the other hand, athletes must have targets and achievements and the status of increasing achievement during the coaching process so that it causes athletes to experience stress and emotional instability, including junior athletes in the Long-Term Sports Centralization Program (PSOJP) Jawa Tengah.

Based on the background above, conditions that tend to make athletes experience stress must get attention and this situation is considered as adversity that can interfere with the mental condition of athletes to be able to survive and maintain their psychological condition during the Covid-19 pandemic. In line with this, the research is to measure and determine the resilience status of Athletic PSOJP Athletes in response to Covid-19.

## 2. Methods

This study aims to measure the extent of the resilience status of the athletic PSOJP athletes during the Covid-19 pandemic. Participants in this study involved athletes from Central Java PSOJP Athletics. Participants consisted of 10 athletes with a distribution of 6 male athletes and 4 female athletes. Athletes aged 14 to 20 years ( $M = 18.00$ ,  $SD = 2.44$ ). Participants who became respondents in this study were active athletes who underwent a training process during the Covid-19 pandemic with strict health protocols. The sample used in this study used a total sampling of all PSOJP Athletic Athletes.

The procedure in this study is to follow the covid-19 protocol guidelines by not being directly involved with athletes. The measurement process uses a questionnaire that has been made through the online questionnaire media platform.

The instrument used in this study was The Brief Resilience Scale (BRS) instrument developed by Smith et al [14]. The BRS questionnaire includes 6 statements indicating the psychological resilience of athletes in facing the situation during the Covid pandemic. Apart from that, to trace further the researchers also looked at it by conducting specific interviews. The measurement scale uses a Likert scale with a scale point of 1 = Strongly Disagree, 2 = Disagree, 3 = neutral, 4 = Agree, 5 = strongly agree.

The calculation of the percentage results will provide the conclusions presented in the percentage classification as follows :

**Table 1.** Percentage Classification

Presentase	Klasifikasi
80 – 100 %	Excelent
60 – 79,99%	Very Good
40 – 59,99 %	Good
20 – 39,99 %	Fair
0 – 19,99 %	Poor

The distributions of Resileince statemen are available in this table bellow:

**Tabel 2.** The Brief Resilience Scale: Items and Factor Loadings

No	Indicator (BRS)	Item Scale
1	Resilience	I tend to bounce back quickly after hard times
2		I have a hard time making it trogh streesful event (R)
3		It doesnt not take me long to recover from a stressfull event
4		It is hard for e to snap back when something bad happens (R)
5		I usually come through difficult timess with little trouble
6		T tentd to take a long itme to get over set-backs in my life (R)

### 3. Result and Discussion

#### 3.1 Results

The results of the descriptive analysis will be described in the table below based on N (total of respondents). The results of the descriptive analysis will be shown in table 1 while the percentage results are presented in table no.2. The descriptive results that have been obtained are:

**Tabel 3.** Tabel Analisis Deskriptif

Descriptive Statistics							
Statement	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
1	10	2	3	5	4.60	.699	.489
2	10	3	2	5	3.80	1.229	1.511
3	10	3	2	5	4.10	1.101	1.211
4	10	3	2	5	3.50	1.269	1.611
5	10	2	2	4	3.60	.699	.489
6	10	4	1	5	3.60	1.075	1.156
Valid N (listwise)	10						

Based on table no. 3 can be inferred that the lowest score of the respondents, total of 10 athletes, with the lowest score of 1 and the highest is 5. The lowest score from the Mean data obtained is 3,50 in a statement number 4 while the highest score from the mean data above is of 4.60 from the statement number 1. Below is the descriptive result of the percentage.

**Tabel 4.** Descriptive Percentage of Resilience of PSOJP Athletic Athletes Jawa Tengah

Percentage Interval	Criteria	Percentage
80%-100%	Excellent	20%
60%-79,99%	Very Good	60%
40%-59,99%	Good	20%
20%-39,99%	Fair	0%
0%-19,99%	Poor	0%

Based on the data shown in table 2 it can be seen that the Central Java PSOJP Athletic athletes are divided into 3 criteria, namely the category Good, Very Good, Excellent. The results of the percentage obtained indicate that athletes who have an Excellent level of resilience are still far from half. It can be seen that only 20% of athletes have an excellent level of resilience. Furthermore, 60% of the total number entered into the very good level, and 20% of athletes were categorized as having a fairly good resilience.

In addition to percentage data, resilience measurements are also taken from the athlete's point of view in solving psychological problems during training, especially during the Covid pandemic. The point of view of the athlete is taken from the assessment of (1) Movement Restriction, (2) Action as a positive response. Several athletes conveyed what point of view they felt in an open questionnaire such as:

I am very disappointed and saddened by this situation, especially when there is a limitation on space for movement (Respondent 4). my practice was interrupted (Respondent 3). Very disappointed because we let go of the target and the training was not optimal (Respondent 8).

And in the form of treatment to overcome negative thoughts to stay positive, some of them are by watching movies, looking for entertainment, playing cellphones, worshipping and praying, and staying enthusiastic even though you do not do routine exercise activities. They try to keep their spirits up in any condition because maybe they think this is what can be done.

### 3.2 Discussions

The purpose of this study was to measure the level of resilience of Athletic PSOJP Athletes in response to the Covid-19 pandemic which has an impact on athlete's training and several other aspects. From the data analysis that has been described, the results show that PSOJP Athletic athletes who have excellent psychological resilience are only 20% and the others are in the good category of 60% and 20% are in the good enough category. This proves that the psychological resilience status of the Athletic PSOJP Athletes is in a good category or even tends to be in the middle of not reaching a very good category. This is of course a question why some athletes do not get the maximum criteria for measuring psychological resilience.

Resilience can be influenced by several factors. According to Fletcher, the resilience of athletes is influenced by the stressors they face. And in the resilience formation process, there are 5 main supporting factors, namely motivation, focus, perceived social support, confidence, and positive personality [4]. These factors are the main capital informing the resilience of athletes to be able to survive and maintain their psychological condition to remain at the highest position. From the athlete's point of view, it is clear that most athletes have a very large sense of disappointment and sadness due to the condition of the athletes who have to stay at home and also target sports events that are targeted must retreat and even disappear and in building their physical performance they must start from scratch. Besides, the athlete's concern will lose to other athletes if they have less preparation. Some of these things are also taken into account by the stressor level of the athlete.

Every athlete has different sources of stress and their way of dealing with or dealing with these stressors will be different [15]. In the case of PSOJP athletes, their athletics is one of the sports that needs outdoor training because it is related to that during the Covid-19 pandemic, athletes did not have the intensity of outdoor training because of safety that must be maintained. Besides, PSOJP athletes are young athletes, most of whom still have student status and students who are required to have to work extra hard in learning through an online system that they have never done before. These various sources of stress make athletes more likely not to be able to survive the conditions that force them to do so.

Gould et al. Also conveyed that individuals and institutions influence psychological development for the community, family, and also the individual itself, including people who are not related to sports, the sports environment, and the process of exercising. This is in line with the growth and development of resilience levels which are not only developed cognitively but also from the family, community, and all sports processes and the environment around the individual (athlete) themselves [16].

The results of the medium resilience status of athletic PSOJP athletes provide recommendations and information for athletes that the athlete conditions is not good enough. This should be a consideration for the coach in developing a mental resilience and training program for the athlete. Moreover, strategies are given to athletes in the recovery of psychological conditions [17]. Such as coping strategies in solving problems and situations that threaten athletes and in this study are related to the recovery of feelings of disappointment, and increase in self-confidence and motivation and positive thinking that achievement can still be pursued with serious training and still adhere to health protocols. Another strategy used by athletes and coaches is to redefine the main objectives in achieving the following achievements with goals in the short, medium, and long term. This is needed to foster enthusiasm, confidence, and optimism in athletes related to responsibility and discipline to carry out the process of achieving targets with maximum effort

#### **4. Conclusions**

The purpose of this study was to measure the resilience status of Central Java Athletic Psojp athletes in response to covid-19. In the research process, things that become the main focus are the level of resilience and also the point of view related to restriction of motion and actions taken by athletes in the recovery phase or solving sports training problems. The results of this study indicate that PSOJP Athletic athletes have a good resilience status even though some of them as much as 20% have a moderate level of resilience. Based on these results, the trainer should pay attention to what factors can influence this condition. The coach's consideration of the psychological/mental condition in sports must be paid more



attention to be able to restore the condition and restore the athlete to stay focused, confidently, and build his self-confidence again. Athletes who succeed at the level of resilience are considered to have been able to overcome the problems they experience and be able to withstand difficult conditions.

Some of the actions that can be taken by the coach in restoring the condition and increasing the level of athlete's resilience are psychological skills training which includes motivation, self-confidence focus, and self-determination, then the implementation of goal setting as a coping strategy for athletes. And further research can be investigated further about how factors can influence or specifically influence psychological resilience in athletes.

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# Mental Health vs Mental Toughness in Athlete

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**Abstract.** Mental health and mental toughness are two psychological attributes that are often inherent in an athlete. This review appraise the evidence base regarding the mental health and mental toughness of athletes. Methods : A systematic search of the Routledge, Elsevier, SAGE, and Google Scholar databases, up to and including February 2021, was conducted. The search yielded a total of 26 records. Results : Mental health in athletes has a role in being able to maintain the psychological stability of athletes, being able to actualize their potential, and not raising psychological complaints before, during or after the competition. Meanwhile, mental toughness acts as an important psychological aspect for athletes when faced with stressful or unpredictable situations.

**Keywords:** Mental health, mental toughness, athlete.

## 1 Introduction

Mental health issues and mental toughness are psychological attributes that are often discussed in athletes. There are still many who think that mental health and mental resilience are the same attributes. Even though the two attributes are very different. Athletes are often associated with the attribute of mental endurance, where the hope is that an athlete must be able to survive mentally in stressful situations both when doing training and just before the race. An athlete is required to be able to survive and must not fall even when under stressful conditions. While mental health is a situation where a person is able to self-actualize and there are no complaints about mental disorders in him.

The results showed that athletes who have mental toughness in the low category show several symptoms of mental disorders such as burnout and depression [1]. The presence of mental problems in the athlete indicates that he is not mentally healthy. The high stigma against people with mental health, especially athletes, makes them not open and do not receive appropriate treatment [2], [3]. Mental health cannot be separated from physical health in athletes, mental health can reduce the appearance of psychological disorders when athletes experience injuries [4]. The results of other studies indicate that mental toughness is related to anxiety, where high mental toughness in athletes will have an effect on the athlete's anxiety level being low. This condition indicates that training is needed to increase mental toughness [5]–[7]. It is important for athletes to recognize that mental health and mental toughness are important. Because the mental health condition and mental toughness are expected to be able to improve their performance in sports activities.

The purpose of this study was to examine the role of mental health and mental toughness in athletes. From the results of this study, it is hoped that mental health and mental toughness will be of concern to related parties around the athlete environment, such as coaches and sports

organizations, so that they are able to improve athletes' achievement and performance in competitions.

## **2 Methods**

The research method in this study uses a systematic review literature method. Researchers collected articles from several publishers, namely Their Routledge, Elsevier, SAGE, and Google Scholar data bases. The collection of articles was carried out during February 2021. Based on the search, 26 articles were obtained that match the research criteria.

The first stage carried out was the researcher conducted an initial screening by looking at the title and abstract that were in accordance with the theme. The keywords used are mental health and mental toughness.

The second stage is selecting articles according to predetermined criteria. These criteria include: 1) Articles published in the year of at least 2000; 2) Discusses mental health in athletes and / or mental toughness in athletes; 3) Types of articles can be research articles and review articles.

The third stage, the researcher carried out the data extraction stage. Researchers extracted data according to a template that had been prepared, namely the type of research and design, population, research objectives, results and research findings.

## **3 Results and Discussion**

### **3.1 Mental health in athlete**

Mental health is a condition in which mentality can function optimally, be able to be active and productive, be able to establish social relationships, and be able to adapt to uncertain environments [8]. Mental health is not only a condition characterized by the absence of mental disorders, but also how individuals are able to recognize inner potential that can be used to improve one's mental well-being [8].

For athletes, mental health is an important and must-have aspect. This is because athletes are more often exposed to uncertain situations [9]. This uncertain situation demands athletes to adapt quickly. When athletes are unable to adapt to a stressful environment, athletes will complain of mental health problems such as stress, depression, depression, and even panic [9]–[12].

Athletes tend to be prone to complaints related to mental health when the match lasts until after the match [9]. This is because these situations are unpredictable, such as the result of the match not as expected. In addition, athletes who are in the transition stage from adolescence to adulthood and are currently pursuing higher education are also reported to experience higher distress [10]. In addition, the presence of high competitive power between athletes often results in mental health problems [13].

The emergence of mental health problems is also influenced by gender. The results showed that female athletes have a higher stress score than male athletes. This is because women still have difficulty expressing their emotions to others compared to men [14]. Apart from these differences, hormonal and biological differences also have an effect [14]. Another factor is dissatisfaction with achievement, where conditions of failure to achieve predetermined targets

result in athletes complaining of mental health problems [11]. In addition, physical health problems also affect the mental health of athletes. Athletes who experience injuries have reportedly complained of several conditions related to problems in mental health [12]. Athletes are required to have excellent physical condition, but when the athlete is injured, there will be a concern that the athlete's performance when competing will decrease. Athletes who experience injuries will receive more comprehensive assistance and treatment, namely a recovery program that not only focuses on physical recovery but also on mental recovery [15].

Mental health conditions in athletes need to be maintained or improved because this condition has an impact on the athlete's performance [8], [16]. Athletes with good mental health conditions are expected to be able to show their full potential during the match.

Efforts to maintain the mental health of athletes must involve multidisciplinary disciplines and professions. Here, not only athletes and coaches play a role, but there is also a need for the participation of psychologists, psychiatrists, or doctors to provide special treatment related to mental problems of athletes [9].

### **3.2 Mental toughness in athlete**

Mental toughness is one of the psychological attributes of an individual which includes how to integrate all the potential that is owned in the face of uncertain situations so as to keep the individual away from stressful or depressed conditions [17]. This mental toughness can be manifested in a person in the form of self-efficacy, optimism, motivation, enthusiasm, and other positive aspects of mental health [17]. The presence of good self-efficacy in athletes is expected to be able to improve athletes' performance when competing [18].

Mental toughness is a psychological attribute that is often inherent in athletes. Because with the presence of mental toughness in athletes, it is expected that they can eliminate the symptoms of mental disorders such as depression, stress and anxiety [19]. In addition, mental toughness is identical with self-confidence, ability to rise from failure, perseverance, being able to handle problems effectively and being able to maintain concentration even though situations are not conducive [20].

Athletes who have mental toughness have several indicators, including being able to face challenges, being able to learn from bad experiences, self-confidence, and low levels of depression, anxiety and stress [19]. When athletes have good mental toughness, it is hoped that they will increase their commitment to continue to play an active role and strive to improve their inner performance [21]. Athletes with mental toughness will have a high sense of competitiveness, achievement motivation and stable performance during the race [22].

The aspects needed by athletes to achieve mental toughness are generally good coping skills in situations or demands in sports such as competition, training and lifestyle, have a good commitment to stay focused and confident under pressure [23]. Mental toughness is influenced by several internal factors, namely narcissism, competition, self-welfare, self-concept, psychological abilities, self-insight, self-esteem, the need for satisfaction, and is also influenced by external factors, namely the existence of training programs, education, physical training, coaches and relationships. with coach and gender [24].

The effect of mental toughness on athletes has been shown to improve athlete performance [22]. With this good performance it will increase the athlete's success in the match. Mental toughness in athletes can be improved through a process of learning, experience and environmental influences [25]. The learning process can be done by involving athletes in activities that aim to increase mental toughness [26]. With activities such as training, it is hoped that they will be able to encourage athletes to develop their psychological strength and be able

to identify what is needed to develop themselves [20]. Experience how to deal with and solve problems will also affect mental toughness of athletes. When athletes use positive coping in dealing with problems, it is hoped that their mental toughness will also be formed. The influence of the environment, where the behavior and mindset of the people around him will also have an influence on the condition of his mental toughness.

### **3.3 Role mental health and mental toughness in athlete**

Mental toughness is a positive manifestation or indicator to create a healthy mental condition in athletes [17]. The concepts of mental toughness and mental health tend to overlap in a positive way, namely the perspective on stress.

Some of the factors that increase stressors in athletes include the sports environment, personal problems, the atmosphere of competition and sports organization. There are some athletes who are prone to mental health problems due to the inability to manage their training time, due to lack of commitment, failure to compete, injury, or problems with family or friends. This condition can lead to stress, depression, or anxiety in athletes.

Athletes who are not in a mentally healthy condition will find it difficult to actualize their potential, find it difficult to face uncertain match situations, lack motivation and even be unable to rise from defeat. The condition that appears shows that the athlete does not have mental toughness. Mental toughness plays a role in the personality aspects and sports activities of athletes that can improve psychological aspects and prevent mental health problems.

The aspects of mental health and mental toughness in athletes have a causal and inseparable relationship. Athletes who are in a mentally healthy condition are expected to have good mental toughness and vice versa.

Athletes are expected to have a mentally healthy condition so that athletes do not have complaints related to psychological problems before competing until after competing, there are no problems related to social aspects, are able to actualize their potentials, and have psychological toughness in dealing with various stressful situations. To maintain a healthy mental condition and mental toughness, athletes need help from various parties such as family, friends, coaches, and psychologists.

## **4 Conclusion**

Mental health and mental toughness have a very important role for the psychological development of athletes. The presence of these two attributes is complementary. Mental health in athletes has a role in being able to maintain the psychological stability of athletes, being able to actualize their potential, and not raising psychological complaints before, during or after the competition. Meanwhile, mental toughness acts as an important psychological aspect for athletes when faced with stressful or unpredictable situations. Here athletes are expected to have good psychological toughness and resilience in themselves. Good mental toughness in athletes can be an indicator that the athlete is in a healthy mental state. The attributes of mental health and mental toughness in athletes are expected to improve athletes' performance when competing. Therefore, athletes need to get guidance and training that aims to maintain or improve mental health and mental toughness of athletes.

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# Traditional Games as Fundamental Physical Activity to Improve Locomotor Skills

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**Abstract.** The purpose of this study was to investigate the traditional games in the fundamental physical activities using locomotor skills. This study using Class Action Research to see the improvement in implementing traditional games. The study using 18 children 7-9 years and took place in Madrasah at Ungaran Barat. All participants were agreed and full fill the inform consent with the guidance from the teacher. There were only 8 children who got score 44-62 and 10 children got 63-81 at cycle I. Data at cycle II found that the category of Developed as Expected were 3 children and Very Well-Developed as 15 children. The data on the pre-cycle locomotor basic motion skills of 33% in Undeveloped category. Cycle I found 45% in the Began to Develop category and in the cycle II of 83% in the Very Well-Developed category. This study found that traditional games was appropriate to improve locomotor skill.

**Keywords:** locomotor skills, physical activity, traditional games.

## 1 Introduction

Development of early childhood aimed at children from birth to age six years. This guidance was carried out through giving responses for physical education to help the growth and development of movement in the body and the soul [10]. Physical activity supports the children to have readiness to set a higher level of education. Games used in children are games that can stimulate creativity and fun. There is no element of coercion and play and its naturally simple. Motor development is one of the activities that can develop motor aspects optimally and can stimulate children's brain development. The development of the motoric aspects aims to introduce and train gross and fine movements, improve the ability to manage, control and coordinate body movements, and improve body skills and a healthy lifestyle as conveyed by Apriliani, Yasbiati, & Elan, [1] so that it can support skills and physical growth.

Early childhood education was a media in organizing activities that focus on laying the basic foundation towards the physical development of children, especially in fine and gross motor coordination, intelligence, socio-emotional, language and communication. The growth of early childhood education was adjusted to the stages of development that every child goes through at his age [15]. Children have enormous potential to optimize all aspects of their development, including the development of motor skills as the elements of maturity and control of the body movements [16]. Motor skills were divided into two parts, there were gross motor and fine motor. Gross motor was an activity using large muscles which includes locomotor, non-locomotor and manipulative motion. Fine motor meant the ability of preschool children to move using smooth muscles. The basic of locomotor skills were the movement

which certain body parts to moving. Basic locomotor movement skills include walking, running, jumping and hopping [21]. To improve locomotor skills, it was necessary to support a learning environment which was conducive area to develop the children's potential (Sutaryono, Irawan, & Permana, 2020), both in the indoor and outdoor environments.

Basically, children learn while playing, therefore learning in early childhood is basically playing. Some traditional games can be used as media to support children when playing the games. Traditional games were the media to make children more active in their activity as they did every day. In accordance with the characteristics of children who are active in conducting various explorations of their environment. Children have to be monitored by the teacher either parent every day to know their activities. Activities undertaken do not always rely on directions from parents or teachers. They can interact with friends or discover something new in the development of locomotor movements and activities. The activities carried out at school are actually only a driving force in carrying out basic movements for children. The next stage is in the creativity of the child itself but still under the supervision of the teacher or parent. Experience in the field is knowledge and knowledge that is not obtained in school and it is expensive. Most children are too busy at home and are shackled by smartphones which make children have limitations in physical activities.

Based on observations of researchers at Madrasah Ibtidaiyah, researchers found that locomotor basic motion skills were still low and the lack of innovation in the delivery of the material provided such as the use of classrooms in learning and the field for physical activity. Children will feel comfortable and enjoy the lesson if the atmosphere in the classroom were fun. Increasing the achievement of child development at the age of 5-6 years i.e. Children can coordinate the movements in a controlled, balanced, and agile. Traditional games can be played in an outdoor place that can increase the enthusiasm of learning. Traditional games were a means of enhancing the insights of knowledge gained from a series of play and adventure experiences that can stimulate one's spirit and physical activity. The form of activities presented in the form of traditional games that were educational. Traditional game was essentially a game with coordination from the gestures and children were able to develop their kinesthetic abilities. Young children also have to protect their fundamental movement skills and habitual physical activity [3] to increase physical performance.

Based on the existing problems, the researcher was interested in revealing the locomotor's ability to use traditional games for students at Madrasah Ibtidaiyah in Ungaran Barat. The purpose of this study was to investigate the traditional games in the fundamental physical activities using locomotor skills.

## **2 Methods**

This study using Class Action Research [2] which aims to see how much the improvement in implementing traditional games. The study took place in Madrasah in Ungaran Barat and this study using boys 7-9 years old. This classification accordance with Kurniawan, [10] and Tzapakidou, Stefanidou, & Tsompanaki, [19] which stated that age has an important role in the development of motion through analysis for the next stage. According to Irawan & Permana, [9]; Sutaryono, Ansori, Irawan, & Permana, [17] with physical activity through traditional games, children will feel happy and even complacent they were indirectly doing physical activity through traditional games. This is the basis for recruiting the participants in this study using several criteria such as being active in physical activity,

actively participating in school activities, and understanding some types of traditional games. This study already qualified from the review of Health Research Ethics Committee of Universitas Negeri Semarang, Indonesia based on the Standards and Operational Guidance for Human Participants regarding WHO 2011. 30 children participated in this study, and then they were homogenized in demographic characters such as social, economics, and live environment. After homogenized subjects, 20 subjects were randomly selected. In the last session, 18 participants were attending and participating traditional games includes Sunda Manda, Jumping Rope, Betengan, and Throwing Sandals with running, galloping, hop scotching, jump stride, horizon jump, and lateral run-gliding movements. All of the participants were agreed and full fill the inform consent and identity with the guidance from the teacher before did the games.

The instrument test using Gross Motor Development edition 2 (TGMD-2) as Tsapakidou, Stefanidou, & Tsompanaki, (2014) which is designed for children from 3-10 years. The test is divided into two sub-tests, a) in sub-test of travelling skills and b) in sub-test of handling skills. In the present study using method similar with Tsapakidou et al., [19] study, only the sub-test of travelling was examined. This sub-test examined and assessed the correct implementation in: 1) running, 2) galloping, 3) hop scotching, 4) the jump stride, 5) the horizontal jump and 6) in the lateral run-gliding.

Data collection in this study using observation sheet with data scoring techniques as follows:

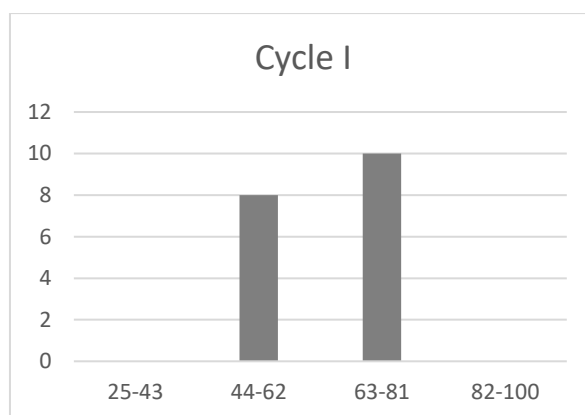
**Table 1.** Criteria of locomotor basic skills

Number	Code	Category
82-100	VW	Very Well Developed
63-81	DE	Develop as Expected
44-62	BD	Began to Develop
25-43	UD	Undeveloped

The category (table 1) divided into four types after modified as study needed, there were Very Well Developed, Develop as Expected, Began to Develop, and Undeveloped. According to Arikunto [2], the criteria of locomotor basic skills were modified in accordance with the model and needed in this study. Based on the skills criteria set by the teacher, 75 % children must get the grade in the Develop as Expectation category. This study also consisted of two cycles in two weeks as Arikunto [2], and each cycle divided into four steps, there were; planning, action, observation, and reflection.

### 3 Results and Discussion

The results of this study found that at the first meeting participants were still unable to perform and enjoy traditional games correctly. Then they begin to adapt by understanding and adapting the game to their maximum performance as in the traditional games that children usually do. In this game, the locomotor motion they perform can be seen in the cycle 1 of locomotor basic skills (Figure 1).

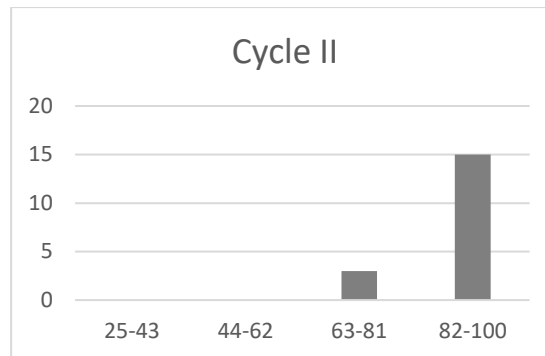


**Fig. 1.** Cycle I of Locomotor Basic Skills

There were only 8 children who got score 44-62 and 10 children who scored 63-81, so there were still some children who had not Developed as Expected (Figure 1). The influencing factors in the first cycle were the child has not concentrated on seeing examples of traditional games by the teacher. Some children still disturbing other friends and some other do not understand the rules of the game. Weaknesses that found in the first cycle become correction for improvement and were applied in the second cycle. In the second cycle, traditional games were used according to standard rules and have been agreed from the Indonesian Traditional People's Sports Games Committee (KPOTI). The games used includes Sunda Manda, Jumping Rope, Betengan, and Throwing Sandals. The instruments used were run, gallop, leap, jump, hop, kick, strike, dribble, and roll. In accordance with the implementation instructions conducted by Tsapakidou et al., [19] in his study. In this second cycle, traditional games were more conducive because children already understand the rules of the game and children feel comfortable in practicing traditional games.

Traditional games are a media to increasing students' physical activity. Traditional games in their application will be more educative by increasing social emotional abilities and providing positive meanings for students at school. This is inseparable from the intent and purpose of life-long learning which means that by playing students will learn a lot in everything. Through traditional games there are values and educational meanings in it. In addition, traditional games can also train students' emotions by training them to be more patient in waiting their turn while playing. In addition, students also indirectly learn to obey the rules [1].

Through traditional games, students are immersed in the game so that they will avoid the burden of their thoughts and reduce the stress in their lives. In playing, students also feel free because their thoughts used in physical activities can divert their burdens and emotions for positive things [22]. This traditional game is also able to improve students' social emotional skills and increase their thinking power to be more creative and innovative. In playing traditional games, students are given an understanding of the rules and procedures for playing. It is hoped that students do it right. The activities and movements in this traditional game refer to the expected locomotor movements such as the steps that each student must do when they are young, starting from walking, running, jumping, and jumping [21].



**Fig. 2.** Cycle II of Locomotor Basic Skills

When some participant playing, another participant become supporters to encourage their friends to play, and vice versa. After the game was finished the children were given an evaluation and reward to motivate them to active in movement, as in the study Goodway, Crowe, & Ward, [5] and Wang, [20]. Locomotor basic skills at cycle II in Figure 2 can be seen that the children who Developed as Expected were 3 children and Very Well Developed as many as 15 children.

Activities which was implemented by children can increase stimulus motion and can develop motion skills to exquisite the children motoric skills. Study by Rismayanthi [14] found that basic motion skills were motor stimulation for kindergarten children through physical education activities in the sports. She also recommended that children should do more activity for their growth and health. Irawan & Permana,[9]; Permana & Irawan, [12] stated that traditional games were more attractive to give children activities. They are playing without any limit and have a deal as rules to playing the games. Natural movement [7] will make children become active and elevate their performance in doing competition. Locomotor skills are the basic to improve achievement in the children especially who want to be an athlete.

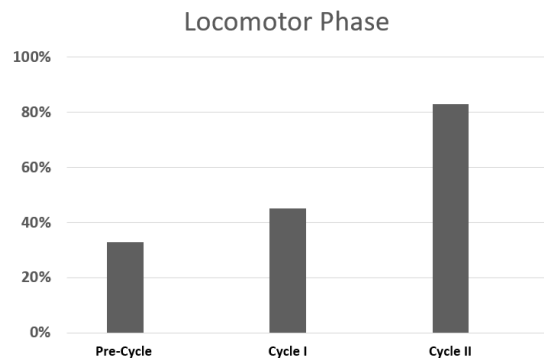
Motor development is defined as the development of controlling bodily movements through coordinated activities of the nerve center, nerves and muscles. The ability of students both physically and motorically develops according to age and there are stages. The first stage develops normally. Second, its development has encountered a barrier. This causes the physical and motor development of children to tend to be predictable. Likewise, the growth of students as adults can grow normally or will be stunted [6].

In coordinating student abilities, gross motor coordination skills in students are divided into three [1]. First, locomotor skills. Skills to move the body can be in the form of running, jumping, rolling, bouncing, walking, dropping, and sliding. These skills support awareness of motor perceptions. This awareness includes awareness of self, space, time, direction, and hearing. This can be seen when children try to imitate other people's movements.

This imitation movement is a basic motion that enters the memory and repeatedly resides in the nervous system and becomes automation. Second, non-locomotor skills. This skill includes the movement of the limbs of both the upper and lower extremities where the limb in question is only still, does not change position or does not move places. Movement in this skill is associated with balance in the body. The last skill is manipulation skill. This skill is an activity to control small muscle movements, with limited movements. Limited movement in

this case is limited to the body parts of the hands and feet. Apart from manipulative motion, this third skill is also called the skill of projecting an object.

A person's skills are influenced by basic movements when they are children. This provision is what leads students to have skills in achievement. A student is also expected to grow and develop during the learning process both at home and at school. Good growth and development will support students' thinking skills and movement abilities, especially in activities. The golden age of students is not the same, but it can be predicted according to physical activity and ability to improve skills. Students who are active have an indication of improving their performance if they are supported by training programs and support from their closest people, including parents, coaches, friends, and family. As an effort to support these goals, educators and parents have an obligation to always accompany and monitor student growth and development and physical improvement, especially in locomotor motion. It is hoped that the basic movement will be carried out correctly to the next stage, namely towards improving performance.



**Fig. 3.** Comparison among pre-cycle, cycle I, and cycle II

Data collection from pre-cycle, cycle I, and cycle II were combined to find out how significant the differences among three data obtained. The difference can be seen in Figure 3 that there was significant difference. Explanation of the data among pre-cycle, cycle I, and cycle II where in the pre-cycle was 33% of participants in the Undeveloped category, then in the cycle I 45% of participants in Began to Develop, and in cycle II found 83% of participants received in Very Well-Developed.

Tsapakidou et al., [19] investigated the locomotor development of fundamental movement skill learning among children 3.5 to 5 years of age. They found that children in their age have many potentials to increase fundamental basics skills for their future. Study from Rahajeng [13] found that there were match between locator basic skill and manipulation skills for children more effective than a free-play program. The similar findings have been reported in other studies [4,11]. Relationship of physical activity to fundamental movement skill among adolescent provides children with a wealth of information to gives good perceptions of their growth.

Learning is an activity that involves a person in an effort to obtain knowledge, skills, recreations and positive values by utilizing various sources for learning and social communities. Learning can involve two parties, namely students as learners and teachers as facilitators and also sports management. For students, learning aims to bring changes in student behavior towards a better direction this can be addressed in various forms such as

changes in knowledge, understanding attitudes and behavior and skills and other aspects that exist in individual students [7]. Locomotor skills cannot be reach with just one time, this ability is obtained by continuous training which is regular and increasing. Even though it has been done continuously, if a child does not do it in a certain period of time the movement may disappear from the memory.

Permana & Irawan, [12] also said that by doing physical activity through traditional games, the locomotor and locomotor movements are indirectly remembered and carried out automatically. this happens because the movement has entered the memory and the nerve response to the brain has received to be done at any time. This locomotor motion does not only rely on the ability of the muscles, but also links the work interactions of the brain. Balance and coordination of several physical components that are owned to make a person move flexibly. This balance can also be affected by the soles of the feet that are owned by each person. The model of the soles of the feet in a person has an effect even though Irawan et al., [7] study did not find any significant differences. However, it affects the agility and speed of daily activities. Understanding and knowledge about learning motion must be emphasized in children to find out how children move normally without experiencing a problem and even injury in physical activity.

The creativity of teachers and parents is a source of information in providing learning about how to do locomotor motion properly and correctly. Direct practice in Physical Education at school also provides a special role in giving children experience how locomotor movements are done correctly. While playing at home with traditional games or folk games will indirectly increase children's physical activity and strengthen memory in carrying out movements that are difficult to do such as normal movements. These movements are like a series of running, jumping and rolling movements. The variation of these movements is a development of existing movements and is a combination of adjusting to the conditions in the field when playing. Non-locomotor, locomotor, and manipulative motion are a series of series that must be mastered by every child. If there is a series that is missed indirectly for children will experience difficulties when they grow up. The mismatch that is experienced, such as inadequate coordination when carrying out a movement, or also inadequate reaction speed in carrying out a movement. Before that happens, it would be best if every child should carry out each phase of the movement completely. In children phase they have stages in motor skills. starting on your back, then on your stomach, crawling, creeping, walking, running, and jumping.

Locomotor movements in traditional games have a huge impact. Some traditional games such as hadang, betengan, egrang, and suda manda [8], indirectly trigger the role of the brain in coordinating movements between several body components. Coordination between the eyes, hands and feet also affects the reaction speed a person has. It is also used for children with special needs in doing physical activities at school to improve fitness [18]. Traditional games have an important role in improving children's fitness and skills. In traditional games it takes physical, mental, and patient abilities. Traditional games also make a major contribution to how to learn and perform locomotor movements to the most difficult levels. Therefore, it takes people who have the patience and perseverance to accompany and direct the children, especially those who are learning locomotors and their variations. Teachers and parents are figures who have influence in mastering this locomotor motion. They are in accordance with the criteria to always accompany and improve the movements the children do both at home and at school. Physical education for all children gave a new knowledge for life experience and child development. This also applies to traditional games that can be used as a basis for learning locomotor motion in children. A limitation to this study was solely boys participating

in this study, and this study only investigate the traditional games in the fundamental physical activities using locomotor skills.

#### 4 Conclusion

The result found that the data on the pre-cycle locomotor basic motion skills of 33% in the children's category Undeveloped. Cycle I found 45% in the Began to Develop category and in the cycle II of 83% in the Very Well-Developed category. This study stated that traditional games was appropriate for a fundamental locomotor skill development. The weaknesses in this study that there were no data related to the children fitness condition. Future studies can add children's physical fitness activities that can monitoring the increase of physical abilities.

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# Feature Sport News, Before and During Pandemic Covid 19

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**Abstract.** The Covid-19 pandemic has affected the sports news industry, one of which is on featured sports news. This study aims to analyze the differences in the characteristic of feature sport news in ten categories given. A descriptive qualitative research method were implemented with three primary data namely documentation, interview and observation. Of 57 feature sport news, before (August 4, 2019 - November 29, 2019) and during the pandemic (February 29, 2020 - May 29, 2020) were analyzed. The results of this study shows that there is limited difference in quality but a high difference of quantity in feature sport news before and during pandemic. This difference is due to the decrease of sports event during pandemic which result on minimum hard news. Thus, the journalist fill the gap on sports rubric by writing more feature news.

**Keywords:** : feature sport news, Covid-19, characteristic

## 1 Introduction

There is recipe for print media to continue to sell, it must use the 3S formula, namely, sex (sex), scandal (scandal) and, sport (sport).[1]. So if you want print media to sell well, print media should present content with at least one of the 3S themes[1]. It cannot be denied that news with these three themes is able to attract readers, and is claimed to be the most effective way to attract consumers' attention. The above statement may seem like an anecdote on the one hand, but on the other hand it is real. Sports news has become news that is always present in the daily printed media, in this way it has indeed proven to be an attraction. Drs Moh. As'ad S. Upsi said that attractiveness is an attitude that makes people happy about the object of a situation or certain ideas[2]. This will be followed by feelings of pleasure and a tendency to look for objects that he likes. Meanwhile, the attraction caused by sports news is the factual entertainment value. Given that most humans have a hobby to do sports and have their respective idols. Sports news also contains a lot of good information about idols, clubs, rivals and sports. The appeal of sports news is that it contains an element of entertainment in it and can be a kind of catharsis for some people who want to actualize themselves[2].

Sport news or sport news presented in printed media is not always straight news, but sports news is packaged in the form of features. This makes sports news in the form of a feature serve as an alternative to adding variety to the rubric in print media so that it does not appear monotonous if the news is written only using the straight news format. A typical feature or essay is news that is written creatively and subjectively, especially to entertain readers about an event, a state of one aspect of human life.[2]. Usually, a story writing feature

begins with something that attracts attention and ends with something to remember. On the other hand, feature stories are still based on facts and data taken through a journalistic process.

Featured news is a creative and subjective article written to entertain and educate readers about an event, circumstance, or aspect of human life [3]. The human interest aspect is the most prominent aspect. In making a distinctive essay, we must start with something catchy and end with something that will always be remembered. Featured news includes news products that are soft news [4]. This means that the news feature also reports actual factual information obtained from sources [5]. Not much different from straight news, feature news employs the 5W = 1H formula in its publishing. Furthermore, the features are portrayed in a casual creative language [6].

Reporting from the official website page of the National Agency for the Acceleration of Covid-19 Handling, until now Saturday, August 29, 2020, it is stated that there have been 169,151 confirmed cases in Indonesia with 122,758 people recovered and 7,261 people leading to death. Corona virus cases first entered Indonesia on February 14, 2020, to date it has counted to 122,758 cases, this proves that the development of the corona virus is very significant [7]. The emergence of this outbreak also resulted in a temporary suspension of sports competitions, both national and international leagues. As stated in the PSSI decree number 05 / SKEP / I-2001 which was signed by the PSSI general chairman, it states that the official competition termination will take effect from January 21, 2021 through the PSSI Executive Committee (Exco) meeting. With the termination of this kind of competition, will it also have an impact on the print media which provides information based on the results or events in a league competition.

This research refers to the characteristics of the spot news feature before the covid-19 lockdown and during the covid-19 lockdown. Featured characteristics according to [8] there are ten indicators: news writing techniques, news content, news retrieval techniques, news objectives, news series, nature of presentation, journalist code, news copyright, news time, and news structure. According to [9] an indicator is essentially a control variable that can be used to calculate changes in an event or operation. Of the 10 indicators, researchers will take and display a comparison of the characteristics of features sports news after and during the Covid-19 pandemic. The research question is how do feature sport news compare in terms of their characteristics before and after the Covid-19 pandemic.

## 2 Method

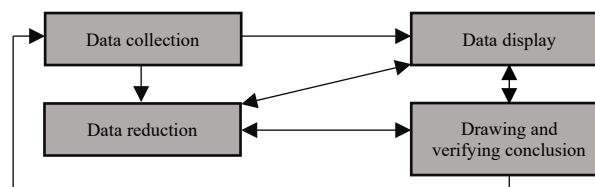
This study used a qualitative descriptive method with three data sources: observation, interviews and documentation. Qualitative research methods are based on the post positivism philosophy, used to examine the condition of natural objects where the researcher holds the key instrument, the sampling of data sources is done purposively the collection technique is triangulation (combined), the data analysis is inductive and the results of qualitative research emphasize the meaning rather than generalizations [10]. Qualitative research data are in the form of text, photos, stories, pictures, artifacts and not in the form of numbers. The data collection process can be carried out if the direction and objectives of the research are clear and the source of the data is that the informant has been identified, contacted and has received approval of their desire to provide the required information [11]. The data collection process includes observation, interviews and documentation.

Observation is the collection of data directly from the field [11]. Researchers used an observation rubric validated by the head of the Suara Merdeka Bureaucracy to make observations. The observation rubric consists of 10 indicators of the characteristics of the news it refers to [8]. The results of the observations were used as the basis for preparing interview guidelines. The interview guide has been validated by the relevant validator, namely the head of the Suara Merdeka bureaucracy. The interview method used is a structured interview. Structured interviews are used as a data collection tool if the researcher already knows with certainty what knowledge will be obtained [10]. Sampling in the interview process was carried out by using purposive sampling technique with three sources selected as follows: the deputy head of the bureaucracy, sports journalists and general journalists. The sample for the qualitative approach is purposive, which means that it is in line with the research's goals and objectives [11]. The documentation process was obtained from the sports news data of Suara Merdeka edition, 4 August 2019 to 29 November 2019 and 29 February 2020 to 29 May 2020.

**Table 1.** Characteristics *Feature Sport News*

No.	Indicator	Observation	Interview	Documentation
1.	Writing technique (narrating).	√	√	√
2.	The news content is objective, factual and accurate.	√	√	√
3.	Data collection technique (projection, investigation, communication and confirmation).	√	√	√
4.	News goal (informative and recreation).	√	√	√
5.	News series (series of facts the facts are present informally),	√	√	√
6.	The nature of presentation (factuality).	√	√	√
7.	Journalist code (using full name)	√	√	√
8.	News copyright (is a weak individual creative journalist).	√	√	√
9.	News time (using setting and not including date and time in the intro).	√	√	√
10.	News structure (outside the inverted pyramid pattern).	√	√	√

After the data is collected, data validity checks are carried out by using the Milles and Hubberman data analysis method.



**Fig.1.** Interactive model data analysis

The method of qualitative data analysis activities is carried out interactively and continues until the data collected is saturated [10]. Researchers obtained a total of 853 sports news, which were then reduced at the reduction stage by removing non-feature news in order to obtain 53 feature news. The process of data reduction is the process of summarizing, selecting the main things, focusing on the important things, looking for themes and patterns and removing unnecessary data [12]. All feature news is then analyzed using the observation rubric and tested for validity using data analysis belonging to Milles and Huberman. Then the results of the data reduction are presented (display data). In qualitative research, Data presentation in qualitative research can take the form of brief explanations, charts, relationships between categories, flowcharts and so on. The data presentation aims to make it easier for researchers to draw conclusions (verifying conclusions). Initial conclusions are provisional in nature and will change if there is no strong evidence to support the next stage of data collection, if the conclusions are supported by evidence and are consistent, the conclusions put forward are credible conclusions and can be translated into results and discussion.

### 3 Results and Discussion

In the feature sport news characteristic rubric, there are ten indicators:

#### 3.1 News writing techniques

Related to the technique of writing news on the feature sport news which aims to tell or to a story as for its characteristics, namely by using a short story writing style that is flexible, lively and alluring. Here are examples the documentation results of news writing methods used before and during the Covid-19 pandemic:

Before the Covid-19 Pandemic	During the Covid-19 Pandemic
<p>Pada 1992, pundit BBC Sports Alan Hanser mengkritik keras kebijakan Sir Alex Ferguson. Sementara klub-klub lain berlomba mengumpulkan pemain bintang, Fergie justru mengusung pasukan akademi: dari David Beckham, Ryan Giggs Paul Scholes, Nicky Butt, Gary Neville, hingga Phi Neville ke skuad utama. Ketika itu, MU sedang dalam masa kebangkitan sejak mulai ditangani Fergie pada 1986 dan sempat mengalami masa-masa puasa gelar.</p>	<p>Benar, George, caramu menciptakan gol itu sungguh layak dikenang karena kau seolah-olah menciptakan sesuatu dari kemuskilan. Kau pasti masih ingat, ketikakau sedang berlari membawa bola ke gawang Verona, teman satu timmu, Zvonimir Boban, bergumam-gumam, "Kapan dia mau berhenti? Kapan dia akan berhenti? Dia tak akan berhenti. Dia tak akan pernah berhenti."</p>
<p><b>Fig.2.</b> You Can't Win Anything With Kids [13]</p>	<p><b>Fig.3.</b> <i>George Kau Bukan Pemain Lagi</i> or <i>George, you are not a Player Again</i> [14]</p>

Based on the results of observations of all feature sport news before and during the Covid-19 pandemic, using news writing techniques to tell stories or to stories [8]. In the news entitled "You Can't Win Anything with Kids" by Amir Machmud using the phrase "Sementara klub-klub lain berlomba mengumpulkan pemain bintang, Fergie justru mengusung pasukan akademi" or "As other clubs compete to gather star players Fergie is actually

carrying out academy troops” as a lively and attractive style of language. Even so, the language style is also influenced by the characteristics of each journalist. For example, with Saroni Asikin who wrote a feature work entitled "George, Kau Bukan Pemain Lagi" or "George, you are not a Player Again", using diction that is rarely used by people in general, such as "Caramu menciptakan gol itu sungguh layak dikenang karena kau seolah-olah menciptakan sesuatu dari kemuskilan " or "The way you create goals is truly memorable because you seem to create something out of obscurity".

Although the news writing technique before and during the Covid-19 pandemic was consistent with the theory, journalists who write news have a significant impact on how a flexible, lively and attractive language style is applied to writing through the ability to use the language style of the journalists themselves. In rhetoric, language style is often referred to as "style," which refers to the ability or abilities to write or use beautiful words [15].

According to the results of an interview with the deputy head of the Suara Merdeka bureaucracy, the main characteristic of a feature news writing technique is, "Unlike straight news which aims to inform, features prioritize telling stories about facts or information. Therefore, in the process of writing a feature that aims to tell stories, it can be seen from various styles of language and diction". In this news writing technique indicator, there are as many as 16 news stories before the pandemic period and 37 news during the pandemic period which have a story writing technique.

### 3.2 News content

Related to the content of the news in the sports news feature, which is objective, factual, true and accurate, while the features are by using a channel and a lighter in the delivery of the news. For example, here are the results of news content documentation before and during the Covid-19 pandemic:

Before the Covid-19 Pandemic	During the Covid-19 Pandemic
<p>Banderol Cou yang dibeli Barca dari Liverpool Rp 2,6 triliun pada 2017 menjadi pengganjal. Maka hijrah ke Bayern Muenchen dengan status pinjaman menjadi opsi terbaik bagi pemain berjejuduk "Si Penyihir Kecil" itu.</p>	<p>Selain kariernya yang cemerlang, petenis asal Rusia ini juga mengalami masa terendah dalam kariernya. Pada 2016 lalu, Sharapova tersandung masalah doping menjelang turnamen Australia Open 2016 dan menjalani skors 15 bulan.</p>
<p><b>Fig.4.</b> <i>Couthino dan Habitat Bersenang-senang</i> or Coutinho and Habitat Having Fun [16]</p>	<p><b>Fig.5.</b> <i>Siap Bersaing di Medan Berbeda</i> or Ready to Compete in a Different Field [14]</p>

Based on the results of observations of all sports news feature news before and during the Covid-19 pandemic, the content of news about events is objective, factual, true and accurate [8]. The data contained in the news content is objective, factual and accurate. This is illustrated by the sentence in the news entitled "Coutinho dan Habitat Bersenang-senang" or "Coutinho and Habitat Having Fun" in the sentence "Banderol Cou yang dibeli Barca dari Liverpool Rp 2,6 triliun pada 2017 menjadi pengganjal" or "The official coupon that Barca purchased from Liverpool for Rp. 2.6 trillion in 2017 has been a booster". And "Pada 2016 lalu, Sharapova tersandung masalah doping menjelang tournament Australia Open 2016" or "In 2016, Sharapova stumbled over a doping problem ahead of the Australian Open 2016

tournament" in a feature news entitled "Siap Bersaing di Medan Berbeda" or "Ready to Compete in a Different Field". The two sentences explain that the data or information contained in the news content contains objective, factual, true and accurate characteristics.

According to the findings of interviews with the deputy head of the Suara Merdeka bureaucracy, it was stated that the main feature of news content that is objective, factual, true and accurate is "Sentences used in sports news features use factual lines and lighters, this is intended to make the features relevant to read the next 10 years and out of date". In this news content indicator, there are as many as 16 news stories before the pandemic period and 37 news during the pandemic period which contain news that is objective, factual, true and accurate.

### 3.3 News techniques

Related to news retrieval techniques on sports news features, namely by methods or through projection, observation, investigation, communication and confirmation processes. For example, here are the documentation results of news-taking techniques before and during the Covid-19 pandemic:

Before the Covid-19 Pandemic	During the Covid-19 Pandemic
<p>Sang pelatih, bisa pula dipahami, mulai kehilangan kepercayaan karena performa Cou tak kunjung membaik. Pemain 27 tahun itu pun makin lama makin kehilangan konfidensi lantaran pressure psikologis yang menyebabkan sulit menuntaskan kemampuannya.</p> <p>Keluarga besar Bayern menyambutnya, dan percaya pemain dengan tembakan-tembakan placting dari luar kotak penalti itu bakal menuai sukses di Bundesliga. "Kalau sudah 100 persen fit, dia bakal menjadi pembeda di sini," ungkap Benjamin Pavard, bek Bayern asal Prancis.</p> <p style="text-align: center;">* * *</p>	<p>Favre ingin mempromosikan striker berbakat itu ke tim utama. Moukoko di level U-16 ketika usianya masih 12 tahun.</p> <p>Sang <i>youngster</i> memiliki koleksi 50 gol dan sembilan assist dalam 28 penampilan bersama Die Bonussen yang finis sebagai <i>runner-up</i> di Bundesliga U-17 musim lalu. Dia telah mengemas 31 gol dalam 18 laga sejauh ini plus mencetak empat gol pada tujuh partai di UEFA Youth League, kompetisi yang mencatat namanya sebagai pencetak gol termoda dalam sejarah.</p> <p><b>Rekor Termuda</b></p> <p>"Kami punya rencana dengannya, tapi saya tak bisa mengatakan secara pasti kapan dia akan bersama kami," ujar Favre.</p> <p>"Mungkin pada Maret, namun kami masih harus menunggu beberapa hal," jelas pelatih asal Swiss ini.</p>

**Fig.6.** *Couthino dan Habitat Bersenang-senang* or Cou and Habitat to Have Fun [16]

**Fig.7.** *Talenta Luar Biasa* or Talenta Extraordinary [17]

Based on the results of observations of all feature sport news before and during the Covid-19 pandemic, the data collection process is through projection, observation, investigation, communication and confirmation [8]. "Pemain 27 tahun itu pun makin lama makin kehilangan konfidensi lantaran pressure psikologi yang menyebabkan sulit menuntaskan kemampuannya" or The 27-year-old player is increasingly losing his conflict due to psychological pressure which makes it difficult to complete his abilities" in a feature news entitled "Cou dan Habitat Bersenang-senang" or "Cou and Habitat to Have Fun" states that journalists have made observations on Coutinho's performance, while the statement expressed by Benjamin Pavard in the last paragraph is a form of communication as well as confirmation from the source.

In a feature story entitled "Talenta Luar Biasa" or "Talenta Extraordinary" by Edi Indiarto, sentences that prove projections, observations and investigations are contained in the second paragraph. "Mungkin pada Maret, namun kami masih harus menunggu beberapa hal" or "Maybe in March, but we still have to wait a few things", was a line explaining the communication and confirmation. From the results of the interview with the deputy head of

the Suara Merdeka bureaucota, it was stated that the main characteristic of the news retrieval technique was “Collecting relevant data before being correlated with the facts contained in an event or obtained from sources, this is what makes the feature more weigh because of the time it takes to process it. not easy and takes a little longer”.

### 3.4 News purposes

Related to the purpose of news in the sports news feature, namely conveying information as well as entertaining (informative and recreational). For example, here are the documentation results of news destinations before and during the Covid-19 pandemic:

Before the Covid-19 Pandemic	During the Covid-19 Pandemic
<p>Ucapan Hansen, yang kemudian menjadi "tagline" populer dan diproduksi dalam berbagai properti pun laris manis di pasar mediatika. Kritik berbalik menghantam dirinya, karena visi Fergie terbukti berada di jalur tepat. Dengan anak-anak akademi itu The Red Devils bergerak menjadi kekuatan hebat Liga Primer Inggris. Mereka menemukan puncak kematangan pada 1999 dengan meraih trebel liga, Piala FA, dan Liga Champions.</p>	<p><b>YA</b>, George, golmu itu abadi, tapi tak ada pujaan untuk manusia yang bersifat abadi. Pujaan untukmu juga tak abadi. Lebih-lebih sekarang kau sedang banyak dicerca.</p>
<p><b>Fig.8.</b> You Can't Win Anything With Kids [13]</p>	<p><b>Fig.9.</b> <i>George Kau Bukan Pemain Lagi</i> or <i>George, you are not a Player Again</i> [14]</p>

Based on the results of observations of all feature sport news before and during the Covid-19 pandemic, the purpose of news is to convey information as well as be entertaining or informative and recreational [8]. The informative form is found in the informed data, while the recreation is in the language style setting that binds the delivery of the data or information. Amir Machmud conveyed information that MU broke the treble winner in 1999 with the words "*Dengan anak-anak akademi itu The Red Devil bergerak menjadi kekuatan hebat Liga Primer Inggris*" or "With these academy boys, The Red Devil moved to become a great force for the English Premier League" in a feature news entitled "You Can't Win Anything with Kids".

Meanwhile, Saroni Asikin in the news "*George Kau Bukan Pemain Lagi*" "George, you are not a Player Again" or compared Goerge's current condition with his heyday through his language style and diction. From the sentence above, it is evident that the delivery of information is also accompanied by a language style that aims to entertain the reader. According to the results of an interview with the deputy head of the Suara Merdeka bureaucracy, it was stated that the main characteristic of an informative and recreational news objective is, "All news aims to provide information that is in the feature besides providing information, it is also required to be entertaining (recreational). This is intended so that the feature does not only touch the cognitive area but also touches the affective area of the reader". In this news objective indicator, there are as many as 16 news items before the pandemic period and 37 news items during the pandemic period which have informative and recreational news purposes.

### 3.5 News series

Related to a series of news in the feature sport news a series of facts or information presented in an informal, informal manner. For example, here are the documentation results from a series of news before and during the Covid-19 pandemic:



Before the Covid-19 Pandemic	During the Covid-19 Pandemic
<p><b>SENTUHAN</b> Pep lantas mendunia. Setelah empat musim berada di Camp Nou, dia menerima tawaran membesut Bayern Munich pada 2013. Sang mantan <i>playmaker</i> ini tetap seorang perfeksionis. Namun, dia tak bisa lepas dari "virus" minta bintang.</p> <p>Ditarget meraih trofi Liga Champions, Pep gagal total bersama Die Roten. Dia hanya sanggup mempersembahkan titel domestik, yakni kampion Bundesliga dan Piala DFB.</p> <p>Dalam kegelisahannya kemudian datang tawaran menggiurkan dari Manchester City.</p> <p>Pada musim pertamanya, 2016-2017, Pep dibuat kaget lantaran gagal memberi trofi The Citizens. Manajemen tetap memercayainya. Misi utamanya adalah membawa trofi Liga Champions ke Stadion Etihad.</p>	<h2>Setan Merah Tak Lagi Merindukan Pogba</h2> <p><b>BRUNO</b> Fernandes tak kesulitan beradaptasi dengan kultur sepak bola Inggris yang identik dengan permainan intens. Bahkan, dia tak butuh waktu lama untuk nyetel dengan para pemain Manchester United setelah didatangkan dari Sporting Lisbon pada bursa transfer Januari 2020 lalu.</p> <p>Kehadirannya langsung berdampak signifikan untuk The Red Devils. Dengan kecerdasan dan kreativitasnya di lini tengah, pemain asal Portugal ini ikut membantu mengangkat performa rekan-rekan setimnya menjadi lebih baik.</p> <p>Dia tidak hanya memanjakan penyerang-penyerang United lewat umpan-umpan terukur, tapi juga mendorong gelandang lain seperti Juan Mata mengeluarkan kemampuan terbaik. Hasilnya, permainan Setan Merah lebih hidup dan sering meraih hasil maksimal.</p> <p>"Dia datang dan dia seperti menjadi udara segar untuk bernapas. Dia datang dan tampak seperti seseorang yang ingin bermain sepak bola serta menikmati sepak bola," kata legenda Manchester United Rio Ferdinand.</p>
<p><b>Fig.10.</b> <i>Viruses Ask the TOP Players</i> [18]</p>	<p><b>Fig.11.</b> <i>Setan Merah Tak Lagi Merindukan Pogba or Red Devils No Longer Miss Pogba</i> [19]</p>

Based on observations of all feature sport news before and during the Covid-19 pandemic, the news series are not presented formally [8]. Presentation of features is informal. It can be seen in the lead of a news story or the first paragraph, if in direct news or straight news the content of the news can be known only by reading the lead (first paragraph), because of the nature of straight news to report and presenting information in a concise, concise and, straightforward manner. However, in contrast to features, each section of a feature paragraph relates to each other using relaxed language and even uses figures of speech, the aim of which is to touch the emotions of the reader.

According to the results of an interview with the deputy head of the Suara Merdeka bureaucracy, the main characteristic of a series of news that is presented informally is that "In a feature, the form of a news series is not like straight news, which is only in plates, but is presented in a more varied manner. This is due to spreading points. The information points in each paragraph are intended to be able to describe the events that occur in an engaging narrative. In this news series indicator, there are 16 news stories before the pandemic period and 37 news stories during the pandemic period which have an informal news series.

### 3.6 Nature of news presentation

Regarding the nature of the presentation on the feature sport it is not captivated by actuality. For example, here are the documentation results of the nature of the presentation before and during the Covid-19 pandemic:

Before the Covid-19 Pandemic	During the Covid-19 Pandemic
<p><b>OLE</b> Gunnar Solkjaer menghela napas panjang. Lega. Muka imutnya terlihat semringah ketika meninggalkan area Stadion Partizan, Kamis (24/10) malam itu. Tim asuhannya, Manchester United (MU), menang versus Partizan Belgrad pada lanjutan penyisihan Grup L Liga Eropa. Hanya 1-0. Itu pun lewat sepakan penalti Anthony Martial pada menit ke-43 menyusul pelanggaran pemain Partizan terhadap Brandon Williams.</p>	<p>Gasperini memang bukan <i>allenatore</i> papan atas. Dia cuma sekali menukangi klub besar, yakni Inter Milan pada 2011. Di luar itu, pemilik rambut perak ini membesut Crotona (2003-2006), Genoa (2006-2010), Palermo (2012-2013), Genoa (2013-2016), dan Atlanta sejak 2016.</p>
<p><b>Fig.12.</b> <i>Mempercayai Para Taruna</i> or Trusting the Taruna [20]</p>	<p><b>Fig.13.</b> <i>Klub Dengan Bahan Bakar Semangat</i> or The Club Fueled by Passion [19]</p>

Based on the results of observations of all feature sport news before and during the Covid-19 pandemic, the nature of the presentation is factual, namely using data or facts that are based on the truth and the fact that is out of date.[8]. In the news entitled "Mempercayai Para Taruna" or "Trusting the Taruna" by Saroni Asikin, it is explained that the data in conveying the information is factual. This is contained in the sentence "Muka imutnya terlihat semringah Ketika meninggalkan area Stadion Partizan, Kamis (24/10) malam itu" or "His cute face looked happy when he left the Partizan Stadium area, Thursday (24/10) that night". Meanwhile, Edi Winarto proves the nature of factuality by writing the sentence "Diluar itu, pemilik rambut perak ini membesut Crotona (2003-2006), Genoa (2006-2010), Palermo (2012-2013), Genoa (2013-2016), dan Atlanta sejak 2016" or "Apart from that, the owner of silver hair has refined Crotona (2003-2006), Genoa (2006-2010), Palermo (2012-2013), Genoa (2013-2016), and Atlanta since 2016."

According to the results of an interview with the deputy head of the Suara Merdeka bureau, the main characteristic of the presentation that is not captivated by actuality is that "The data used in the features, especially the sports news feature, are factual data, for example the record data for MU's victory last season. written a feature with Liverpool's record winning record this season. This shows that the data contained in the feature does not have to be the latest (actual) data". In the indicator of the nature of the presentation of this news, there are as many as 16 news stories before the pandemic period and 37 news during the pandemic period which have the nature of presenting news that is objective, factual.

### 3.7 Journalist code

Related to the journalist code in the feature sport news, it can be seen at the end of the news paragraph, namely in the form of a full name. Based on the results of observations of all feature sport news before and during the Covid-19 pandemic, the journalist code contained in the sports news feature news is the full name. In the Sunday edition of the daily Suara Merdeka, 18 August 2019, three sports news features were seen, each of which was written by Alwin Basri, Budi Winarto, and Arif M Iqbal. Meanwhile, during the pandemic, the Sunday edition, March 29, 2020, there were also features written by Krisnaji Satriawan and Darjo Soyat, respectively. There is no difference either before or during the Covid-19 pandemic in writing journalistic code in this feature story.



According to the results of an interview with the deputy head of the Suara Merdeka bureau, the main characteristic of the journalist code is the full name, which is "If in straight news the journalist code is written only using the initials of the name and number, it is inversely proportional to the feature that uses the full name. and to be a form of appreciation

for the journalist who wrote the feature". In this journalist code indicator, there are 16 news items before the pandemic period and 37 news items during the pandemic period which have a journalist code in the form of the journalist's full name. For example, here are the documentation results from journalist codes before and during the covid-19 pandemic:

Before the Covid-19 Pandemic	During the Covid-19 Pandemic
<p>rapkan tuntas pada Desember mendatang. (Alwin Basri, pengamat F1-47)</p> <p>gemar melakukan tukar pukulan dalam <i>standing fight</i>. (Budi Winarto-47)</p> <p>masing-masing pemain selama berada di akademi. (Arif MIqbal-29)</p>	<p>F1 telah menggelar balapan virtual untuk mengisi kekosongan tujuh balapan awal musim 2020. Dilansir dari Crash, semua pembalap diundang untuk mengikuti balapan virtual tersebut. Seri pertama akan dimulai pada seri Bahrain, Minggu (22/3) lalu. (Krisnaji Satriawan-67)</p> <p>Kita nggak ngomongin juara ya, karena juara juga kadang butuh faktor luck," sambung Nova. (Darjo Soyat-67)</p>
<b>Fig.14.</b> Suara Merdeka, Sunday edition, 18 August 2019 [21]	<b>Fig.15.</b> Suara Merdeka, Sunday edition, 29 March 2020 [22]

### 3.8 News copyright

Related to news copyright on the feature sport news can be seen in the journalist's code. For example, here are the documentation results of copyrighted news before and during the covid-19 pandemic before and during the covid-19 pandemic:

Before the Covid-19 Pandemic	During the Covid-19 Pandemic
	
<b>Fig.16.</b> You Can't Win Anything With Kids [13]	<b>Fig.17.</b> George Kau Bukan Pemain Lagi or George You're Not a Player Again [14]

Based on the results of observations of all feature sport news before and during the Covid-19 pandemic, the copyright of the news contained in the sports news feature is in the form of a journalist's full name. There is no difference to copyright either before or during the Covid-19 pandemic. According to the results of an interview with the deputy head of the Suara Merdeka bureaucracy, it was stated that the main characteristic of news copyright is the full name "a feature that uses the full name, this is due to more accountability and to be a form of appreciation for the journalist who wrote the feature". In this news copyright indicator, there are 16 news stories before the pandemic period and 37 news stories during the pandemic period which have copyright news.

### 3.9 News time

Related to the time of the news on the feature sport news can be seen in the first paragraph or intro. For example, here are the documentation results from the news time before and during the pandemic Covid-19:

Before the Covid-19 Pandemic	During the Covid-19 Pandemic
<p><b>MEMBICARAKAN</b> Liverpool saat ini tidak klop kalau tak mengangkat peran manajernya, Juergen Klopp. Pelatih asal Jerman yang menukangi The Reds sejak 8 Oktober 2015 itu benar-benar menjadi kesayangan Liverpooldian. Kinerjanya oke, hasilnya pun terlihat nyata.</p>	<p><b>Kegundahan Vettel, Keberanian Ferrari</b></p> <p><b>KEGUNDAHAN</b> Sebastian Vettel akhirnya berbuah kepastian. Pembalap Formula 1 (F1) asal Jerman itu memutuskan meninggalkan Tim Scuderia Ferrari setelah musim 2020 selesai. Keputusan juara dunia empat kali itu sekaligus menegaskan ambisinya untuk juara masih tinggi.</p> <p>Saya memahami, pada usia 32 tahun, peluang Vettel untuk menambah gelamya masih terbuka. Agar kans itu membesar dia butuh pengakuan sebagai pembalap utama di timnya. Sayangnya, Ferrari mulai meragukan kemampuan mantan <i>driver</i> Red Bull ini.</p>
<p><b>Fig.18.</b> <i>Mengedepankan Keseimbangan or Promoting Balance</i> [23]</p>	<p><b>Fig.19.</b> <i>Kegundahan Vettel, Keberanian Ferarri or Vettel's Worries, Ferrari Courage</i> [22]</p>

Based on the results of observations of all feature sport news before and during the Covid-19 pandemic, the time of the news contained in the sports news feature news is in the form of a lighter, not the date of the event. In a feature story entitled "Mengedepankan Keseimbangan" or "Promoting Balance" by Edi Indarto, uses the word "Membicarakan" or "Talking about" at the beginning of the sentence in the intro. Meanwhile, Darjo Soyat uses the word "Kegundahan" or "Anxiety" to initiate the intro. In contrast to straight news, the beginning of the sentence uses the date time or city name. According to the results of the interview with the deputy head of Suara Merdeka, it was stated that the main characteristic of the news time is "If in a feature, the time in the news is indicated by the date or day while in the feature it is shown by setting either the name of the person or the event in the intro". In this news time indicator, there are as many as 16 news items before the pandemic period and 37 news items during the pandemic period which have news time using the description of the setting.

### 3.10 News structure

Related to the structure of the news in the feature sport news can be seen in the paragraphs that are important to each other. Based on observations of all feature sport news before and during the Covid-19 pandemic, the structure of the news contained in sports news feature news is in the form of messages at the beginning of a paragraph and is not bound by an inverted pyramid. There is no difference in the structure of the news both before and during the Covid-19 pandemic. According to the results of an interview with the deputy head of the Suara Merdeka bureaucota, the main characteristic of the inverted pyramid pattern structure is "Because the features are written not using 5W + 1H (inverted pyramid pattern), each paragraph section in the feature is equally important, this is why reading features cannot be used. in pieces". There are 16 news stories before the pandemic era and 37 news stories during the pandemic period in this news structure indicator that have a news structure outside the inverted pyramid. For example, here are the documentation results of copyright news before and during the covid-19 pandemic:

Before the Covid-19 Pandemic	During the Covid-19 Pandemic
<p><b>MEMBICARAKAN</b> Liverpool saat ini tidak klop kalau tak mengangkat peran manajernya, Juergen Klopp. Pelatih asal Jerman yang menukangi The Reds sejak 8 Oktober 2015 itu benar-benar menjadi kesayangan Liverpoolian. Kinerjanya oke, hasilnya pun terlihat nyata.</p> <p>Setelah musim lalu memenangi trofi Liga Champions, pada awal musim 2019-2020 Klopp mempersembahkan gelar Piala Super Eropa. Di Liga Primer Inggris, Si Merah juga tampil gagah. Dari delapan laga, semua berhasil dimenangkan Jordan Henderson dan kolega.</p> <p>Jalan menuju titel liga pertama sejak 1990 pun terus dirancang Klopp. Juara Premier League bukan hanya jadi impian, melainkan juga standar bagi Liverpool. Semua piala terasa kurang bermakna tanpa kembali membawa pulang trofi Premiership ke Anfield.</p>	<p>Meski baru berusia 32 tahun tetapi Sharapova kesulitan untuk bermain maksimal. Salah satu penyebab penampilannya menurun adalah cedera bahu. Dalam tiga hajatan Grand Slam terakhir, mantan petenis putri nomor satu dunia itu senantiasa tersingkir di babak pertama. Bahkan, kini peringkatnya terus menurun hingga 373 dunia. Posisi ini merupakan yang terendah baginya sejak Agustus 2002.</p> <p>"Saya masih baru dalam hal ini, jadi tolong maafkan diriku. Tenis, saya mengucapkan selamat tinggal," ungkap Sharapova dalam sebuah wawancara kepada majalah <i>Vogue and Vanity Fair</i>.</p> <p>"Mengenang kembali ke masa lalu, saya menyadari tenis sudah menjadi gunung untuk diriku. Saya berjalan menyusuri lembah dan berliku-liku, tapi pemandangannya dari puncak luar biasa. Tapi usai 28 tahun dan lima titel Grand Slam, saya siap untuk mendaki gunung lain, untuk bersaing di medan yang berbeda," imbuhnya.</p>
<p><b>Fig.20. Mengedepankan Keseimbangan or Promoting Balance [23]</b></p>	<p><b>Fig.21. Siap Bersaing di Medan Berbeda or Ready to Compete in Different field [14]</b></p>

## 4 Conclusion

The results of this research indicate that all feature sports news in the daily newspaper Suara Merdeka, both before the Covid-19 pandemic and during Covid-19 followed the ten feature characteristic indicators, which are news writing techniques, news content, news retrieval techniques, news objectives, news series, the nature of news presentation, journalist code, news copyright, time/setting and news structure. However, the differences lie in the number of the news. There are more feature sports news produces during the pandemic which likely due to the cancellation of some sports tournament. This phenomenon forced the journalist to be more creative in making content to fill the sports page, one of which through writing more feature news. This study depends only on the suaramerdeka.com site for 91 days before and during covid. Before covid 19 there are 5 days file that could not be accessed and during covid 19 there are 3 files could not be accessed. Further research needs to have access to all news based on the time duration to avoid bias.

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# The Formulation of Vertical Jump Height Measurement As The Basis for Developing Leg Power Test Instrument

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**Abstract.** In some sports movement, leg strength plays an important role in supporting sports activities. Vertical jump height is often used as an indicator of leg strength. The objective was to create an effective formula for measuring vertical jump height as a basis for developing a leg power test instrument. Research and development method with a model from Borg and Gall in carrying out this research was used. Testing the validity of this research is by comparing the results of measuring jump height using the vertical jump test, DF jump test and prototype, as well as a re-test for reliability testing. The analyze was used ANOVA. The results showed that the coefficient of validity for a jump with an arm swing was 0.69 and for a jump without an arm swing was 0.77, and reliability was 0.97. The research concluded that the formula developed is effective enough to measure jump height as a basis for developing leg power test instruments. The reviewed needs to provide more effective results.

**Keywords:** Formula, jump height, leg power.

## 1 Introduction

Until now, Indonesia hasn't yet become a country that can produce many international class athletes that can be renowned around the world. This encourages the importance of developing science and technology in sports. Several sports that often achieve maximum achievements in singles /multi events at the international level have also not been able to be consistently maintained. Efforts to produce athletes who are able to obtain the best performance must not only go through a good coaching process but also must be supported by the application of science and technology as well. At this time the role of sports science and technology is very important in an effort to improve sports achievement and advance the sports of a nation. Finnsgard stated that the current application of sports science and technology is an inseparable part of efforts to foster elite sports and help optimize the potential of athletes [1].

The application of science and technology in sports achievements can be used by coaches and athletes to support the training process in order to get maximum training results. So far, manufacturers of sports technology equipment have originated and been developed by other countries which have elite sports, such as America, France, Germany, China and Japan. Indonesia as a developing country has not applied much science and technology in the process of fostering national sports. This is due to the limited national budget to meet the needs of science and technology as well as limited human resources [2].

One of the benefits of sports technology products is to make it easier for coaches to carry out sports evaluation programs, especially measuring the capacity of athletes and one of them is leg power. Leg power is needed by athletes in several sports, including athletics, swimming, basketball, soccer, volleyball, badminton, tennis, sepak takraw, baseball, martial arts, and others. So far, the measurement of leg power has been carried out by connecting the results of the jump height test, which is carried out through the vertical jump test [3]. This test can be done quite easily and cheaply, but it has a weakness in the meter board that is installed in a vertical plane such as walls and poles that coincide with the board, so that the testee cannot perform the movement optimally since they are afraid if the legs or other body parts hit the wall. Another weakness is that it requires careful observation by the tester to see the results for the jump height [4].

Another test use that uses a more modern measuring instrument is the Jump DF which was developed using a touch sensor on a plate connected to a recording machine [5]. After the testee stands and jumps on the plate, the display box will show the results of the jump height achieved. However, to have this tool requires a large amount of funds. The price for 1 set of Jump DF TKK-5414 series produced by Takei company Japan is IDR 125,000,000.00. Based on the description related to the use of instruments for measuring jump height, the authors conducted research aimed at developing a formula for measuring jump height with a digital system. The problem in this research is how is the formula to measure the jump height with a valid digital system? The output in this study produces a formula for measuring the jump height with a valid digital system .

## 2 Methods

Researchers used research and development methods with a research and development model from Walter R. Borg, Meredith Damien Gall, and Joyce P. Gall which consisted of 10 stages, namely [6]; 1) research and information collecting, 2) planning, 3) develop preliminary form of product, 4) preliminary field testing, 5) main product revision, 6) main field testing, 7) operational product revision, 8) operational field testing, 9) final product revision, and 10) dissemination and implementation [7], which can be described as a research and development design as seen in figure 1.

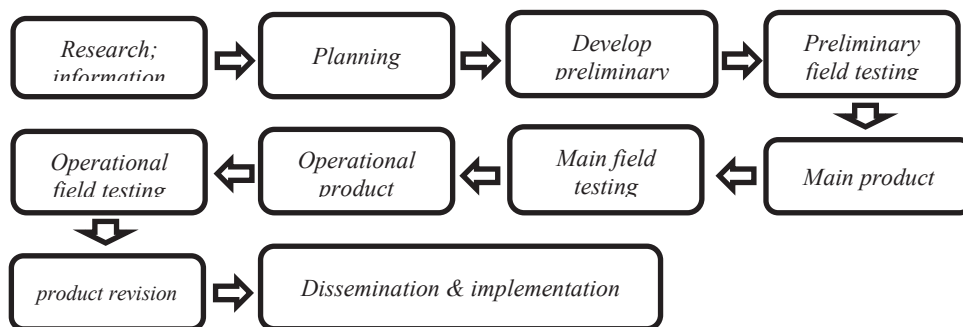


Fig. 1. The design of jump measurement formula development with digital system



Small-scale and large-scale testing was conducted at the Sports Test and Measurement Laboratory at the Faculty of Sports Science, Semarang State University. Meanwhile, the laboratory which is the center of the Robotics Team of UNNES is an expert partner in the field of electronics for the development of formulas for measuring jump height based on digital systems. Sources of data were obtained from the results of field tests with the subjects of volleyball, basketball, and athletic athletes who were all 13 students of the Faculty of Sport Science, Semarang State University. Formula validity testing was done by comparing the results of measuring the jump height using the vertical jump test with the vertical board and jump DF. Data analysis was performed by using ANOVA statistic [8].

### 3 Results

The results of the developed formula consist of 5 stages which can be explained as follows;  
Stage 1 : Weighing the body, in order to obtain  $m_{jumper}$ ,

Stage 2 : the jump made will cause pressure on the plate so that the plate gets pressure which can be formulated as follows;  $F_{pressure} = m \cdot g$ , in which  $F_{pressure}$  = downward force,  $m$  = maximum load of downward pressure, and  $g$  = gravity

Stage 3 : the jumper is in the air, so that the value of force is obtained  $m$ . When the jumper has left the surface of the plate automatically there is no pressure on the plate, so that the change in force is obtained from the maximum pressing time until takeoff and can be seen in the formula:  $F = m \cdot a$ , in which  $F$  = upward force (to get back to normal),

$m = m_{jumper}$  (the weight of the jumper we get in stage 1), and  $a$  = acceleration.  $F$  is the upward return force from the plate to return to normal conditions, where this force is pointing upwards so that there is an acceleration effect ( $a$ ). Meanwhile, the load received by the plate during this stage is the weight of the jumper ( $m_{peloncat}$ ). From the formula above, because this force runs from the maximum pressing time until the plate has no more pressure, it can be formulated as follows:  $F = m \cdot a$ , because there is a time lag  $t$  so :  $F \cdot t = m \cdot a \cdot t$  or : [9]

$$\int_{t_1}^{t_2} F_{jumper}(t) dt = m \cdot a \cdot t, \text{ it can be considered that } v = a \cdot t \text{ so : } \int_{t_1}^{t_2} F_{jumper}(t) dt = m \cdot v$$

While taking off :

$$F_{pressure} = \int_{t_1}^{t_2} F_{jumper}(t) dt$$

$$m \cdot g = m_{jumper} \cdot a \cdot t$$

$$a = \frac{m \cdot g}{m_{jumper} \cdot t}$$

Stage 4 : Calculating the predicted altitude. After  $v$  is known, then kinetic and potential energy analysis can be used with the following formula,

$$KE_{to} + PE_{to} = KE_p + PE_p$$

$$\frac{1}{2} m \cdot V_{to}^2 + m \cdot g \cdot h_{to} = \frac{1}{2} m \cdot V_p^2 + m \cdot g \cdot h_p$$

Because in this condition all use  $m_{peloncat}$ , so  $m$  on the right and left can be crossed out, so that;

$$\frac{1}{2} V_{to}^2 + g \cdot h_{to} = \frac{1}{2} V_p^2 + g \cdot h_p,$$

$$\frac{1}{2} V_{to}^2 + g \cdot h_{to} = g \cdot h_p,$$

$$g \cdot h_p - g \cdot h_{to} = \frac{1}{2} V_{to}^2$$

$$h_p - h_{t_0} = \frac{v_{t_0}^2}{2.g}$$

Since  $h_{t_0}$  considered to be zero (0), because the height is calculated from the height of the jump toward the plate, then the initial height is plate, so that it can be written:

$$h = \frac{v_{t_0}^2}{2.g}, \text{ since } v_{t_0} = v \text{ obtained from the previous equation, it can be written: } h = \frac{v^2}{2.g}$$

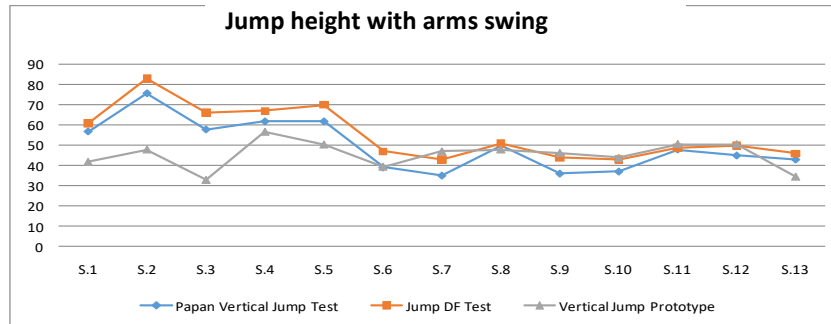
Stage 5 : Jumper landing. When the jumper lands, there will be a significant increase in pressure on the plate, which indicates that the jumper has made a landing. This change is a sign to show the results of the estimated jump height that can be done based on the formula developed above.

From the results of the development of the formula for measuring the jump height above, then a test is carried out to measure the ability of the jump height [10]. The results of measurements using 3 types of instruments, namely the vertical jump test board, jump DF test and vertical jump prototype both with arm swing and without arm swing as in table 1. Measurement result data with 2 other instruments are used to test the validity of the developed formula.

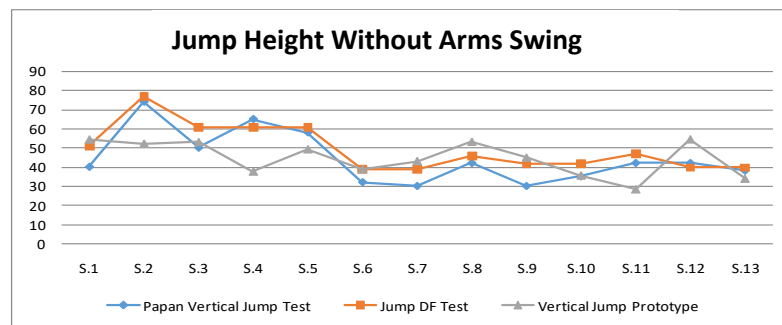
**Table 1.** The results of the jump height measurement with 3 test instruments

Nb.	Board Vertical Jump Test (cm)		Jump DF Test (cm)		Vertical Jump Prototype (cm)	
	With arms swing	Without arms swing	With arms swing	Without arms swing	With arms swing	Without arms swing
S.1	57	40	61	51	41,99	54,21
S.2	76	74	83	77	48,13	52,09
S.3	58	50	66	61	33,06	52,84
S.4	62	65	67	61	56,89	37,75
S.5	62	58	70	61	50,57	49,16
S.6	39	32	47	39	39,64	38,91
S.7	35	30	43	39	47,16	43,10
S.8	50	42	51	46	48,11	53,03
S.9	36	30	44	42	46,36	44,90
S.10	37	35	43	42	43,95	35,71
S.11	48	42	49	47	50,78	28,59
S.12	45	42	50	40	50,70	54,26
S.13	43	38	46	40	34,71	34,06

Based on the data from the measurement results of the jump height with the 3 instruments in table 1 above, a comparison of the measurement results is obtained which can be seen in Figure 2 (a) and (b).



(a)



(b)

**Fig. 2.** Comparison of data from the measurement of jump height of 3 types test instruments (a) with arms swing and (b) without arms swing

Furthermore, the data from the measurement of jump height from 3 types of test instruments were analyzed with ANOVA statistics which aims to determine the correlation and used as a parameter to determine the validity coefficient of the formula developed to measure the jump height. As seen in Table 2 below, it is known that the validity coefficient is 0.69 for the arms swing test and 0.77 for without arm swing test [11].

**Table 2.** The results of the validity test using ANOVA

Test Variable	Coefficient of Validity	
	With Arms Swing	Without Arms Swing
Vertical Jump Test (VJT) - Jump DF Test (JDF) - Vertical Jump Prototype (VJP)	0.69	0.77

## 4 Discussion

Paying attention to the test results of the formula for measuring the jump height, the validity coefficient was obtained which comprised 0.69 and 0.77, so it can be concluded that the formula developed for the test involving the motion of arms swing was still in a low validity level or was questionable (0.60-0.69), while the test without arms swing was acceptable or acceptable (0.70-0.79). Therefore, in order to make the formula applicable to an instrument for measuring jump height or leg power, it is necessary to make further improvements and adjustments so that a higher coefficient of validity can be obtained (0.80-0.84) with the very good validity category.

## 5 Conclusion

Based on the result and discussion, it can be concluded that the formula designed to measure the jump height in this study is considered to be questionable since the coefficient validity of the test has not gained the standard of validity test. Therefore, a further study needs to be conducted to make it more valid.

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# Motivation Level and Mobile Technology Role Toward Yosim Pancar Dance Training in Pandemic Covid-19 Era

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**Abstract.** This study to get the impact of mobile technology and motivation level toward 96 students' Yosim Pancar (YP) dance abilities. It was experimental with a factorial by level 2x2. Data analysis used were two-way anova and Tukey test ( $\alpha < 0.05$ ). Data collection used observation, interviews and tests. The results of this study indicate the physical fitness with mobile phone application treatment ( $r = 15.97$ ;  $SD = 5.15$ ) and video ( $r = 14.60$ ;  $SD = 4.18$ ). The physical fitness with mobile phone application on students who have high motivation has ( $r = 17.54$ ;  $SD = 5.03$ ) and low motivation ( $r = 14.7$ ;  $SD = 4.06$ ). While the physical fitness with video on students who have high motivation has ( $r = 14.70$ ;  $SD = 4.06$ ) and low motivation ( $r = 14.51$ ;  $SD = 4.29$ ). There is an interaction between the two models of mobile technology with a level of motivation.

**Keywords:** Yosim Pancar dance, physical fitness, motivation, mobile technology.

## 1 Introduction

*Yosim Pancar* dance is a form of movement that is used as a gymnastic motion. It is an old dance move that is similar to the *poloneis* of the Western dance originating from the Sarmi district of Papua. The movement is increasingly developing and spreading through the Western and Eastern regions of Papua. The name of the dance movement is taken from the name of the type of jet-engined fighter aircraft. This aircraft is called *Straal Jager* which is the same as the Dutch Pancar Gas when landing the wheels or flying off the runway emitted a gas in the form of smoke. It did aerobatic movements at the Frans Kaisepo Airport in Biaks around the 1960s when a conflict occurred between the Dutch Kingdom and the Indonesian government. These movements were imitated by the Papuan artists, cultural observers of origin, so that the name of the motion called *Pancar* emerged [1]. This dance movement is not the same as other dance movements. It has a beautiful expression of the human soul which is displayed in the form of body movements that are smoothed through aesthetics.

Therefore, the *Yosim Pancar* dance movement is used as a form of gymnastics because every movement provides aesthetic value of gymnastics and a level of physical fitness in the form of physical sports activities. It is one of the learning materials in physical education lessons and dance sports have become part of the physical education curriculum in several countries. In Indonesia, specifically in Papua, the *Yosim Pancar* dance is a material taught in physical education learning for junior high school students. Dance has its own benefits that allow students or students to develop communication skills, provide experiences in the body,

and experience in physical activities. In addition, physical fitness exercise and *Yosim Pancar* dance are also major contributors to the development of fundamental basic movements that are important for physical activity in other sports. Thus, the concept of *Yosim Pancar* learning must be right on target and the needs of junior high school students, such as the *Yosim Pancar* dance training facility that can provide a level of success.

Moreover, training activities have only been carried out conventionally and have not taken advantage of technological advances. In fact, teachers and students currently have technology facilities that can be used for training or education process [2]. This means that the success of *Yosim Pancar* training is also influenced by the students themselves, because students' internal factors are also one of the indicators in supporting *Yosim Pancar* dance training activities. Each student has a different background and interest in carrying out physical activities. Especially during the Covid-19 pandemic, *Yosim Pancar's* training activities required a level of motivation and learning facilities that made use of technology.

Motivation is a way that must be owned by students to achieve goals [3] [4]. The trainer can influence the level of student motivation in doing physical exercise [5] [6]. Students who have good self-control will show high motivation [7]. This condition is related to self-fulfillment related to psychology and physical activity [8] [9]. Basically, motivation is a psychological condition that encourages someone to do something. In learning activities, motivation can be said to be the overall driving force within students that raises, ensures continuity and provides direction for learning activities, so that it is hoped that goals can be achieved [10]. Also, the teacher's role is important to support the students' motivation [11]. Tangkudung stated that a good physical condition influences the psychiatric aspects to increase motivation work, spirit, and confidence [12].

*Yosim Pancar* learning is as physical activity learning refers to holistic change of individual quality [13] [14]. Therefore, to achieve the objectives of the *Yosim Pancar* training activity requires the appropriate multimedia. In connection with current technological advances, various media such as videos can be used for *Yosim Pancar's* physical training process. Moreover, technology has also been widely used in the field of sports [15]. In schools, internet networks have also been used for sports activities [16]. Even sports competition activities have used technology, [17] such as virtual technology device [18].

From previous research, it is known that the physical exercise process requires motivation as a form of desire for achievement for individuals and also sports facilities that have used a lot of technology. Therefore, this study focuses on the process of testing mobile technology and the level of motivation of students to physically practice the *Yosim Pancar* dance in the Covid-19 pandemic era. This was because *Yosim Pancar's* training had to be done at home. It requires the right media so that students feel comfortable. The assumption that if students do not have motivation, the *Yosim* transmitting training activities cannot be carried out optimally. Therefore, this study aims to obtain information on the influence of mobile technology with motivation on *Yosim Pancar* training activities for junior high school students in Yapem Timur Serui Papua.

## 2 Method

This research was conducted on students of Junior High School Dawai, at Yapem Timur Serui District, Papua. The research approach was experimental with a factorial treatment by level 2 x 2. It can be seen from the below table.

**Table 1.** Matrix of research

Motivation (B)	Mobile Technology	
	Mobile Phone Application (A1)	Video (A2)
High (B1)	A1B1	A2B1
Low (B2)	A1B2	A2B2

The population of study was 628 students Junior High School Dawai. The research sample was 96 students in 2016/2017 academic years. Technique of taking sample was simple random sampling. The samples used were divided into two groups, namely those with high and low motivation. The determination of the level of motivation is measured according to the theoretical concept of Verducci, namely 27% of students who have the highest score enter the high motivation group and 27% of students who have the lowest score enter the low motivation group. So, the high and low motivation groups each consisted of 48 students. The experimental sample grouping is as follows.

**Table 2.** Group of experiment

Motivation (B)	Mobile Technology	
	Mobile Phone Application (A1)	Video (A2)
High (B1)	24	24
Low (B2)	24	24

The treatment was given according to the schedule of Yosim Pancar training activities that had been determined by the school. Thus, this study has 2 validation treatments, namely controlling internal and external validation. Data collection techniques using observation, interviews and tests. The research instrument was a physical fitness test through the Yosim Pancar dance.

The data analysis technique was a two-way analysis of variance (ANOVA) and then continued with the Tukey test at a significance level of  $\alpha = 0.05$ . The homogeneity test used the Lilifors test. While the homogeneity test uses the Barlet or Levene Statistic test. research instrument was a physical fitness test through the Yosim Pancar dance.

### 3 Discussion

The result of data analysis show that motivation and mobile technology has influenced on training activity of Yosim Pancar for Junior High School students. The following is the statistic descriptive;

**Table 3.** Statistic descriptive

Motivation	Mobile Phone Application (A1)	Video (A2)
High (B1)	$\sum X = 421$ $\sum X^2 = 12989$ $\bar{X} = 17,54$ $SD = 5,03$ $N = 24$	$\sum X = 353$ $\sum X^2 = 9115$ $\bar{X} = 14,7$ $SD = 4,06$ $N = 24$

Low (B2)	$\sum X = 346$ $\sum X^2 = 8848$ $\bar{X} = 14.41$ SD = 3.90 N = 24	$\sum X = 348$ $\sum X^2 = 8890$ $\bar{X} = 14.51$ SD = 4.29 N = 24
Total	$\sum X = 767$ $\sum X^2 = 21753$ $\bar{X} = 15.97$ SD = 5.15 N = 48	$\sum X = 701$ $\sum X^2 = 18005$ $\bar{X} = 14.60$ SD = 4.18 N = 48

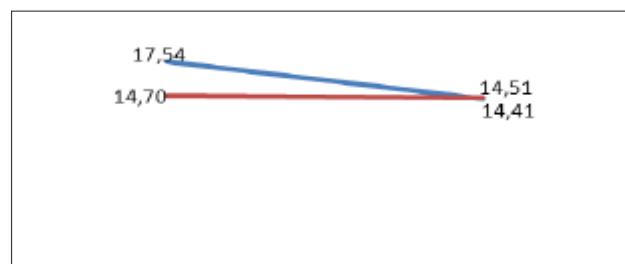
By testing the normality and homogeneity of the research data, the requirements for analysis of variance have been fulfilled. The summary can be seen in the table below.

**Table 4.** Analysis of variance

Variance Source	Dk	Jk	KT	Fo	Ft
Between rows (b)	1	114,286	114,286	5,968*	4,01
Between column (k)	1	77,786	77,786	4,062*	4,01
Interaction (b <sub>x</sub> k)	1	87,500	87,500	4,569*	4,01
Within	52	995,857	19,151		4,01
Total corection	55	1275,429			

Based on the summary of the results of the ANAVA calculation analysis at the level significant  $\alpha = 0.05$  obtained  $F_o = 5.968$  and  $F_t = 4.01$  thus  $F_o > F_t$  so  $H_o$  was rejected. So, it can be concluded that there are differences overall significant influence. The results of this study indicate the overall mean results of the physical fitness of the Yospim Pancar dance on the mobile phone application treatment ( $r = 15.97$ ;  $SD = 5.15$ ) and video ( $r = 14.60$ ;  $SD = 4.18$ ). against the results physical fitness. In other words that the results of physical fitness use YP dance training ( $X = 31.95$  and  $SD = 5.15$ ) was better than the fitness results jasamani using the SKJ exercise ( $X = 14.60$  and  $SD = 4.18$ ).

While Interaction count  $F_o = 4.569$  and  $F_t = 4.01$ , it appears that  $F_o > F_t$ , so that  $H_0$  is rejected and  $H_1$  is accepted. Therefore, it is concluded that there is an interaction between motivation and mobile technology that can be seen below;



**Fig. 1.** Interaction between motivation and mobile technology

The physical fitness value of the Yospim Pancar dance with the use of the mobile phone application on students who have high motivation has a mean ( $r = 17.54$ ;  $SD = 5.03$ ) and low motivation ( $r = 14.7$ ;  $SD = 4.06$ ). While the physical fitness of the Yospim Pancar dance with



the use of video on students who have high motivation has a mean ( $r = 14.70$ ;  $SD = 4.06$ ) and low motivation ( $r = 14.51$ ;  $SD = 4.29$ ).

These findings indicate that motivation needs to be considered in the development of physical fitness training in the form of the Yosim Pancar dance in the covid-19 pandemic conditions. This motivation is a support the physical fitness of students.[19] In other words, to improve physical fitness, it is necessary to involve a motivational factor. In addition, the use of technology makes it easy for students to carry out exercises that are carried out offline or for students to do their own training activities through video and applications from mobile phones. Many virtual simulation is as the tools of sport training nowadays [20]. For students, the digital technology help them to increase the learning and teaching [21].

For students who have high motivation, the data obtained shows that the mobile phone application has a better effect than video on the physical fitness results of the Yosim Pancar dance. Thus, it can be recommended that the use of a mobile phone application be more suitable for students who have high motivation in increasing the mastery of the Yosim Pancar dance. Technology is evident in sports in a variety of contexts including play experience, consumption and spectators. Because of the inherent need for technology in sport, it becomes even more important to understand how to develop a comprehensive strategy for innovation management [22].

#### 4 Conclusion

Based on the results of data analysis, several conclusions can be explained, namely

1. Overall, there is a difference between the use of video and mobile phone applications with the level of student motivation in physical fitness training for the Yosim Pancar dance.
2. There is an interaction between mobile technology and motivation in physical fitness training for the Yosim Pancar dance
3. For students who have high motivation, the use of mobile phone applications has a better effect than the use of videos in physical fitness training for the Yosim Pancar dance.
4. For students who have low motivation, the use of video is better than the mobile phone application in physical fitness training for the Yosim Pancar dance.

It can be concluded that besides there is an interaction between the two models of mobile devices with a level of motivation. In the era of the Covid-19 pandemic, it provides challenges for students who have low motivation because students find it difficult to learn to use technological devices. Unlike students who are highly motivated, students do not face learning difficulties. This research has an impact on teacher classroom management in providing learning in online classes in the Covid-19 pandemic era.

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# Biomotor Profile of Basketball Athletes Aged Under 16 Years

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**Abstract.** This study aimed to determine the biomotor profile of basketball athletes aged under 16 years in the Cirebon Region in 2020. The samples consisted of 20 basketball athletes aged under 16 years selected using the purposive sampling technique. The biomotor profile was analyzed using the T score. The T score showed that the biomotor profile of athletes in the very poor category was 7.69%, in the poor category was 15.38%, in the moderate category was 38.46%, in the good category was 23.08%, and in the very good category was 15.38%. Furthermore, the result of the biomotor profile based on the average value was in the moderat category. Both the coaches and athletes need to increase the training hours, especially in terms of practicing basketball techniques related to biomotor improvement.

**Keywords:** Athlete aged under 16 years, basketball, biomotor profile.

## 1 Introduction

Basketball is a team sport that consists of five players in each team. Many aspects need to be emphasized in basketball, such as (1) physical aspects (the more dominant physical component is stamina); (2) technical aspects (technical fundamentals in basketball are shooting, passing, and dribbling); (3) strategy aspects (the basic strategies used in basketball are the pattern of defense (defense), the pattern of attack (offense), the transition from defense to offense (fastbreak), and the transition from offense to defense); (4) mental aspects (it is important to train basic mental skills, appearance 80% of an athlete's peak is influenced by mental aspects and only 20% by other aspects, so this mental aspect must be managed deliberately, systematically and with a plan [1]. Basketball is also a game that uses speed (feet and hands) and alacrity (overall body movements) at the right time [2].

Basketball competition requires not only technical aspects but also physical, strategic, and mental aspects. Good fundamental technical skills such as dribbling, passing, and shooting must be possessed by every athlete so that in implementing offense and defense strategies can be done and mastered well [3]. In a match for 4x10 minutes, athletes must have good physical and mental conditions to compete well [4]. Several techniques must be excelled in basketball games, apart from dribbling, passing, and shooting techniques. There are moving without the ball techniques such as cutting (V-cut, L-cut, back cut, rear cut, front cut, backdoor cut, slashing); screen settings such as screen (pick & roll, give & go, pick & pop out, down the screen, back screen, cross-screen, curl, double screen, multiple screens, screen to screen); kick out; drive penetration and motion/pattern [5]. Besides, in the basketball game, there are five positions adjusted to the athlete's ability and characteristics, including position 1 (Point Guard / Playmaker), position 2

(Small Forward), position 3 (Shooting Guard), position 4 (Power Forward), and position 5 (Post / Center).

The characteristics of the athletes and positions during matches differ, especially in the ability to master the physical, technical, strategic, and mental abilities. Training the physical, technical, strategic, and mental abilities of the athletes takes a long time. This process starts from anatomical adaptation to enhancing the development in every basketball aspect, both during training and competitions. Bompaa stated that the basic abilities of athlete biomotor consist of strength, endurance, speed, coordination, and flexibility. In supporting achievement, the ability of biomotor components is very important for every athlete such as: endurance, muscle strength, speed, muscle explosive power, agility, flexibility, and balance [6]. Therefore, every athlete must have a good biomotor component. The difference in motor skills of each athlete must also be known by a coach, as explained by Arias-Estero *et al.*, who stated that "The coaches' main focus should be on providing an appropriate learning environment in which participants can make decisions".

Physical condition is the foundation of sports achievement. The technique, tactics, and mentality of athletes will be developed properly if they have good physical qualities. A good physical condition can help athletes to achieve maximum performance. Therefore when doing technical, strategic, and mental exercises, the athlete will not be disturbed by physical problems. Physical exercise is important for all age groups in basketball. However, in each age group, athletes have different physical conditions. The physical condition must be enhanced properly and correctly according to the level of the age group. In physical condition, there are energy fitness and muscle fitness. Energy Fitness is a component of energy sources that causes motion, while muscle fitness is the whole of the biomotor components, which include strength, endurance, speed, power, flexibility, balance, and agility [7]. Athletes with good biomotor will show good performance in the competition.

Biomotor is the ability of human movement influenced by the condition of the organ systems in the body. These organ systems include the neuromuscular system, respiration, digestion, blood circulation, energy, bones, muscles, ligaments, and joints. Therefore, if a basketball team wants to win a match, each athlete must have a good biomotor. The basic components of biomotor include several physical conditions such as endurance, strength, speed, coordination, and flexibility [8]. The development of biomotor components is a combination of physical conditions, such as stamina is a combination of endurance and speed, agility is a combination of speed and flexibility (flexibility), and power is a combination of strength and speed.

The main biomotor component in basketball is endurance, which the function is to determine the athlete's fitness level, so that the athlete able to produce maximum and stable performance throughout the match. Basketball athletes in the 16 year age group who have good endurance will get various benefits, such as will always be concentrated and focused throughout the game, will easily determine and change the rhythm of the game, and stay fit throughout the game. Endurance according to Sukadiyanto can be grouped into anaerobic endurance and aerobic endurance [9].

Another major biomotor component that plays a role in achieving the best performance in basketball is strength. Strength is applied when performing dribbling, passing, shooting, and other movements. According to Sukadiyanto strength is the ability the entire muscle system to contract in overcoming resistance or load. Athletes who have good strength will be able to follow all training programs and will be maximal in the competition. Strength training that is carried out continuously will produce strength as expected.

Speed is the last major biomotor component in the most important basketball game. This is because basketball is a sport that requires speed, especially during the transition from defense to offense or the transition from offense to defense [10]. If an athlete has the ability to run or pass, the athlete has good defensive and offense technical skills.

The biomotor components of coordination, flexibility, power, and agility will be easily mastered if the biomotor components of endurance, strength, and speed have been mastered. From some of the explanations above, it can be concluded that good physical condition will have a function and role in the process of increasing performance and achievement in sports.

Based on the discussions above, it needs to know the biomotor components of basketball athletes, especially basketball athletes in the 16 year age group. Therefore, we were interested in doing research on biomotor components in basketball athletes of the 16 year age group in the Cirebon region. The purpose of this study was to determine the biomotor profile of basketball athletes in the age group of 16 years old in the Cirebon Region. There were several biomotor components in this study such as endurance, strength, speed, coordination, flexibility, power, and agility.

## **2 Method**

This study used a survey method which data collection techniques using tests and measurements. The survey method is one of the studies conducted by collecting information by compiling a list of questions for respondents. This study was conducted at the GMC Basketball Club, Cirebon City, with a population of athletes in the 16 year age group. This study used a total sampling, namely all athletes aged 16 year age group with male gender. This study analyzed how the Biomotor Profile of Basketball Athletes in the Age Group of 16 Years. The sample in this study was 20 basketball athletes in the 16 year age group. Biomotor profile data were collected by (1) an athlete's endurance test using the Multi-stages Fitness Test (MFT) or also known as the Bleep Test; (2) the athlete's strength test uses a push-up test, sit-up test, and back-up test; (3) the speed test using sprint running, the data is obtained using the 20-meter sprint running a test; (4) the coordination test uses a catch throw basketball by measuring the ability and speed of throwing catch within 15 seconds; (5) a flexibility test with the athlete performing sit and reach, (6) this power test the athlete performs a vertical jump test to determine the leg power during vertical jumps; (7) the agility test performed was the modified AAHPERD run test [26]. The results of the study are presented in five categories, namely very good, good, moderate, poor, and very poor.

## **3 Result**

The results of the study on the Biomotor Profile variables of basketball athletes in the 16 year age group are presented in Table 1.

**Table 1.** Frequency Distribution

No	Test	Percentage	Category
1	Endurance test	69.23%	Moderate
2	Strength test	38.46%	Good
3	Speed test	84.62%	Very good
4	Coordination test	38.46%	Moderate
5	Flexibility test	38.46%	Moderate
6	Power test	30.77%	Poor
7	Agility test	84.62%	Very good

Based on table 1 Biomotor Profile of Basketball Athletes in the 16 Years Age frequency distribution shows that endurance test of 69.23% was in the moderate category, strength test of 38.46% was in the good category, speed test of 84.62% was in the very good category, coordination test of 38.46% was in the moderate category, flexibility test of 38.46% was in the moderate category, power test of was in the poor category, agility test of 84.62% was in the very good category.

Biomotor Profiles of Basketball Athletes for the Age Group of 16 Years based on the T Score are presented in Table 2.

**Table 2.** Biomotor Profiles of Basketball Athletes in the Age Group of 16 Years Based on the T Score

No	Category	Percentage	Total
1	Very good	15.38%	3 athletes
2	Good	23.08%	5 athletes
3	Moderate	38.46%	7 athletes
4	Poor	15.38%	3 athletes
5	Very poor	7.69%	2 athletes

Biomotor Profile of Basketball Athletes in the 16 Years Age Group based on the T Score shows that 7.69% (2 athletes) was in the very poor category, 15.38% (3 athletes) was in the poor category, 38.46% (7 athletes) was in the moderate category, 23.08% (5 athletes) was in a good category, and 15.38% (3 athletes) was in the very good category. Based on the average value, it shown that the Biomotor Profile of Basketball Athletes in the 16 Years Age Group was in the sufficient category.

## 4 Discussion

This study aimed to determine the biomotor profile of basketball athletes in the 16 year age group. The biomotor variables be analyzed were: (1) the athlete's endurance test measured by the Multistage Fitness Test (MFT) or often called the Bleep Test; (2) the athlete's strength test measured by a push-up test, sit-up test, and back-up test; (3) the speed test measured by sprint running, the data was conducted using the 20-meter sprint test; (4) the coordination test measured by a catch throw basketball by measuring the ability and speed of throwing catch within 15 seconds; (5) the flexibility test measured by the sit and reach activity, (6) the power test measured by performing a vertical jump test to determine the leg power when making a

vertical jump; (7) the agility test measured by the modified AAHPERD run test [11]. In other studies, the selected biomotor criterion such as leg strength was measured by using leg lift with dynamometer, speed was measured by conducting 50 meters dash, cardio-respiratory endurance was measured by using John Cooper's 12 minutes run/walk test and flexibility was measured by using sit and reach test. [12]

Every athlete must have their respective goals to get the achievement. The athletes must continue to train hard and follow a training program well to get better achievements. Regular training and proper training program will significantly improve the ability and performance of the athletes. It is not easy to develop the biomotor component of the athletes. The athletes must commit and follow the programmed training to have an excellent biomotor. Therefore, communication between coaches and athletes must properly be maintained, so that the results obtained during training will result in maximum performance [13].

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# Development of Physical Test Application Model

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**Abstract.** This study aims: 1) to produce a valid physical test application model, 2) to determine the effectiveness of the physical test application model 3) to determine the physical abilities of athletes through the physical test application model. This research is a research development (Research & Development) in the form of a physical test application model with the following procedures: (1) product analysis, (2) developing the initial product (3) perform a expert validation (4) perform a small-scale and large-scale field trials (5) product revision and (6) final product. The test subjects in this study were 65 athletes from South Sumatra. Data analysis was carried out by descriptive qualitative and quantitative. The results of this study produce a physical test application model that is valid, effective and practical. It is recommended for trainers and teachers to use this physical test application model as an alternative in measuring the physical abilities of athletes.

**Keywords:** Model, application, physical test.

## 1 Introduction

The 21st century is a digital era, this can be seen from the rapid development of technology that aims to solve problems that exist in all fields of science including sports science [1]. Sport science is one of the fields of science that cannot be separated from the use of technology, one of which is for testing and measurement activities [2]. Testing and measurement is useful for aptitude tests and sports development which focus on three aspects including physical ability, mental ability and social traits [3]. Another function of testing and measurement in sports is to determine the level of activity or physical activity of a person, especially in athletes [4].

Excellent physical ability is important for an athlete, so it is necessary to know the athlete's physical fitness which includes speed, muscle strength, agility, flexibility, muscle strength and endurance [5] [6]. The physical test can be done by utilizing technology by developing a special application model for the physical test. Through this physical test application model, it will reduce the error rate in managing test data, make the test committee more effective and efficient in obtaining objective and valid data [7].

According to the author's observations, the physical test for PON 2021 South Sumatra athletes was carried out manually so that there were several weaknesses, namely 1) the results of the tests carried out were inaccurate, 2) it took a longer time to find out the results, 3) more human labor was needed. From some of the weaknesses of manual testing, it is necessary to design a test application model, so that it can be used as a guide by the coach to measure the



physical abilities of athletes so that it can improve the quality of the physical components which ultimately increase the peak performance of athletes during the match.

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## **2 Methods**

This research is development research and is a type of research used in solving practical problems in the field of sports. The opinion of Borg and Gall [8] that research and development is a process used to develop or validate products used in education. Then the opinion of Sugiono [9] argues that research and development methods are research methods used to produce certain products and test the effectiveness of the product.

This research was developed by modifying the research and development steps developed by Borg and Gall [8] including the following activities: (1) needs analysis, (2) developing initial products (3) conducting expert validation (4) conducting tests try small-scale and large-scale fields (5) product revisions and (6) final products.

This research took place at the Sriwijaya University campus with a sample of 65 South Sumatra athletes, 10 trainers and 12 field test staff. Data analysis was carried out descriptively qualitatively and quantitatively. To find out the validity of the product developed, it was adapted from Dewi and Mashami [10], while to find out the practicality of the product developed using the criteria suggested by Saenab et al [11].

## **3 Results**

After the product development model for the athlete's physical test application is tested on a small scale and then revised, the next step is to conduct trials on a large scale. The following is the research data:

### **3.1 Model validation test results**

The final product is evaluated or assessed by 2 experts in their respective fields. The first validator is an expert lecturer in technology and the second validator is an expert lecturer in the field of sports coaching. The validation results can be presented in Table 1.

**Table 1.** The results of the physical test application model validation.

Aspect	Average	Criteria
The model suitable with the needs of sports tests	3.83	Valid
The model suitable with the form of a physical test	3.92	Valid
Ease of tools and model facilities to use	3.89	Valid
The model developed effectively measures the physical components of athletes	4.00	Very Valid
The model suitable with the athlete's physical test principles	3.92	Valid
Practicality of model developed	3.92	Valid
The model is developed according to technology	3.67	Valid
The model developed is easy to operationalize	4.00	Very Valid
The model developed improves physical test performance	3.93	Valid
The model developed makes the physical test time efficient	4.00	Very Valid

Based on the results of the validation carried out by two validators, it was found that the physical test application model met the criteria as a physical test model. In conclusion, from the data obtained, the physical test application model developed is valid so that it can be used in measuring the physical abilities of athletes.

### 3.2 Model practicality test results

The response of athletes to the implementation of the physical test application model can be applied in physical test activities, summarized in Table 2.

**Table 2.** The response of athletes to the physical test application model.

Aspect	Average	Criteria
Ease of taking a physical test	3.52	Very Positive
Benefits of the physical test application model	3.40	Very Positive
Usability of the physical test application model	3.59	Very Positive
The model suitable with the form of a physical test	3.52	Very Positive
Efficiency and effectiveness model to measure the athlete's physical test ability	3.49	Very Positive
Mean	3.50	Very Positive

Table 2 describes the athlete's response to the application of the physical test application model, which received a very positive response with an average score of 3.50.

### 3.3 Physical test results for athletes using a physical test application model

The results of the research on the aspects of explosive power, speed, agility, flexibility, and endurance (Vo2 max) on 65 athletes from South Sumatra.

**Table 3.** The results of the athlete's physical test.

Physical Components	Number of Athlete	Minimum Score	Maximum Score	Mean Score	Category	Standard Deviation
Explosive Power	65	40	64	50.05	Poor	7.272696
Speed	65	2.54	3.33	2.9895	Excellent	0.192093
Agility	65	9.01	13.33	10.452	Good	1.080061
Flexibility	65	33	65	46.15	Excellent	7.995229
Endurance (Vo2 Max)	65	7.9	11.8	9.61	Poor	1.199956

Based on the test results in table 3, the results of the test results for the power component mean score 50.05 in the poor category, the mean speed component of the mean score is 2.989 in the excellent category, the agility of the mean score is 10.45 in the good category, the flexibility of the mean score is 46.15 in the excellent category and endurance (Vo2max) mean score 9.61 with poor category.

#### 4 Discussion

The physical test application model for athletes is in line with the opinion of Bompa, [12] that the test and form of physical exercise are highly dependent on the components of physical needs, so it is necessary to know the physical components needed for the sport. Then Fox's opinion [6] the conditioning stage is the first stage to start training in an exercise program and is arranged based on the results of the athlete's physical test. Then Iyakrus's research, [13] the physical test develops aspects that are in accordance with the needs of athletes in the field and will be able to support the athlete's appearance so as to create self-confidence during the competition.

Iyakrus's research [13] by conducting a physical test will determine the person's fitness level based on the data obtained from the test results, then based on the existing data the trainer can compile a targeted training program.

Research results from Lidor [14] through the test will obtain objective data about the physical condition of an athlete, then Nurhasan's opinion [15] that a good physical test is a test conducted based on the needs of the sport, while Widiastuti's opinion [16] test is a collection of information to measure about the physical condition so that you can find out the progress of the training done so far.

#### 5 Conclusions and suggestions

Based on the analysis of the results of research on the development of a physical test application model, it can be concluded as follows: 1) the physical test application model is a test application based on the needs of the physical components of the sport and is designed in a series of tests to improve the quality of athlete training, 2) the application model Physical test has good validity and is very practical to use for athletes. The physical test application model as a product that has been produced in this study can be used as an alternative in measuring the physical components and improving the quality of athletic training.

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# Analysis of Technical Forehand Boys Athlete Junior UNNES Tennis Club

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**Abstract.** The purpose of this study are to analyze and measuring the forehand technique of boys athletes Unnes Tennis Club (UTC) junior based on the ready position, to analyze and measuring the forehand technique of boys athletes UTC based on racket grip and grip strength, to analyze and measuring the forehand technique of boys athletes UTC based backswing movements, to analyze and measuring the forehand technique of boys athletes UTC based on the racket's impact. Type of this research is a descriptive analysis research with quantitative and qualitative approaches. This research will analyze and present the facts of the problematic symptoms systematically so that is easier to understand and conclude. This research will be carried out at the UNNES Tennis Court, Gunungpati, Semarang City. The sampling technique in this research was purposive sampling. The sample in this research amounted to 14 boys athletes.

**Keywords:** Analysis, forehand, tennis, junior.

## 1 Introduction

Sport are all aspects related t sports theth require regulation, education, training, coaching, development and supervision [1]. This process of regulating, training, coaching, developing, and supervising can be systemized in an association forum, namely a sports club. The sports aspect carried out by the club aims to create and improve sports achievements. Achievement sports are sports that foster and develop athletes in a planned, tiered and sustainable manner through competitions to achieve achievements with the support of sports science and technology [1].

Unnes Tennis Club (UTC) is a sports club that accommodates tennis observers in the Universitas Negeri Semarang (UNNES) and its surroundings. The main task and function of this club is to assist UNNES in developing potential achievements, potential income through assets, and potential development of patner cooperation. The development of potential achievements carried out by UTC is to form Unnes Tennis Club Junior. UTC Junior consists of 19 children aged 10-16 years old.

In the game of tennis, scoring is the result of a series of strokes taken by the player. The series of strokes is carried out repeatedly so that accumulatively will form game patterns [2]. This pattern of play will be formed if an athlete has good hitting skills. The average training age for UTC junior athletes is 9 months. The mastery of punches is still very poor, so the game pattern cannot be implemented properly. Currently the world is experiencing a crisis on a very large scale that has never happened before in modern times, namely the covid-19 pandemic [3].

Corona virus disease 2019 (corona virus disease/covid-19) is a new name that given by the World Health Organization (WHO) for patients with the 2019 corona virus infection which was first reported from the city of Wuhan [4]. The covid-19 pandemic has made governments in various countries enforce strict health protocols, such as regulations that undoubtedly interfere with sporting events and a number of other aspects. In order to maintain the health of athletes and other parties involved in sports activities, most sporting events, both at the national, regional and international levels have been postponed until an undetermined time limit or cancellation. The postponement of a number of sporting events makes the coaches to reschedule the exercise program that has been made so that their body fitness can remain at home [5].

This activity limitation is thought to have an impact on the athletes' movement competence and even to the occurrence of injuries. Based on the results of research published in the journal *Medicine & Science in Sport & Exercise* The Official Journal of the American College of Sports Medicine with the title *The Accute: Chronic Workload Ratio Is Associated with Injury in Junior Tennis Players*, the conclusion is that injured players have an average 1.5 times more weight training done in the last week compared to the previous 4 weeks. The majority of the players continued training to cover injuries and were not ready for the training load they were experiencing [6]. Movement competence involves two very fundamental things, namely motor skills and body coordination [7]. Basically, motor development can be divided into two, namely gross motoric and fine motoric. Gross motor skills are a part of motor activity that includes large muscle skills, such as crawling, prone, neck lifting, and sitting. Fine motor skills are part of motor activities that involve the movement of small muscles, such as picking up small objects with the thumb and forefinger, drawing, and writing [8].

Basic Sports Techniques Tennis consists of groundstroke, serve, volley and half volley. The groundstroke is divided into 2, namely the forehand groundstroke and the backhand groundstroke. The forehand has become the weapon of choice for most tennis players today. The style of play will be affected by how well the player takes this shot. The forehand is often the core strategy of both players in competition; a player can develop a game plan. A good forehand has the strength of consistency, accuracy and variety. This allows players to beat opponents in ways ranging from defending to attacking with one shot, or placing opponents in a defensive position to transitioning towards the net. Players with strong forehands include Andy Roddick, Roger Federer, Rafael Nadal, Venus Williams, and Serena Williams [9].

The forehand stroke involves a number of muscles and joints in the body. In addition to the core movements that are often used in the arm area, in carrying out a series of forehand strokes, an athlete also pays attention to footwork when running kicks the ball and maintains his body weight when hitting the ball [10]. In the sport of tennis, athletes must ensure their forehand strokes can anticipate a variety of conditions including variations in the spin speed and bounce of the incoming ball, as well as different target areas and amounts of psychological stress [11].

Motion biomechanics experiments can measure the load on the body and describe the behavior of the equipment used. In tennis, a stiffer tennis racket and a lower gripping force reduce the mechanical load on the arm, without compromising ball speed. A novice tennis player who hits the ball too close to the hand and experiences a much higher vibration in the wrist. Biomechanical measurements can identify significant deficiencies in racket performance predicted by theoretical studies [12].

An athlete and coach must be able to analyze the motion of the strokes made during a training session. Good analytical skills of an athlete aim to carry out movement correction as soon as possible, when the athlete makes a stroke that is not in accordance with the target area. Good analytical skills from a coach are also needed to provide input to athletes and provide

treatment for movements, so that these movements become effective and efficient. Analysis of motion in this sport uses the basics of sports biomechanics.

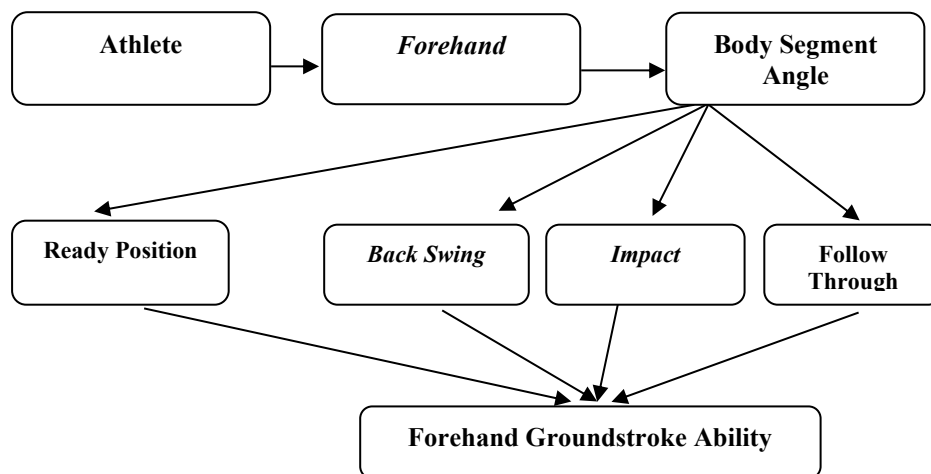
Based on the observations of the research team in the field, the coaching team has not yet carried out a detailed analysis of the athlete's forehand stroke movement. The team of trainers only made movement corrections using their visual analysis and delivered corrections verbally without the aid of analytical tools or software. This method of analysis is still conventional and the coaching team does not get measurable training progress.

Based on the above problems, the research team will make a quantitative and qualitative analysis of the forehand strokes of Unnes Tennis Club Junior athletes with the title "Analysis of Technical Forehand Boys Athlete Junior Unnes Tennis Club "2021.

## 2 Methods

### 2.1 Type of research

In accordance with the problems described, this research was carried out using descriptive analysis research with qualitative and quantitative approaches. Namely, analyzing and presenting the facts of the symptom that is a systematic problem so that it can be easier to implement and state [13]. The research team describes the implementation of this research into a research design chart as follows:



**Fig. 1.** Chart of tennis groundstroke forehand research design

Based on this chart, it can be explained in this descriptive analysis research, the qualitative approach only reaches the description stage, namely analyzing the records and stages of the forehand groundstroke movement. Meanwhile, the quantitative approach provides measurements and calculations using the Dartfish program related to body segment angles, backswing, racket impact motion with the ball, and systematic follow-up movements so that it is easier to understand and conclude.

## 2.2 Research instruments

Retrieval of data in research requires appropriate instruments or tools. So that these tools are able to measure what you want to measure. In this study, the Dartfish software program was used. To get the data to be analyzed by the Dartfish program, supporting tools are needed to collect the data. The facilities and infrastructure needed include a tennis court, a handy camera, a digital camera, a tripod, paper, a whistle and writing instruments.

Dartfish is a software that basically someone needs to measure something that can't be seen by the eye's eye. This software is equipped with a camera, this software can analyze movement but the tendency is qualitative, manipulation of movement variables cannot be done directly. Dartfish can be used to slow down a movement and stop motion, measuring length, angle of body segments, speed and acceleration of motion and timing. Simulation can be done but not directly. The results of the recorded images can then be transferred to a computer, so that the recorded video images can be analyzed according to the wishes of the observer. Dartfish is specialized in the production of interactive, entertaining and educational video analytics and digital image processing.

Dartfish are produced by the United States. Dartfish USA, Inc. 1301 High tower trail suite III, Atalanta, Georgia 30350. The program facilities available in this software are:

1. Dv Import: transfer clips from digital cameras or camcorders to a computer.
2. Dv Export: transfer clip from computer to camera.
3. Player: Play clip pictures or videos, slomotion frame by frame or full screen.
4. Analyzer: analyzing other movements in terms of body segments, movement trajectories, speed, time and distance, this facility can also compare the appearance of two athletes.
5. Simulcam: comparing two movements with different execution times.
6. Stromotion: shows the stages of the movement from the beginning to the next.
7. Producer: describes and at the same time provides comments, as well as product communication through infonates or other media.

A video of the motion of the forehand groundstroke was observed using two cameras. The first camera to use a tripod with a handy camera note that it is perpendicular to the trajectory of the motion which is also perpendicular to the direction of the trajectory of the motion, but is at the side of the subject. While the second camera is on the back so the direction of the motion trajectory will be recorded from the rear point of view.

## 2.3 Data collection methods

Execution test for groundstroke forehand motion:

The Goal : to find out the forehand groundstroke motion and to obtain information and data from the analysis of the forehand groundstroke movement of UTC Junior boys athletes.

Tools : Dartfish, handy cameras, digital cameras, tripods, writing instruments, racquets, tennis balls, computers and the Dartfish software program.

Stages of the test: The data collection techniques of this research are; The initial step taken is to re-record the subject to be studied. Furthermore, the subject is given an explanation of the procedures or rules in data collection in the hope that the subject will make a serious forehand groundstroke movement. After the subject understands all the procedures or rules in data collection, then it is followed by a forehand groundstroke motion test. The test is carried out one by one in order to determine the forehand groundstroke motion.

After being called by name, the subject stood up and took the position of executing the forehand groundstroke behind the prepared baselane line. Furthermore, the subject performs a



forehand groundstroke, in which the subject makes the best possible forehand groundstroke and is directed to a predetermined target. In the data collection technique, the execution of the stroke is recorded using 2 handy cameras using a tripod with the note that the handy camera is perpendicular to the direction of the motion trajectory as well as perpendicular to the direction of the motion trajectory, but at the side of the subject.

While the second camera is behind the target of being hit so that the direction of the trajectory of the blow from the rear viewpoint will be recorded. Furthermore, Besier states that the correct placement of the camera and tripod will determine the angles of the body segments which allow them to be analyzed in detail and accurately with the latest advances in computer technology. The number of subjects in this study were recorded as many as 14 athletes. Furthermore, the recording is changed in the form of clip movements (video clip) with the extension avi. The file is then entered into the Dartfish software program.

Expert Judgment : In this Expert Judgment, it is to find out the suitability and correctness of the throwing technique performed by the subject. The Expert Judgment stage is carried out by providing the results of data processing that have been analyzed with the Dartfish software program to: (1) One academic, (2) One person who is an expert in operating the dartfish software, (3) One national licensed tennis coach.

Test Administration Instructions: The subject is in the ready position and a feeder is on the other side of the net. The feeder directs the ball to the right of the athlete. Each subject performs 2 tests with 1 kind of movement, namely forehand groundstroke. Each research subject hit 3 times. The research subjects carried out a punch motion using their dominant hand. The interval between strokes and the other is 25 seconds. This refers to the ITF rules between points.

performance assessment : The motion of the forehand groundstroke is recorded into a digital camera or handy camera then the results of the recording are processed into a program called Dartfish. The overall results of the recorded forehand groundstroke strokes are analyzed for movement errors which include backward racket swing motion, racket ball hitting motion, and follow-up movements. After that Expert Judgment will assess and determine several strokes that match the criteria of the stroke and the result of the stroke in a good and correct position. From the analysis and assessment of Expert Judgment, the data will obtain an assessment for each movement error made by each athlete, as well as the most frequent movement errors made by athletes.

## **2.4 Data analysis technique**

Data analysis or processing is an important step in research activities, especially if we want to draw conclusions about the problem under study. In accordance with the descriptive type of analysis, it will discuss the arrangement of data into lists, graphs, pictures, or other forms [13]. The movement of the forehand groundstroke was recorded using 2 camcorders using a tripod with the record that the first camcorder was perpendicular to the direction of the motion trajectory and the target. The first Handycam is perpendicular to the trajectory of the motion, but at the side of the subject. While the second camcorder is behind the target so that the direction of the movement trajectory will be recorded from the rear viewpoint.

In this study, the data analysis technique used the Dartfish software program. The recorded forehand groundstroke is then entered into a laptop or computer. The recording of the forehand groundstroke stroke that is inserted into the laptop has been converted into the form of videoclip movements, then the clip movements are analyzed using the Dartfish software program using the Analyzer facility. By using the Analyzer facility in the Dartfish video clip software program, it can be analyzed. For a quantitative explanation of movement analysis focused on

measurements relating to the angles of the body segment, target accuracy, arm angle, torso inclination at the time of hitting position. And a qualitative explanation is about the stages of movement when making a forehand groundstroke stroke, from time to time from the start of kicking to the impact of kicks. These movements are broken down into several stages of movement, each movement is shown the sequence of movements along with the time when the movement takes place.

From this qualitative explanation, it can be described the stages of movement of the forehand groundstroke from the corners of the body segments, how the angles of the arms, the position of the legs when hitting, the head, and other body parts. The 14 tennis athletes were given the opportunity to hit 3 times. The total strokes made by the research subjects amounted to 3 strokes.

The results of the analysis that have been obtained will be used as a profile for each individual. So that each athlete can find out the movement errors made when making a forehand groundstroke, as well as the most frequent mistakes made by UTC junior tennis athletes.

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# Central Java Shooting Sports Training Center Management In the 2020 Pandemic

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**Abstract.** The purpose of this study to analyze the planning, organizing, implementing, and monitoring systems of Shooting Sport PELATDA during the pandemic. The research method used is descriptive qualitative at the Provincial Board of PERBAKIN, Central Java. The results of this study are replanning in various aspects, namely training organization, duties of trainers, support for training facilities, and programs. Exercises with a design of independent exercises at home. The management of equipment is also a difficult issue that has an impact on funding; the implementation aspect requires adjustments that require time and role of the coach. Nonstandard facilities and even; the aspect of supervision, especially the trainers in monitoring the. The training results report was sent via photos or videos not be used optimally in evaluating the athlete's performance in training. The conclusions in this study are replanning and changes in the organizing system in the shooting sport.

**Keywords:** Training center management, shooting, sports.

## 1 Introduction

The world was shocked by the emergence of diseases caused by the Corona virus or commonly known as Covid-19 (Corona Virus Diseases-19). This virus began to plague and then spread to all corners of the world very quickly including in Indonesia, so that WHO designated this outbreak as a global pandemic. This disease has a major impact in all aspects of life, including in the world of sports in all forms of organizing activities including sports training which are temporarily stopped and carried out with limitations to prevent and break the chain of transmission of Covid-19. Therefore, a special management of sports organizations is needed in responding to the developments that have occurred due to Covid-19.

Sports management is an amalgamation of skills that are correlated with aspects of planning, organizing, leadership, controlling, budgeting, and evaluating in an organization which has the main ingredient as a sport-related resource [1]. The benefits of sports management are shown through how the success of a person's ability to manage, lead and simultaneously foster a sports organization [2], in which sports organizations cover various fields which are important parts that must be controlled so that they can be used as tools to achieve goals. end of the organization. The ultimate goal of sports management is to achieve victory for its athletes in participating in a championship both nationally and internationally.

The Central Java shooting sport branch is under the guidance of the Central Java PERBAKIN Provincial Board, which is one of the leading sports of many sports prepared by KONI in Central Java province to participate in the National Sports Week (PON) which will be

held in October 2021 in Papua. Shooting as one of the leading sports is expected to achieve maximum performance and get a gold medal in the upcoming PON, so that this sport must carry out regional training camps seriously through planned and continuous training programs carried out in a Regional Training Center program. (PELATDA) Central Java in preparation for the XX PON in 2021 in Papua.

PELATDA PON XX, which has been implemented since 2018, is carried out with a decentralized system that is concentrated in various regions of Central Java according to the domicile of the area where athletes live, including those carried out by the shooting sport. As time went on in early 2020, to be precise in March, Indonesia was faced with the conditions of the Covid-19 Pandemic, which forced us all to adhere to strict health protocols and not be allowed to carry out activities outside the home, including shooting athletes who were running PELATDA which have to carry out the exercises in their respective homes.

During the Covid-19 pandemic, the training process for shooting athletes in Central Java was not normally carried out, the implementation of face-to-face training together in one training ground on the shooting range turned into independent training in their respective homes, so that the training program automatically previously planned by the coach, changes must be made to suit the existing conditions, namely independent training using limited facilities in the homes of each athlete. Likewise, the coaching team will certainly redesign and make new formulations of technical assistance, monitoring and evaluation of training programs that are being and have been carried out by athletes in order to be effective, at least to maintain the conditions already owned by shooting athletes.

Fostering shooting athletes like other athletes in other sports, in an effort to achieve optimal performance within a certain time target must continue to be carried out, despite the situation and conditions of the Covid-19 pandemic which must be faced with limitations in various aspects for the benefit of health and safety. Athletes still have to do intensive training even in conditions of limitation, this is none other than so that the athlete does not lose the performance and physical condition they have achieved which was built in the long process of the previous few years. Likewise, in this case, if the training is not continuous, it will have an impact on decreasing achievement and can also have an impact on the athlete's inability to achieve peak performance at the predetermined target time of the main match.

The Covid-19 pandemic does not only affect the problem of shooting training programs for athletes and the problem of coaches who are forced to reformulate the implementation of training programs only, but with the limited training facilities / infrastructure in the homes of each athlete, it becomes a problem that is not easy and quickly resolved. Then what is no less important is another aspect that is a factor that influences the implementation of training for shooting athletes, namely the aspect of the availability of funds to support the program to run well. Financial factors are very much needed to support and back up all the necessary needs, both for the provision of training infrastructure, consumption and supplements for athletes, incentives for athletes and coaches, and other needs especially in conditions of the Covid-19 Pandemic which were never planned before. so that there is a need for a specific policy in responding to it. According to Griffin [3], management is a series of activities (including planning and control) directed at organizational resources (human, financial, physical, and information) to achieve organizational goals in an effective and efficient manner. in other words, management is a tool used to achieve the desired goals, it appears that management is always applied in a relationship with a collaborative effort or a group of people in an organization.

The problems described above are in important aspects that affect the development of achievement and the implementation of regional training camps for shooting, each of which cannot be separated from the frame in the broad framework of the management of the Central

Java shooting sport Pelatda organization, which in its management requires the application of good management functions and discipline to achieve the expected organizational goals, namely maximum achievement for shooting athletes in the XX PON in 2021 in Papua. In order for the implementation of the management function to run well, it requires management elements that are interrelated with one another. According to George R. Terry in his book *Principle of Management*, there are six main resources of management, namely: (1) Man; (2) Materials; (3) Machines; (4) Methods; (5) Money; and (6) Market.

Therefore, to find out to what extent the implementation of Pelatda in the Central Java Shooting sport branch in 2020 during the Covid-19 pandemic, a critical evaluation step is needed so that existing problems can be found to find the best solution through the management process approach, namely by looking at how far. implementation of the management function of management resources in the Central Java Shooting Central Java Regional Training Center in 2020.

The formulation of the problems in this study are as follows: 1) How is the regional training center (PELATDA) resource planning system for Central Java Shooting during the Covid-19 Pandemic in 2020; 2) How is the regional training center (PELATDA) resource organizing system for Central Java Shooting during the Covid-19 Pandemic in 2020; 3) What is the system for implementing the Regional Training Center (PELATDA) resource for Central Java Shooting during the Covid-19 Pandemic in 2020; 4) What is the monitoring system for the Regional Training Center (PELATDA) shooting sport in Central Java during the Covid-19 Pandemic in 2020.

The objectives of this study are as follows: 1) To analyze the regional training center (PELATDA) resource planning system for Central Java Shooting during the Covid-19 Pandemic in 2020; 2) Analyzing the resource organizing system for the Regional Training Center (PELATDA) for the Central Java Shooting sport during the Covid-19 Pandemic in 2020; 3) Analyzing the regional training center (PELATDA) resource mobilization system for Central Java Shooting during the Covid-19 Pandemic in 2020; 4) Analyze the monitoring system for the Central Java Regional Training Center (PELATDA) shooting sport during the Covid-19 Pandemic in 2020.

## **2 Method**

The research design and approach used in this study is a qualitative approach, because the data collected is in the form of words, pictures, and not numbers [4]. This qualitative research approach describes the results of the analysis through the design of a management process, namely the implementation of a planning system, an organizing system, an actuating system and a controlling system, on resources or management elements. during the Pandemic in 2020, which consists of organizational /committee aspects, human resources, training programs, infrastructure, and funding.

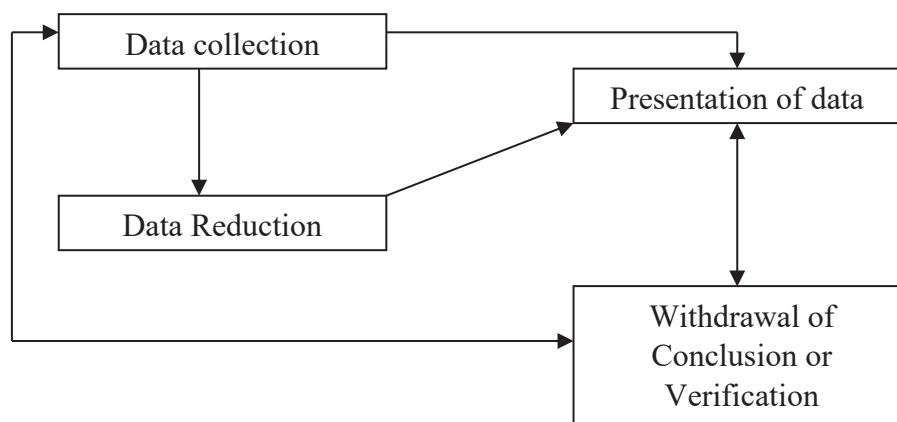
The data sources of this research are all those that can provide information about the management of the Central Java shooting sports training center in 2020. The research data is in the form of written or spoken words, photos or actions obtained from data sources, namely people, writing, and places. This is in line with Arikunto's [5] opinion that data sources are obtained from three objects, namely, person, place, paper.

Data collection techniques by observation (observation), interviews (interview), and documentation, as well as a combination (triangulation). To obtain primary data, data collection

tools are used in the form of observation (observation) and interviews (interview), while documentation in the form of archives is used as supporting data or secondary data. Drawing conclusions in this study in addition to using data triangulation can also use the rubric of sports coaching management categorization.

In this study, researchers used participatory observation, namely by observing the activities of the subject at the Central Java Provincial Board of Commissioners in Central Java and at the training ground and infrastructure as well as at home. Arikunto stated that observation or what is also called observation includes sight, smell, hearing, touch and taste [6]. Interviews in this study were conducted by researchers with the committee of Pelatda, coaches, athletes, who could provide information about the management of the central Java shooting sports training center. Documentation consists of various things that can help collect research data. The documentation in this study includes: the organizational structure of the regional plate committee, trainer qualifications, training programs, infrastructure data, athlete data, and budget.

The data analysis technique used is the analysis in the field with the Miles and Huberman model. Miles and Huberman [7], suggest that "activities in qualitative data analysis are carried out interactively and continue to completion, so that the data is saturated". In other words, the actual data analysis was carried out by researchers since they started collecting data. During the interview, the researcher directly analyzes the answers from the informants to ensure that the answers are satisfactory to answer the problem formulation. Activities in data analysis using the Miles and Huberman model include data reduction, data display, and conclusion drawing / verification. The analysis steps are shown in the following chart:



**Fig. 1.** Data analysis method

The data obtained through interviews is of course very large in number, therefore the data obtained must be immediately analyzed through data reduction. According to Sugiyono states that "reducing data means summarizing, selecting main things, focusing on important things, looking for themes and patterns and removing unnecessary" [7].

Data presentation in qualitative research can be in the form of descriptions, abbreviations, tables, charts, graphs, flowcharts, pictograms, and so on. According to Sugiyono [7] states that "by displaying data, it will be easier to understand what happened and plan the next work based

on what is understood". The data that has been reduced is a collection of data from interviews with sources.

The final step in data analysis for Miles and Huberman's model is drawing conclusions and verification. Based on the data that has been presented, the researcher is able to draw a conclusion that is still temporary. When the conclusion is supported by strong evidence in the field, then the conclusion is creative.

### **3 Results and discussion**

#### **3.1 Management organization**

Committee with an organizational structure consisting of elements from the chairman, secretary, treasurer, engineering, training, monitoring / evaluation and general affairs. This committee is formed and designed so that it can organize and manage the central Java shooting sports training center activities so that it can run well as planned. Written documents that can be used as the basis for this committee to work are the Decree of the General Chairperson of the Central Java Perbakin Province and a description of the duties according to the main duties and functions of each position in the organization.

In its implementation, each individual committee member is on average active and can carry out their respective main tasks and functions, even though there are still some personalities who cannot work optimally, because they have to divide their duties with their main work and several other activities that are carried out. However, in terms of work responsibilities, it can be said that the average is good in the context of sports organizations [8].

In terms of supervision of the committee's performance, it is still weak, because no one has been specifically assigned to do that, considering that the committee personnel also include the management personnel of the Central Java Perbakin Province, so the committee cannot independently carry out its duties so it is still very subjective.

#### **3.2 Exercise program**

Planning for the training program has been prepared since the beginning of the training camp for the shooting sports area. The training program was prepared for the purpose of shooting athletes with high achievements at the XX PON 2020 in Papua, which at that time was planned to take place in October 2020 when the Covid-19 pandemic had not yet emerged, so that the idealism of the program design was in such a way both from physical and technical aspects. , strategy, and mental. However, when the Covid-19 pandemic entered Indonesia and the government gave instructions to anticipate by stopping all face-to-face activities including training, as well as the implementation of PON XX was postponed in 2021, the training program was reconstructed according to the conditions of the Covid-19 Pandemic which required a protocol. strict health with existing limitations, namely exercises carried out independently in each house.

The change in training from face-to-face together with other athletes on the shooting range, changing to self-training independently in each house, makes something new and unexpected and never thought of before, so what kind of training program is it? can be effectively run by athletes making it a trial and error training program provided by the coach [9].

The organization of training programs during the Covid-19 pandemic that was found in the field was still very tattered, especially in the early days of the pandemic, given the lack of integration between physical, technical and mental aspects which are important aspects of shooting athlete training. During a pandemic, what is prominent in athlete training is the physical aspect because training can be easily done independently with limited space. Most of the technical and mental training programs cannot be carried out by shooting athletes maximally due to the lack of training facilities and infrastructure, besides that there is no motivation because the training must be done alone, without a companion, and the supervision of the coach.

Monitoring and evaluation of training programs carried out by coaches during the pandemic is by sending training photos and videos, as well as the results of scoring which are carried out periodically by athletes, so that the form of supervision carried out with such a model is certainly less valid and difficult to accounted for. In general, the training program for shooting athletes during the Covid-19 pandemic in 2020 did not work well and resulted in not maximizing training outcomes, this can be seen from the scoring document that is periodically carried out by athletes [10].

### **3.3 Human Resources**

The recruitment system of a coach and / or assistant coach selected to handle the Central Java shooting training program, is not carried out with procedures and uses objective criteria. Recruitment is carried out on the basis of a habit that has been going on for years without an evaluation of the previous coach's performance. Trainers who are active in the Perbakin shooting range in the GOR Jatidiri complex have the highest chance of being appointed as coaches, because of their habit and as if it has become a culture that has been running from year to year, so it can be said that for years the shooting coaches in Central Java were only dominated by certain people only.

Organizing the work of coaches in carrying out their daily tasks is not well planned, because due to the absence of competition in coach recruitment, the work of coaches has become routine, so that there are no serious challenges and efforts in handling athletes. Structurally there is a coaching organization, namely there is a head coach, coach and assistant coach, but in its implementation in the field the structure has not functioned properly. One of the causes of this is the lack of proper functioning of the supervisory system for the performance of the trainers carried out by the Central Java Perbakin management [11].

The athlete recruitment system can be said to be very objective considering the athletes selected on the basis of passing the national selection with the Minimum Qualification Score (MQS) system. Based on the MQS system, athletes have the opportunity to take part in the XX PON in 2021, but not automatically because it still has to be determined by the quota given to an area by PB Perbakin. Likewise, competition is still being carried out to become who is the best from the athletes who have passed through the MQS system.

The organization and implementation of shooting athletes who are members of the Central Java Shooting Center, strictly that the competition to be promoted and relegated is carried out on the basis of the results of athletes' achievements from the scores achieved through periodic scoring tests or the results of the championships they are participating in, so that the relegation system and athlete promotion can be said to be very objective [12].

Objective supervision of athletes' achievements can be seen from the achievements they have achieved within a certain period of time, in addition, direct supervision is carried out by coaches who accompany athletes in routine training. During the pandemic, the policy on athlete



treatment is no different from the conditions before the Covid-19 pandemic, so that the previously implemented system can be carried out according to initial planning.

### **3.4 Training infrastructure**

Training facilities and infrastructure for shooting athletes can be said to be expensive compared to several other sports. For example, for means or better known as equipment, shooting sports such as weapons and their devices attached to athletes are absolutely must be owned by shooting athletes personally, considering that weapons with their equipment, including special clothes worn by athletes, cannot be used interchangeably with other athletes. , especially for athletes who are included in the Pelatda shooting program who are actually the best athletes in Central Java, that the weapon is a very important personal tool in which a shooting athlete must recognize well the characteristics of the weapon he is wearing.

In addition to weapons, bullets to support athlete training must always be sufficiently available, considering that shooting sports are a type of precision sport that requires training with a high frequency and intensity of shooting, so that the presence of bullets is absolutely available in large quantities. The calculation of the need for bullets can be planned in advance so that you can predict exactly how many bullets for each athlete in carrying out training in a certain time.

Inventory equipment in the form of weapons, both long-barreled guns and pistols owned by the Central Java Perbakin Province, is mostly used for beginner athletes who are still learning basic shooting, so that shooting athletes who have achieved absolutely do not use inventory equipment [13].

Infrastructure or better known as venues or training venues in the form of buildings and shooting ranges with various equipment attached, in shooting sports have specifications and specificities because the form of shooting ranges and buildings equipped with existing facilities have rules that must be met both technically and security. Pengprov Perbakin Central Java has a shooting range of 10 meters indoor, 25 meters and 50 meters outdoor with the equipment attached to the infrastructure in question. The current condition of the field that is most suitable for use is a field for a distance of 10 meters indoors, for another shooting range that is in renovation condition because it is not suitable for training and holding championships.

In the situation and conditions of the Covid-19 pandemic which require athletes to train independently in their respective homes, athletes cannot exercise ideally, because training cannot use standard and eligible venues / shooting ranges, and are not supported by suitable venue equipment. adequate, thus it can be ascertained that it will greatly affect the achievements of athletes. For athletes who do not have a home shooting training ground they only do "dry" drills without using bullets, making it difficult to know the exact extent of the shot. In the current condition of athletes who only do a lot of physical exercise for months, there will be a feeling of burnout and a decrease in motivation in doing independent training.

### **3.5 Funding**

Provision of funds to support the implementation of shooting training training center programs is very important and absolutely must be available and sufficient. The need for shooting training athletes that absolutely must be supported is the fulfillment of ammunition or bullets, gas for air guns, special clothing for long-barreled athletes, consumption needs and additional food during training, other supplements for athletes, recreational support / refreshing

athletes, provision of equipment. special needs at home for independent training during the Covid-19 pandemic, and other needs.

Planning for funding needs during the implementation of the training center program can be predicted in advance by carrying out calculations according to the needs set forth in the form of an activity Budget and Expenditure Plan (RAB), which can then be implemented according to its use and managed according to the main duties of the Pelatda committee.

In terms of the use of the budget, supervision is carried out by the leadership and treasurer of the committee which in a certain period of monitoring and evaluation is carried out together with other committee members, which will then be followed up by reporting the use of the budget to the chairman of the Central Java Perbakin committee and accountable to the Central Java Province KONI who provide Pelatda funding assistance.

Funding support is obtained from several parties, including from the Central Java Province KONI in the form of assistance for incentives for managers, coaches and athletes routinely received every month, training operational funds, rental assistance and maintenance of training sites, support for training and competition equipment and equipment, support for testing either in the form of try-ins or try-outs. Financial support from the Central Java Province KONI is not sufficient for all athletes' needs while running a long-term training program, therefore additional funds are still needed to cover the budget shortfall, which is supported by funding from the Central Java Perbakin Provincial Management budget, and from individual donors.

#### 4 Conclusions

The conclusions in this study are 1) during the Covid-19 epidemic, re-planning was carried out in all aspects of activities in supporting the training center of Central Java Shooting athletes, both from the management side by the Pelatda committee, from the aspect of human resources, especially coaches and athletes in providing assistance and training. exercise supervision that is carried out independently, training programs that must be adapted to training independently at home, training infrastructure facilities that can support athletes in carrying out training independently, as well as funding issues; 2) changes to the organizing system, especially the coordination of tasks and functions of the manager, as a coach as a companion and supervision as long as athletes exercise independently at home; 3) the implementation of training camps carried out by athletes independently in their respective homes becomes very ineffective, because athletes have to struggle alone in overcoming training problems, motivation decreases because there are no friends and coaches in together, which in turn affects the achievement of achievement in training; 4) the supervision carried out by the coach cannot be maximized because virtually, so it only relies on self-discipline and the care of parents around the athletes when practicing.

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# Availability of Sports Facilities in Semarang City

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**Abstract.** The purpose of this study was to determine the availability of sports facilities and infrastructure in Semarang city. This research is a survey. Methods of data collection using observation, interviews, and documentation. The population used was 16 districts in Semarang city. The results showed that most of the infrastructure was badminton with 50.5%, volleyball court with 15.3%, open sports fields 8.1%, swimming pool 7.8%, martial arts gym 5.6%, basketball court 4%, tennis court 3.4%, soccer field 2.2%, futsal court 0.9%, athletic stadium 0.9%, billiard house 0.3%, bowling arena 0.3%, velodrome 0%. The conclusion shows that the availability of infrastructure that is widely available in the city of Semarang is badminton, volleyball field, and open sports field infrastructure, while the infrastructure that is still lacking is a billiard house, a bowling arena, and a velodrome.

**Keywords:** sport, facilities, Semarang.

## 1 Introduction

Sport is exercise performed by one or more people who are a team or group. The definition of sport from the point of view of physiology is a series of regular and planned exercises that a person consciously does to improve his functional ability, in accordance with his goal of doing sports. [1,2]. Sport is one of the physical activities carried out with the intention of maintaining and maintaining the fitness of the human body. In its development, it can be done as an entertaining, fun activity or it can also be done with the aim of increasing achievement. Increasing public interest in sports is not matched by the quality and quantity of sports facilities [3]. Besides that, sport is a phenomenon in society and an inseparable part of life for humans on this earth. Sport which basically has a very big role in efforts to improve the quality of human resources for mental development and also yourself. A city / district / province that wants very fast and fast progress in various fields, and considers sports to be very important. The strategy for the use of sports must go through development planning in favor of the progress of sports as a whole. Comprehensive because sport has the potential to contain a passion and strength to build a passionate soul from a very long process of development itself [4,5]

In terms of juridical (law) according to Law no. 3 of 2005 sports are all systematic activities to encourage the development and development of physical, spiritual and social potential. Basically, sports have a very strategic role in efforts to establish the quality of human resources to build a city / district / province that wants rapid progress in various fields, even if it should not be merely a slogan to consider sport as an important thing. (6) Sports facilities and infrastructure are something that cannot be separated from one another in sports. Where between the two there is a common relationship. A facility is something that can be

used and utilized in the implementation of sports or physical education activities. Meanwhile, infrastructure is something that simplifies or expedites tasks and has a relatively permanent nature [7,8].

Sports infrastructure is a supporting resource consisting of all types of buildings / without buildings used for sports equipment. Good sports infrastructure can support community growth, especially in the field of improving the quality of human resources in the world of sports [9]. Sports facilities are a permanent form, both for indoor and outdoor spaces. For example: gymnasium (gymnasium), swimming pool, playing fields, and so on ". Sports facilities in it consist of facilities and infrastructure to support sports activities. The facility itself is one of the important elements that must be available in sports. [10] Overall sports facilities include physical and non-physical facilities. Physical sports facilities include infrastructure and physical facilities, including stadiums, arenas and fields for various sports. Meanwhile, non-physical sports facilities include non-physical infrastructure and facilities such as sports clubs / associations, trainers and sports teachers [11]. National Sports Standardization aims to ensure the quality of the implementation of the national sports system through the achievement of National Sports Standards (Government Regulation number 16 of 2007 Article 84) [12]. Regulation of the Minister of Youth and Sports Number 0445 of 2014 article 1 states that the Standard for Sports Infrastructure in the form of a Sports Building is a minimum criterion regarding various aspects related to the building and the environment around the building used for sports activities and / or organizing sports activities. The government through the Ministry of Youth and Sports issued a Sports Building Standardization in Indonesia which has the aim that each sports facility has the same standard of quality as well as safety and security criteria owned by the Sports Building because sports will involve large crowds. The scope of standards according to Permenpora No. 0445/2014 includes: 1) Typology of sports buildings. 2) Location. 3) Zones and circulation. 4) Arena. 5) Player facilities. 6) Match / Activity Management Room. 7) Media facilities. 8) Sports building management facilities. 9) Spectator Facilities. 10) Safety and security facilities. 11) Communication facilities (display board). 12) Building utilities. 13) Prevention of fire hazards. 14) Structure and materials [13]. Typically exclude from definition of a sport facility are the nature areas, and team owners have argued that sports facilities boost local economic activity; however, economic reasoning and empirical evidence suggest the opposite [14, 15].

## **2 Methods**

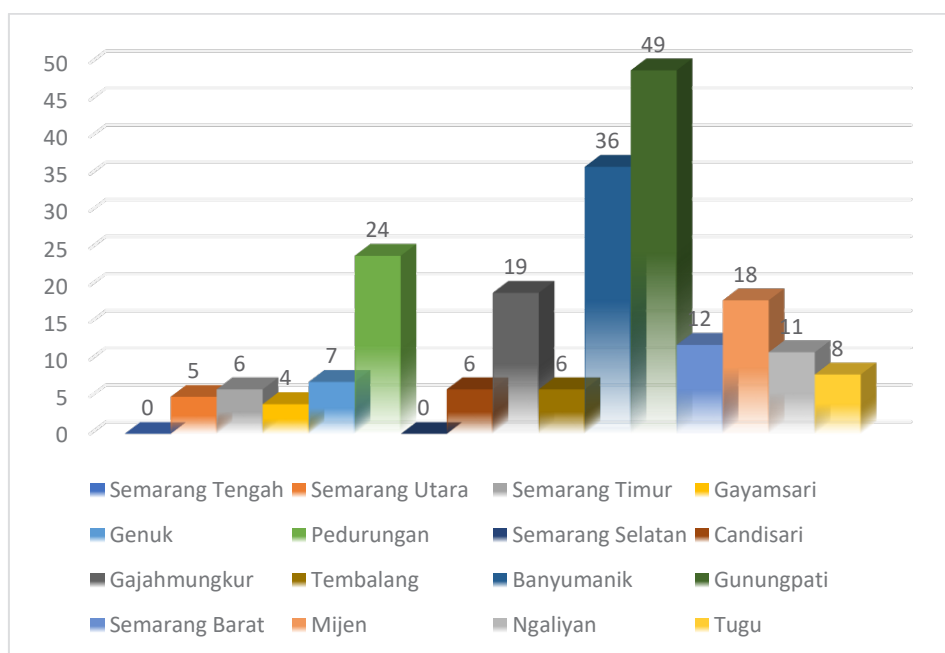
This study used a survey research design. Data collection methods use observation, interviews, and documentation. The research places and locations are as many as 16 subdistricts in the city of Semarang which are used as research sites. The data analysis technique uses a data reduction system to present the data in the form of calculating the quantity as well as the quality of the facilities and infrastructure in the city of Semarang.

## **3 Result and Discussion**

This research produces sports infrastructure data in the city of Semarang.

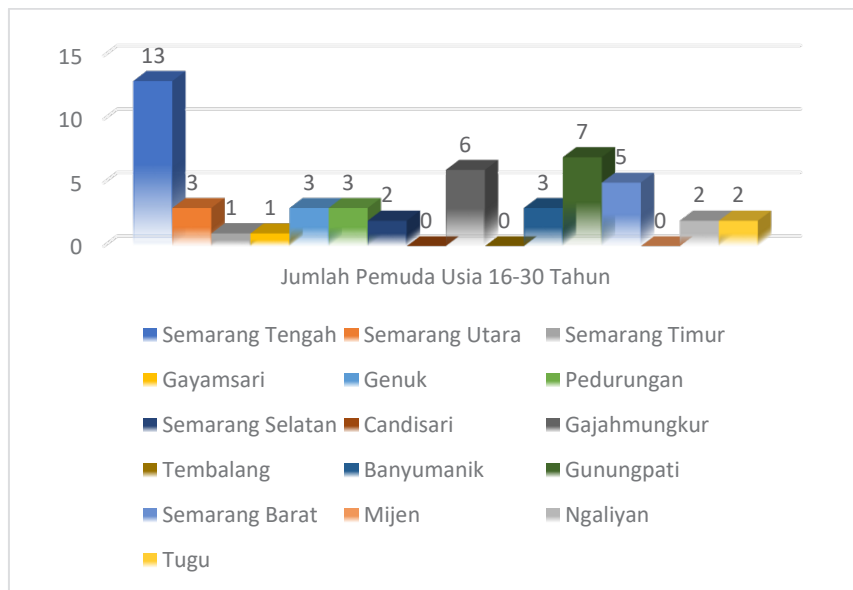
**Table 1.** Volleyball Courts.

Sub Distric	Amount
Semarang Tengah	0
Semarang Utara	5
Semarang Timur	6
Gayamsari	4
Genuk	7
Pedurangan	24
Semarang Selatan	0
Candisari	6
Gajahmungkur	19
Tembalang	6
Banyumanik	36
Gunungpati	49
Semarang Barat	12
Mijen	18
Ngaliyan	11
Tugu	8

**Fig. 1.** Volleyball Courts.

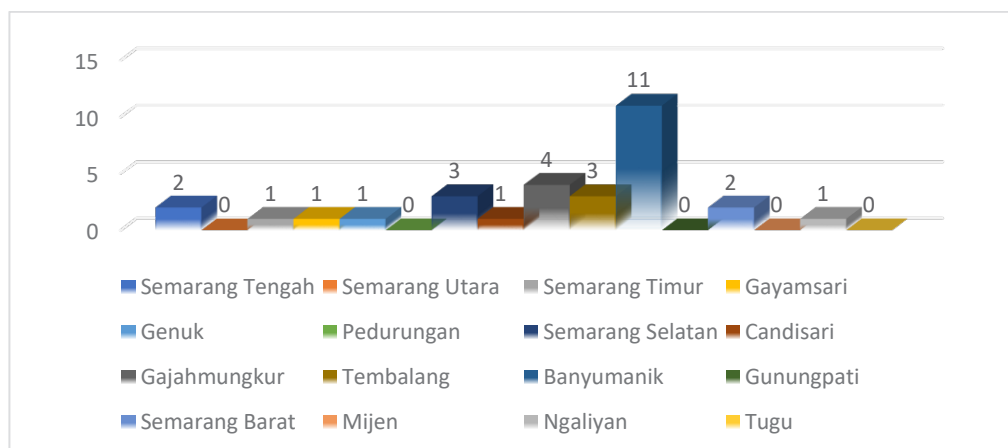
**Table 2.** Basketball Courts.

Sub Distric	Amount
Semarang Tengah	13
Semarang Utara	3
Semarang Timur	1
Gayamsari	1
Genuk	3
Pedurangan	3
Semarang Selatan	2
Candisari	0
Gajahmungkur	6
Tembalang	0
Banyumanik	3
Gunungpati	7
Semarang Barat	5
Mijen	0
Ngaliyan	2
Tugu	2

**Fig. 2.** Basketball Courts.

**Table 3.** Tennis Courts.

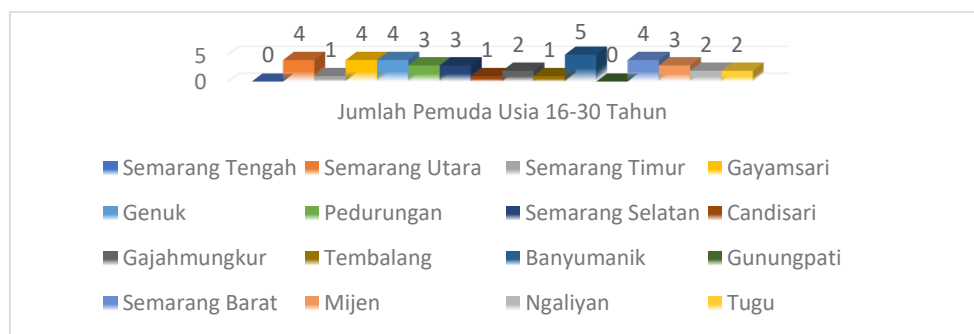
Sub Distric	Amount
Semarang Tengah	2
Semarang Utara	0
Semarang Timur	1
Gayamsari	1
Genuk	1
Pedurungan	0
Semarang Selatan	3
Candisari	1
Gajahmungkur	4
Tembalang	3
Banyumanik	11
Gunungpati	0
Semarang Barat	2
Mijen	0
Ngaliyan	1
Tugu	0

**Fig. 3.** Tennis Courts.



**Table 4.** Futsal Fields.

Sub Distric	Amount
Semarang Tengah	0
Semarang Utara	4
Semarang Timur	1
Gayamsari	4
Genuk	4
Pedurungan	3
Semarang Selatan	3
Candisari	1
Gajahmungkur	2
Tembalang	1
Banyumanik	5
Gunungpati	0
Semarang Barat	4
Mijen	3
Ngaliyan	2
Tugu	2

**Fig. 4.** Futsal Fields.

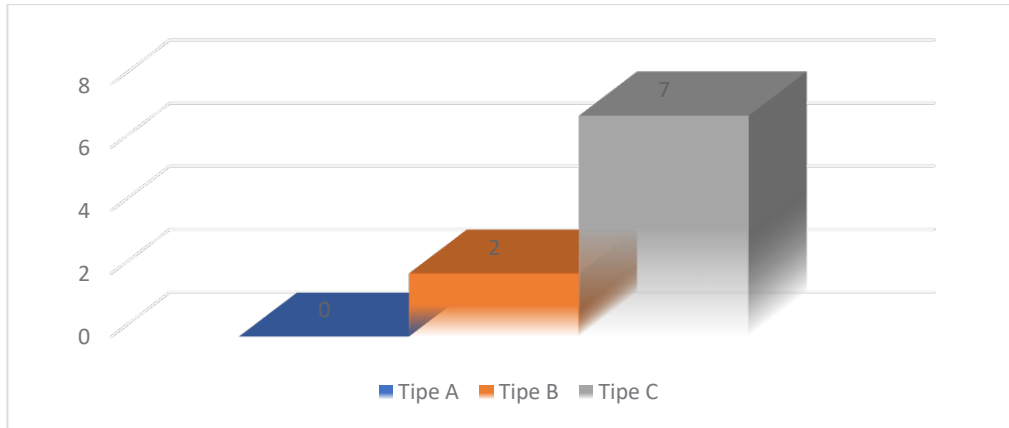
Buildings for football sports activities, including facilities for spectators, both matches / competitions and for training.

**Table 5.** Football Stadiums.

Stadium Type	Amount
Type A	0
Type B	2
Type C	7

Stadium type A is a football stadium with an audience capacity of 30,000-50,000 people, with a total of 8 running tracks for 400 m and 100/110 m running tracks. Stadium type B is a football stadium with an audience capacity of 1000-30,000 people, with a total of 6 or 8 running tracks for 400 m and 100/110 m running tracks. Type C stadium is a football stadium with an audience capacity of 500-10,000 people, with a total of 6 or 8 running tracks for 400

m and 100/110 m running tracks. From the table above, it can be seen that the number of type a football stadiums is 0, type b is 2 and type c is 7.

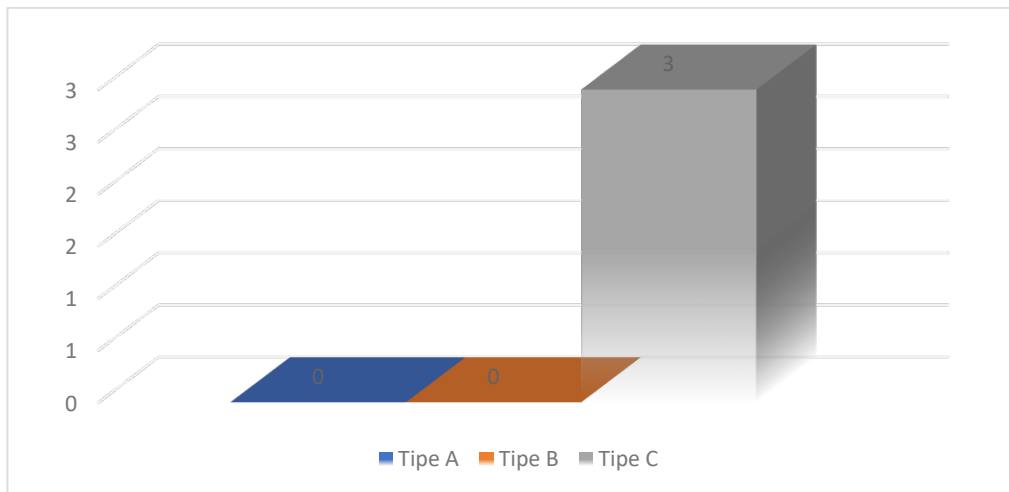


**Fig. 5.** Football Stadiums.

Buildings for athletic sports activities, including facilities for spectators, both matches / competitions and for training.

**Table 6.** Athletic Stadiums.

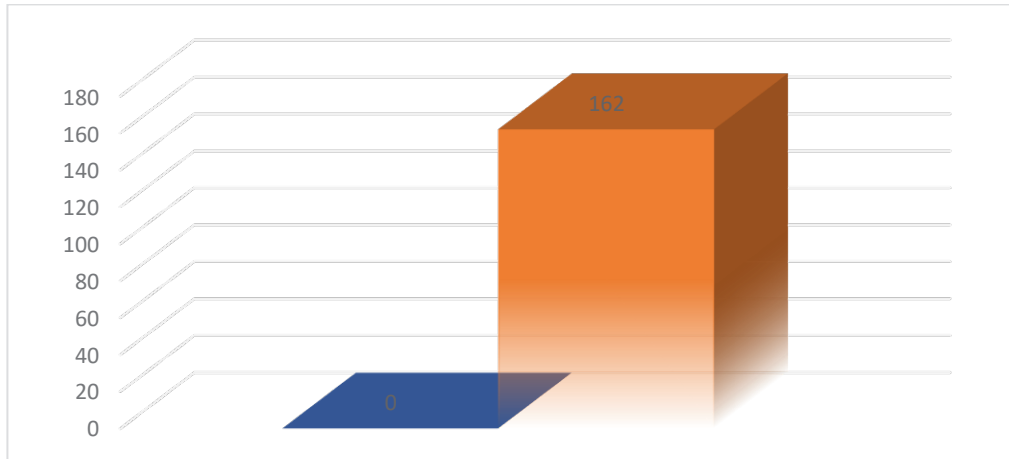
Stadium Type	Amount
Type A	0
Type B	0
Type C	3



**Fig. 6.** Athletic Stadiums.

**Table 7.** Badminton Court.

Location	Amount
Village	0
City	162

**Fig. 7.** Badminton Court.

Based on the results of the study, it was found that the city of Semarang has adequate and complete facilities and infrastructure. The complete analysis is presented in accordance with table 8.

**Table 8.** Sport Facilities.

Sub Indicator	Ave	Min	Max
Volleyball court	13	0	49
Basketball court	3	0	13
Tennis court	2	0	11
Lapangan Futsal	2	0	5
Football Stadium	4	0	7
Athletic Stadium	3	0	3
Badminton Field	162	0	162

In data above, you can see the sports infrastructure indicator with the volleyball field sub-indicator with an average of 13 with the lowest number of 0 in Central Semarang and South Semarang districts, while the highest number is 49 Gunungpati districts. Basketball court had an average of 3 with the lowest number of 0 in Candisari, Tembalang and Mijen districts, while the highest number was 13 districts of South Semarang. The average tennis court was 2 with the lowest number of 0 in North Semarang, Pedurungan, Gunungpati and Mijen districts, while the highest number was 11 Banyumanik districts. The average futsal field is 2 with the lowest number of 0 in Central Semarang and Gunungpati districts, while the highest number is 5 in Banyumanik districts. The average football stadium is 4 with the lowest number of 0 in

type a while the highest number is 7 in type c. Athletic stadiums with a mean of 3 have the lowest number of 0 in type a and b while the highest number is 3 in type c. The average badminton court is 1622 with the lowest number of 0 in rural areas, while the highest number is 162 in urban areas. The sports hall with a mean of 2, the lowest number is 0 in type a, while the highest number is 2 in type c. Billiards houses with a mean of 1, the lowest number is 0, while the highest number is 1 in Candisari, Gajahmungkur and Banyumanik. Open sports fields mean 9, the lowest is 0, Gayamsari, Candisari, West Semarang and the highest is 26, Genuk.

#### 4 Conclusion

Based on the research results, it can be concluded that the city of Semarang has quite a lot of sports facilities, complete, and evenly distributed in 16 Districts. These facilities and infrastructure are put to good use by the people of Semarang City in carrying out sporting activities in the City of Semarang..

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# The Relationship Between Arm Muscle Strength and Grip Strength on Throwing Distance

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**Abstract.** The purpose of this study was to determine the relationship between arm muscle strength and grip strength on the throwing distance of female softball athletes. This research is a correlational study using a survey method. The sample in this study was female softball athletes in Semarang City obtained by the total sampling method. Data collection techniques using tests and measurements. The data analysis technique used correlational analysis. There is a relationship between arm muscle strength and the throwing distance of the female softball athletes in Semarang city with a correlation value of 0.893 with a significance value of 0.000. There is no relationship between the grip strength and the throwing distance for female softball athletes in Semarang city with a significance value of  $0.448 > 0.05$ . Arm muscle strength contributes to the throwing distance, while grip strength does not contribute to the throwing distance in female softball athletes in Semarang.

**Keywords:** Throwing performance, softball skill, elite athlete.

## 1 Introduction

Softball is a type of sport played by two teams of 9 people each team for seven innings or up to an agreed time limit consisting of attacking (hitting) and defending [1], [2]. Softball is a fun and exciting sport, providing significant health benefits such as increased physical fitness, including strength, agility, and upper and lower body coordination. Additionally, important social skills can be learned by interacting with coaches and teammates [3]. Softball is a development of baseball [4]. Softball is a physically demanding sport consisting of several specializations that require different skills and types of abilities.

Softball requires excellent hand-eye coordination, upper limb strength, handgrip strength, and coordinated movement of the hips, shoulders, arms, and wrists [5]. The ability to be in the physical condition is one factor that determines performance in softball [6]. The ability to be in the physical condition is one factor that determines performance in softball. Some of the basic techniques that need to be mastered from this softball game are 1) throwing, 2) hitting, 3) Catching, 4) baserunning, 5) sliding [7]. Throwing is one of the most important defensive skills in softball. Overhead throwing skills depend on the flexibility and mobility of the shoulder joint [8]. Throwing and catching skills are essential techniques when the team is defensive in a softball match. Throwing is a crucial technique or skill that plays a vital role in softball performance. Softball games have three general throwing techniques: overhead throw, sidearm throw, and underhand throw. The overhead throw technique is the technique most often used.

To make a good overhead throw, the athlete must have good flexibility, muscle strength, coordination, muscle synchronization, and neuromuscular efficiency [9], [10].

The throwing technique in softball is an explosive action that requires muscle power. Power is a component of speed and strength. Softball players need muscle strength to perform the throwing technique [9]. This throwing skill is one of the determining factors for performance in softball games. One of the factors in throwing abilities is the arm muscles strength and the grip's strength [11]. Grip strength has an important role in the softball game. The central aspect of hit speed and throwing velocity is the player's grip strength [11]. The technique does play a significant role in throwing movements. The efficiency force transmitted to the ball is judged by the ball's speed, distance, and direction after it is released. The thrown ball's speed and distance are directly related to the magnitude of the force used in throwing and the speed at which the ball is released. The joint action in the shoulder, elbow, wrist, and fingers contribute about 50% of the ball speed [12]. Each player position in softball is required to have good throwing and catching skills. The infielder must make a quick and accurate throwing motion [2] so that the resulting throw is in time, while the outfielder takes advantage of wind conditions to maximize velocity and distance [2].

Based on previous research, arm muscle strength and grip strength contribute to throwing skills in softball games. These two components contribute to the quality of the softball throwing. Several previous studies [9], [13], [14] have suggested that grip strength has a contribution to the speed of throwing. However, no data discusses the analysis of arm muscle strength and grip strength on the throw distance. The good throwing technique in softball if the resulting throw is fast, accurate, and covered. This can be supported by physical abilities, especially the upper body muscles' ability to support the underarm throwing and overhead throwing techniques in softball [14]. From the previous explanation, the overhead throwing technique has an important role in the softball game. The quality of the throw can have a significant effect on the game, especially when in a defensive position, both throwing accuracy, throw distance, and throwing speed. Therefore, this study aimed to determine the relationship between arm muscle strength and grip strength on the throwing distance.

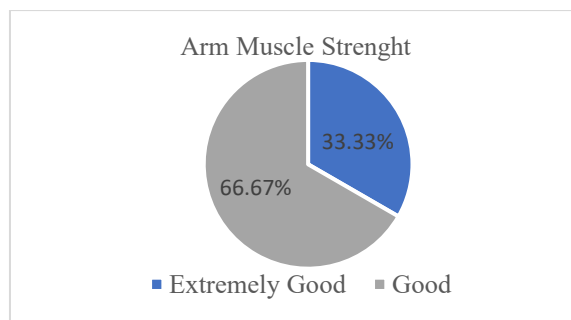
## 2 Method

This research is a correlational study using a survey method. A total of 18 female softball athletes from Semarang City were involved in this study. The sampling technique used was total sampling. The data collection instruments used were tests and measurements that consisted of three tests, namely push-ups to measure the arm muscles' ability, a grip strength test using a handgrip dynamometer, and a softball throwing distance test [15]. The procedure of softball throwing distance test are: 1) sample assume a position in front of a restraining line 6 feet from the throwing line; 2) staying within these lines, sample is instructed to throw the softball as far as possible; 3) three trials are given; 4) the farthest of three trials is recorded to the nearest foot [15]. The procedure of grip strength test are: 1) the participants should be in a standing position, arms at their side, not touching their body; 2) keep elbow bent slightly; 3) participants squeeze the dynamometer with as much force as possible, being careful to squeeze only once for each measurement; 4) three trials should be made with a pause of about 10-20 seconds between each trial to avoid the effects of muscle fatigue; 5) record the result of each trial to the nearest pound or kilogram [16]. Data analysis used bivariate correlation analysis using SPSS 21. The

correlation analysis result will consider the significance value 0.05 for data interpretation with the prerequisite test before analysis.

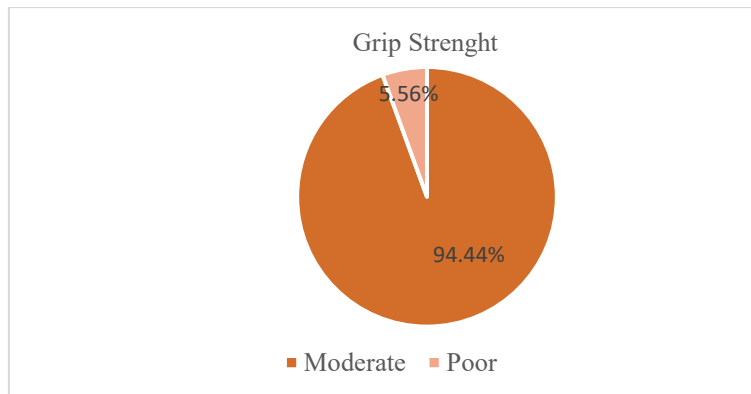
### 3 Result and discussion

Based on the data obtained, 33.33% of athletes have excellent arm muscle strength, 66.67% of athletes have good arm muscle strength, and no athletes have sufficient or less arm muscle strength.



**Fig. 1.** Arm muscle strenght data of female softball athlet

Meanwhile, for grip strength, data obtained by 94.44% of athletes have sufficient grip strength, 5.56% of athletes have insufficient grip strength, and no athlete has grip strength in the good and excellent categories.

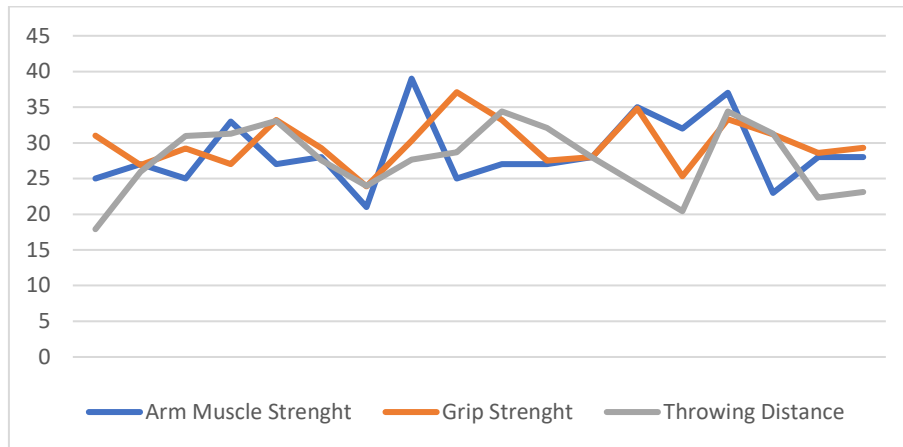


**Fig. 2.** Grip Strenght Data of Female Softball Athlete

Overhead throwing skills exert strong, repetitive force in the shoulder and elbow joints exposing the arms to a wide range of extreme movements [17]. Greater muscle strength is highly correlated with overall athlete performance [18]. Throwing skills play an important role in many sports such as baseball, softball, handball, basketball, and cricket. Although each sport has



different throwing techniques, the muscles used in the throwing technique are the same. Physical and other factors impact the strength and accuracy of throws in a variety of sports and games. Therefore, a good throw is the result of good technique and the contribution of several physical factors [12].



**Fig. 3.** Arm muscle strength, grip strength and throwing distance data

From the results of data analysis performed using correlation analysis, it was found that there was a significant relationship between arm muscle strength and throw distance in softball games with a correlation value of 0.893 and a significance level of 0.000. Furthermore, the result shows no significant relationship between grip strength and throwing distance in softball, with a correlation value of 0.197 and a significance level of 0.448 (Table 1.).

A softball game is the development of a baseball game that requires physical abilities such as speed, strength, and endurance [11]. Besides, male softball players' throwing skills are associated with physiological parameters such as aerobic fitness, speed, explosive strength, flexibility, and grip strength of the right and left hands [9]. The research results were conducted to provide information that arm muscle strength contributes to the throwing distance. In contrast, grip strength does not have a significant relationship to the throwing distance. Arm muscle strength and grip strength are part of the components of physical condition required in softball games and contribute to throwing skills in softball games. Arm muscle strength is one component of the physical condition in softball. Arm muscle strength contributes to the skill of underarm throw, overhead throw, and side throw. Arm muscle strength in throwing techniques is useful for throwing accuracy, throwing speed, and throwing distance. Some of the proven benefits of increasing strength for cricketers are: 1) preventing injury 2) increasing bowling speed 3) increasing throw distance 4) reducing the effect of fatigue 5) increasing bat speed [19].

**Table 1.** The correlation result of arm muscle strength, grip strength and throwing distance

		Arm Muscle Strength	Grip Strength	Throwing Distance
Arm Muscle Strength	Pearson Correlation	1	.169	.893**
	Sig. (2-tailed)		.517	.000

	N	18	18	18
Grip Strenght	Pearson	.169	1	.197
	Correlation			
	Sig. (2-tailed)	.517		.448
	N	18	18	18
Throwing Distance	Pearson	.893**	.197	1
	Correlation			
	Sig. (2-tailed)	.000	.448	
	N	17	17	17

Grip strength is one of the factors that affect the quality of throwing in softball games. Throwing skills in men's softball players are associated with physiological parameters such as aerobic fitness, speed, explosive strength, flexibility, and handgrip strength [9]. Grip strength is evaluated as a component of hand function in most sports. It is one of the best indicators of the overall strength of the limbs. Grip strength is an integrated muscle performance that can be generated in one muscle contraction [19], [20]. Based on the research findings, grip strength does not have a significant correlation with the throw distance. However, in previous studies, handgrip strength has a significant contribution to the speed of throwing. Speed of throwing the ball requires the ability to grip the ball to create control over the ball and increase ball spin, leading to an increase in throwing speed [21]. In addition, [22] has shown that the maximum handgrip strength is related to the speed of throwing the ball ( $r = .79$ ) [13]. Increasing grip strength is not only a skill associated with grasping an object. It can also increase the amount of force generated in a throw. Therefore, with the proper method to increase the hand's grip strength, it will help to analyze the effect of this force on the speed of the ball in throwing [23].

The limitation of this study is only focusing on measuring the throwing distance and does not measure other components of throwing skills such as throwing accuracy and throwing speed. To support the softball performance, throwing technique becomes important basic techniques to be learned and mastered.

#### 4 Conclusion

There is a relationship between arm muscle strength and the throwing distance of the female softball athletes in Semarang city. There is no relationship between the grip strength and the throwing distance for female softball athletes in Semarang city. Arm muscle strength contributes to the throwing distance, while grip strength does not contribute to the throwing distance in female softball athletes in Semarang. For further research, it is necessary to study more variables related to throwing skills, including throwing accuracy and throwing speed.

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# The Training Performance Of Sub Elit Adolescent Archery Athletes Before And During Covid-19 Pandemic

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**Abstract.** The purpose of this study was to know training performance sub elite adolescent archery athletes at the Center for Education and Training for Student Sports (PPLP) before and during covid-19 pandemic. The method used descriptive quantitative. The subject is six female and three male adolescent archery athletes with maximum age is 18 years old. The instrument used push-up test during one minutes to measure arm muscle endurance, a scoring test to measure target accuracy and measure athletes pulse one minutes to find out the ratio of pulse rate during training. Data analysis techniques used are the mean, standard deviation, percentage and normality test, and Paired Sample T Test. The study's conclusion from the results showed no significant difference in the endurance of the athlete's arm muscles ( $P > 0,05$ ), while there is a significant difference in target accuracy and athlete's pulse ( $P < 0,05$ ) before and during covid-19 pandemic.

**Keywords:** Arm muscle endurance, target accuracy, pulse, athlete, archery.

## 1 Introduction

Various sports have made quite high achievements by winning various *events* majorin the World. One of the sports that is currently in demand is archery, which is a shooting skill with a bow and arrow. Meanwhile, archery is a skill or art by shooting arrows using a bow [1].

According to Munawar et al [2] Arm muscle endurance strength is one of the factors that influence archery sport achievement which is an important part of athlete's performance in a competition. Archery can be interpreted as a sports activity of targeting accuracy because with the correct archery technique and the regularity of shooting arrows at the target as precisely as possible [3]. Archery is competed from the national to international level with various divisions, namely: division standard bow, recurve, and compound. The distances contested are also different, for the division the standard bow distance is 30-50 meters, the division is recurve 60-90 meters, the division is compound distance 50 meters [4]. In order for archery athletes to get good and consistent results, physical condition and level of flexibility, coordination, balance and endurance are needed [2].

At the time of lifting the bow, pulling the bowstring, aiming at the target and releasing the arrow, it really requires maximum arm muscle endurance so that the arrow is right on the right target and gets high points [5]. By looking at the current situation we are facing, there is the impact of Covid-19 which is very detrimental to all of us, even there are many athletes whose

physical condition has decreased, one of which is an archery athlete who is not strong enough to pull the last encroachment and lose balance while aiming at the target so that they do not get results score maximum. In the archery sport, an athlete is required to get score a highby having good skills and techniques that will help in aiming at the target with the right target [6] .

According to Akbar et al [7] Lack of physical exercise and exercise will result in the influence of adrenergic hormones in the heart to be more dominant so that it can increase the pulse rate. Regular exercise will result in less adrenergic hormone activity while resting, which will lower the pulse rate in people who have regular exercise and physical exercise habits, so that the heart becomes more effective in pumping blood throughout the body. The decline in sports activities during the Covid-19 pandemic in sports students and an increase in sports activity patterns among non-sports students were the most prominent things. The purpose of this change was made by students to maintain immunity during the Covid-19 pandemic [8] .

Other research states that tablets must always maintain immunity before, during and after exercise [9] . Bashri et al [10] in their research showed that educational media was very feasible based on the results of expert validation and user responses, especially the elderly. Prevention of covid-19 transmission and a healthy lifestyle for the elderly with herbal drinks developed through videos and e-flyers is one of the products of this educational media.

All people are encouraged to carry out regular physical activity during the Covid-19 outbreak as an effort to maintain immunity [11] . Similar research states that students have decreased physical activity during the Covid-19 pandemic. Therefore, it is highly recommended to do sports based on frequency, intensity, time and type with a duration of 150 [12] .

Therefore, it is necessary to carry out this study to determine how much the ratio of muscle endurance, archery target accuracy and athlete's pulse training in the pre-Covid period with the current situation. So that athletes can improve their performance and coaches can understand and pay attention to the training in progress. For this reason, it is very important to carry out this research in order to obtain actual data.

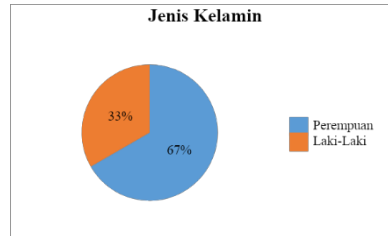
## 2 Method

The type of research approach is descriptive quantitative. This research design used a one-shoot study where the data collection only took place once a day. The target of this study used 9 athletes as the subject, with details of 6 female athletes and 3 male athletes from three divisions of *Standard Bow, Recurve and Compound* who are PPLP Panahn East Java athletes who live in Surabaya. In this study, researchers will do atest *push-up* to measure the endurance of the arm muscles, atest *scoring* to measure target accuracy and then a test to calculate the athlete's pulse to measure how much the pulse issued by PPLP Archery athletes of East Java. Data analysis techniques used mean, standard deviation, percentage, normality, and different tests using the Paired Sample T Test with the IBM SPSS version 24 and Microsoft Excel version 2010 analysis tools.

## 3 Results

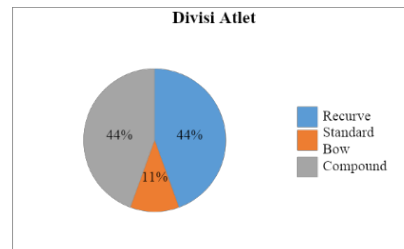
Based on the results of data analysis carried out using push-up tests, scoring tests and pulse counting tests for PPLP Archery athletes in East Java, the following profiles were obtained.

According to Diagram 1 in this study using 9 samples of East Java PPLP athletes consisting of 3 male athletes and 6 female athletes.



**Fig. 1.** Gender of subjects research

From diagram 1, it can be seen that the East Java PPLP Panahan athletes consisted of 33.33% male and 66.67% female athletes. Which means the number of athletes is 9 and consists of 3 male athletes and 6 female athletes.



**Fig. 2.** Division of subject athletes research

From diagram 2 it can be seen that the PPLP Archery athletes of East Java, consist of 44.44%division recurve, 44.44% compound and 11.11%division standard bow. Which means the number of athletes is 9 and consists of 4athletes recurve, 4athletes compound and 1athlete standard bow.

To find out the average value of arm muscle endurance, the accuracy of archery targets and the athlete's pulse in the period before Covid-19 and during the COVID-19 pandemic, athletes were tested with the Paired Sample T Test, which was obliged to perform a normality test first. Following are the results of data normality testing using Kolmogorov Smirnov and Shapiro Wilk which can be presented in table 1.

**Table 1.** Test normality

	Kolmogorov-Smirnov <sup>a</sup>		Shapiro-Wilk	
	Sig.	Description	Sig.	Description
Normal_Otot	.200 <sup>*</sup>	Normal	.936	Normal
Normal_Accuracy	.200 <sup>*</sup>	Normal	.812	Normal
Normal_Deat	.200 <sup>*</sup>	Normal	.821	Normal

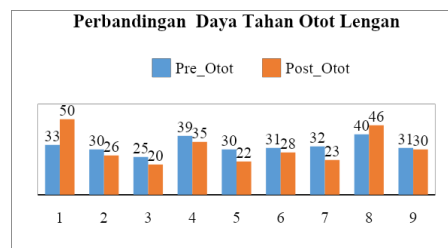
Based on table 1, it is known that the Kolmogorov-Smirnov significance value Sig. from arm muscle endurance (0.200), archery target accuracy (0.200) and the Covid-19 Pandemic pulse rate (0.200), each of which is  $> 0.05$ , which means that the normality test uses the Kolmogorov Smirnov data normally distributed. In addition to testing for normality using Kolmogorov, Smirnov can also test with Shapiro-Wilk with a Sig value. Arm muscle endurance (0.936), archery target accuracy (0.812) and the Covid-19 Pandemic pulse rate (0.821), each of which value is  $> 0.05$ , it can be concluded that the data is normally distributed, which means that the normality requirements in the regression model are met. After the requirements are met, to calculate the average value of the comparative level of arm muscle endurance, the accuracy of archery targets and the pulse of the Covid-19 Pandemic athletes in the period before Covid-19 and during the Covid-19 pandemic, the difference can be calculated using the Paired Sample T Test. in Table 2.

**Table 2.** Muscle descriptive test

		Mean	Std. Deviation
Pair 1	Pre_Otot	32.3333	4.63681
	Post_Otot	31.1111	10.62361

In the results of Table 2, a summary of the descriptive results of the two data categories studied was obtained, namely the variables Before Covid-19 (Pre\_Otot) and the Pandemic Situation (Post\_Otot). For the Pre\_Otot value, the mean Arm Muscle Endurance is 32.3333. As for the Post\_Otot value, the mean value of Arm Muscle Endurance is obtained at 31.1111. The number of East Java Archery PPLP athletes used as respondents was 9 athletes.

Based on Diagram 3, it can be seen that the average ratio of values on muscle endurance was higher before the pandemic, this is because before the pandemic athletes received longer and more intensive training than during the pandemic. For more details, it can be seen in Figure 3 as follows.



**Fig. 3.** Diagram difference avg arm muscle endurance athletes archery PPLP East Java in the prior Covid-19 with pandemic situations Covid-19

Results mean arm muscle endurance in Before Pandemic 32.3333  $<$  Masa pandemic 31.1111, concluded there is a difference Mean Arm Muscle Endurance between Before and Moderate pandemic results. Then the t test difference test was carried out to analyze the significant differences between the two data which are found in Table 4 Paired Samples Test. Also obtained the results of the average difference value of -0.800, which means that there is a difference

between the average Pre\_Otot Arm Muscle Endurance and the average Post\_Otot Arm Muscle Endurance or  $32.333 - 31.1111 = 1.22222$ .

Table 3 shows the results of the correlation value between the pre-pandemic variable and the moderate pandemic variable. For more details, it can be seen in Table 3 as follows.

**Table 3.** Muscle correlation test

	N	Correlation	Sig.	Information for
Pair 1 Pre_Otot & Post_Otot	9	.700	.036	There is a difference.

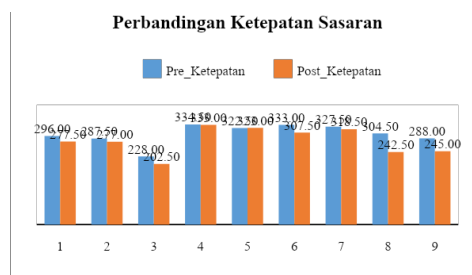
Based on table 3, the Correlation value is 0.700 with a significant value of Sig.  $0.036 < 0.05$  probability means that there is a relationship between before the pandemic and the moderate pandemic variable. The results of table 4 show that there is a difference in the average difference in Arm Muscle Endurance before and during the Covid-19 Pandemic, the Sig value can be seen. (2-tailed) of  $0.662 > 0.05$ , which means there is no difference in the mean Arm Muscle Endurance before and during the Covid-19 Pandemic.

**Table 4.** Different t-T- test muscle test

	Sig. (2-tailed)	Description
Pair 1 Pre_Otot - Post_Otot	.662	Not Significant

Based on the average data calculation, the calculation of Arm Muscle Endurance before the Covid-19 Pandemic was 32.333, which means the average value of the athlete's Arm Muscle Endurance category. before the Covid-19 Pandemic was in a higher category than when the Covid-19 Pandemic got 31.1111 results, which means that the average value of the Arm Muscle Endurance category for athletes in the Covid-19 Pandemic situation was in a smaller category. And after using the Paired T Test, the results showed that there was a significant difference between Arm Muscle Endurance before the Covid-19 Pandemic and during the pandemic.

Based on Diagram 4, it can be seen that the average value comparison on target accuracy was higher before the pandemic, this happened because before the pandemic athletes received a more intensive training schedule than during the pandemic. For more details, it can be seen in Figure 5 as follows.





**Fig. 4.** Diagram of the difference in average target accuracy of athletes in the pre-Covid-19 period with the Covid-19 pandemic situation

In the results of Table 5, a summary of the descriptive results of two variables of the accuracy of targeting archery athletes is obtained, namely before the pandemic (pre-precision) and moderate pandemic (post\_accuracy). For the Pre\_accuracy value, the mean Target Accuracy is 302.3889. Meanwhile, for the Post-precision value, a mean of 280.7222 was obtained. The number of East Java Archery PPLP athletes used as respondents was 9 athletes.

**Table 5.** Descriptive test of accuracy of

	Mean	Std. Deviation
Pair 1 Pre_Ceteness	302.3889	33.56130
Post_Ketoritas	280.7222	44.08026

Based on Table 5, the results of the mean Target Accuracy at Pre\_accuracy 302.3889 <Post\_quality 280.7222 mean that there is a difference in mean Target Accuracy between Pre\_accuracy and Post\_accuracy results. Also obtained the results of the average difference value -21.66667. Which of these results shows the difference between the average Pre\_Correctness and the average Post Test Target Accuracy or  $302.3889 - 280.7222 = 21.66667$  with the difference between 6.04430 to 37.28903. With the information t count has a positive value of 3.198, which means that the mean value of Pre\_Ceteness > than the mean Post\_Cetness.

The next step after calculating the average comparison is seeing the value relationship on the accuracy of the arrows before and during the pandemic which can be shown in Table 6.

**Table 6.** Correlation Test for the accuracy of the

	N	Correlation	Sig.	Description
Pair 1 Pre_Ketepatan & Post_Ketepatan	9	.898	.001	There is a difference

Based on table 6 known value of correlation of 0.709 with significant value 0,001 <probability of 0.05, meaning that it can be concluded there is a relationship between variables Pre\_ketepatan with Post\_ketepatan variables. Then performed a different test using the t test to analyze the significant differences in the two data which are contained in the Table 7 Paired Samples Test.

The results of table 7 show that there is a difference in the average difference in the target accuracy of PPLP Archery athletes in East Java before and during the Covid-19 Pandemic, the Sig value can be seen. amounted to 0.013 <0.05, which means that there is a significant difference in the accuracy of targeting for East Java PPLP Archery athletes before and during the Covid-19 Pandemic.

**Table 7.** Difference T test accuracy

	Sig. (2-tailed)	Description
Pair 1 Pre Ketepatan -Post Ketepatan	.013	Significant

Based average calculation on the result of calculation Arm Muscle Endurance before Pandemic Covid-19 showed 302.3889 which means that the average value of the athlete's Arm

Muscle Endurance category before the Covid-19 Pandemic was in a lower category than when the Covid-19 Pandemic was 280.7222, which means the average value of the Arm Muscle Endurance category for athletes in the Covid-19 Pandemic situation in smaller category. And after using the Paired T Test, the results showed that there was a significant difference between the accuracy of archery before the Covid-19 Pandemic and during the pandemic.

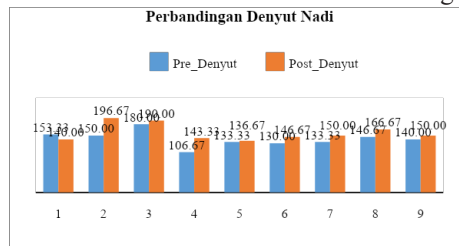


Fig. 5. Diagram of difference in average pulse before and during the Covid-19 pandemic

Results of mean Pulse Rate 141.4815 < Post\_Deat 157.7778, which means that there is a difference in the average pulse rate between Pre\_Pulse and Post\_Pulse results. Then performed a different test using the t test to analyze the significant differences in the two data which are found in table 10 Paired Samples Test.

In the results of table 8, a summary of the descriptive results of the two categories of data under study is obtained, namely the variables Before Covid-19 (Pre\_Denyut) and the Pandemic Situation (Post\_Denyut). For the Pre\_Denyut value, an average of 141.4815 was obtained. Meanwhile, the Post\_Denyut value obtained an average value of 157.7778. The number of PPLP Panahan athletes in East Java used as the research sample was 10 athletes.

Table 8 Descriptive test pulse

	Mean	Std. Deviation
Pair 1 Pre_Denyut	141.4815	20.00771
Post_Denyut	157.7778	21.92158

In Table 8, it is also found that the value (Mean Paired Differences) is -16.29630 which shows the difference between the Pre\_Pulse average and the Post-Pulse average, namely  $141.4815 - 157.7778 = -16.29630$  and the difference between these differences.

Table 9 shows the correlation between the two Pre\_Denyut variables and the Post\_Denyut variable. Based on table 9, it is known that the value is Correlation 0.709 with a Sig.  $0.057 > 0.05$  probability means that there is no relationship between the Pre\_Denyut variable and the Post\_Denyut variable.

Table 9 Correlation test

	N	Correlation	Sig.	Description
Pair 1 Pre_Denyut & Post_Denyut	9	.651	.057	There is a difference

In the results table 9 showed no relationship (correlation) difference in the average difference Pulse athletes Archery PPLP East Java before and Medium Pandemic Covid-19 can know the value of Sig. (2-tailed) of  $0.057 > 0.05$ , meaning that there is no difference in the

average pulse rate of PPLP Archery athletes in East Java before and during the Covid-19 Pandemic.

**Table 10** Differences t -test, pulse rate

Pair 1	Pre Denyut - Post Denyut	Sig. (2-tailed)	Information
		.024	Significant The

Results of table 10 show that there is no mean difference in the accuracy of targeting athletes of PPLP Archery in East Java before and during the Covid-19 Pandemic, the Sig. is  $0.024 < 0.05$ , meaning that there is a significant difference in the Pulse of the East Java PPLP Archery athletes before and during the Covid-19 Pandemic.

Based on the calculation of the average data obtained the results of the Pulse calculation Before the Covid-19 Pandemic, the results were 141.4815, which means that the average score for the Pulse Rate category of athletes before the Covid-19 Pandemic was in a lower category and when the Covid-19 Pandemic (the average (mean) was obtained, 157.7778 was obtained which means the average value of the Pulse Rate category The Covid-19 Pandemic situation athletes are in a larger category. And after using the Paired T Test , the results showed that there was a significant difference between the pulse rate before the Covid-19 Pandemic and during the pandemic.

### 3 Discussion

This chapter will explain the results of the research that the researchers obtained from the push-up test, the scoring test and the athlete's pulse count test. The results of this research data were obtained from the research subjects of athletes PPLP Panahanin East Java.

From the data retrieval process that begins before data collection, the researcher makes a coordination or agreement with the party to be studied so that data retrieval can run smoothly, this data collection is carried out when the athletes exercise together.

And then collect athletes and coaches in the same room to explain the research to be carried out and explain the research implementation rundown to the subject; The researcher prepared the writing equipment, stopwatch and score sheet then distributed to the athletes, After distributing the score sheet athlete's, the pulse rate before training was calculated with the same count which would be calculated through the stopwatch for 1 minute, After calculating the pulse before training then the athlete did atest. pushup for 1 minute with the same count via the stopwatch; Then the athlete performs atest scoring by shooting 36 arrows, in 6 series or encroachment, each series releases 6 arrows given 4 minutes of time; After 1 session is over the athlete counts the pulse of the exercise with the same count for 1 minute; After doing atest scoring for 2 sessions the athlete calculates the number of scores that have been obtained each with a predetermined distance, then collected to the researcher; Then the athlete counts the pulse after training with the same count that will be counted via the stopwatch for 1 minute; Then the researcher distributed the consumption to the subjects and thanked him.

Muscle Endurance is a person's ability to use his muscle mass to contract sustainably with a long load [13] . Muscle endurance is needed to maintain activities that are dominant in muscles. As with other components, muscle endurance is only needed in muscle activity and will gradually decrease with age [14] .

Harsono [15] explains: "Muscle endurance is the ability of muscles to contract consecutively for a long time". Harsono [15] states that: " Strength endurance is the ability of the body's organs to overcome fatigue during activities that require strength for a long time. Achieving target accuracy in archery by doing systematic training, training using key words, practicing eye control and training to focus attention or other methods that will be provided by the trainer [3].

According to Hausswirth [16] defines that the pulse is an indicator to measure the intensity of exercise during physical activity. Recovery pulse rate is the number of pulse beats per minute measured after a 5 minute rest. This measurement is to measure how quickly a person's ability to recover after physical activity.

If an athlete has strong muscle power, accurate accuracy and a regular pulse, it will greatly affect his performance. Therefore an athlete must be able to maintain muscular endurance in the arms, archery accuracy and pulse both when training and competing with the right strategy. When an athlete is training they maintain the predominant activity of a group of muscles.

In athletes, the PPLP Archery condition of muscle endurance, accuracy and regularity of the pulse is very influential because it is one of the components to improve performance.athletes PPLP Archeryhave more intensive physical activity so the need for endurance training is needed.Requirements (Specific EnduranceSpecific Endurance) is endurance that works for a long, medium and short time that carries the characteristics of a sport [17] .

The results of the analysis of the mean Arm Muscle Endurance Before Covid-19 (Pre\_Test) for PPLP Archery East Java athletes are in a higher category, which means that the average value of the Arm Muscle Endurance category for athletes in the Covid-19 Pandemic (Post\_Test) situation is in the category smaller. As for the results of the difference test that has been carried out on Arm Muscle Endurance Before Covid-19 (Pre\_Test) and the Covid-19 Pandemic (Post\_Test) situation,  $p > 0.05$ , which means that there is no significant difference in the endurance of the athlete's arm muscles.

Previous research found that Decline [18] there was a significant effect on bow training on the arm muscle endurance of novice archery athletes. This research is also supported by [19] which states that athletes should pay more attention and increase the endurance of arm muscle strength and eye coordination in order to produce better performance. The most easy and inexpensive way to maintain muscle endurance is to continue to train, because continuing to train consistently greatly affects the increase in strength and endurance of the arm muscles [20].

There are several ways to increase the strength and endurance of the athlete's arm muscles, one of which is by using a dumbbell tool as described by [21] with the results of the analysis of the effect of dumbbell thera training to increase archery accuracy and arm muscle endurance in athletes. archery in Banyumas district.

It can be concluded that an athlete who cannot maintain his muscular endurance, then the athlete cannot give his best performance, and cannot achieve maximum performance results. So an athlete must maintain his body so that he always has good muscle endurance in the period before Covid-19 with the Covid-19 pandemic situation. As stated by Muslim [22] and Gunawan [23] there is a significant relationship between muscle endurance and accuracy of archery shots which is the opposite if an athlete has weak arm muscle endurance, it will reduce the level of target accuracy or accuracy of archery shots.

The results of the analysis of the difference between the average (mean) value of Target Accuracy before Covid-19 (Pre\_Accuracy) and the Covid-19 (Post\_Ketalore) situation in East Java Archery PPLP athletes The results obtained are smaller categories, which means the average value of the athlete's Arm Muscle Endurance category in the Covid-19 Pandemic situation. As for the results of the difference test that has been carried out on Target Accuracy

before Covid-19 (Pre\_Cetness) and the Covid-19 (Post\_Ketoritas) situation in PPLP Archery athletes in East Java  $p < 0.05$ , which means that there is a significant difference in the accuracy of the athlete's archery target.

Accuracy in archery can be achieved through systematic exercises, exercises using key words, practicing eye control and training to focus attention or other methods that will be given by the trainer [3]. Other research on the relationship between concentration levels and target accuracy has been conducted [24]. states that the duration of eye silence is much longer for accuracy than for inaccurate shots. The results suggest that the duration of focus decreases when the player is afraid, that focus reflects the efficiency of visual orientation. Therefore focused training is a useful intervention. Hardi & Nurama [3] and Mukhtar et al [25] also support the results of this study with the results that the higher the level of concentration and accuracy of archery will produce good shots.

The relationship between training that is consistent with target accuracy is not only influenced by the level of focus or concentration of each athlete, but can also be influenced by psychology such as the athlete's panic level, self-confidence and also the intake of food and drink. This is supported by research [26] which states that the emergence of target panic or loss of control comes from themselves, which means that the athlete understands the panic of the target during competition or training in order to master emotions and better target accuracy. Another study conducted by [27] suggested the results of the analysis of the athlete's confidence level of 88.89%, which means that the greater the athlete's confidence will affect the accuracy of archery targets.

It can be concluded that an athlete who cannot maintain his shooting accuracy, then the athlete cannot give his best performance, and cannot achieve maximum performance results. So an athlete must keep his body so that he always has good accuracy in the period before covid-19 with the covid-19 pandemic situation.

The results of the analysis of the difference between the value average of the pulse in the period before Covid-19 (Pre-Pulse) and the Covid-19 pandemic situation (Post\_Pulse) are in a larger category, which means the average value of the Pulse rate category. athletes The situation of the Covid-19 pandemic is smaller than before the Covid-19 pandemic. As for the results of the difference test that has been done, the results obtained are  $p < 0.05$ , which means that there is a significant difference in the archery pulse of athletes.

Previous research has found that [28] stated that adrenergic hormone is a factor in the lack of physical exercise which causes the heart to predominantly increase the pulse rate. There are several ways to recover after strenuous activity so that the athlete's pulse returns to normal, namely by buying watermelons which are supported by [29] which states that giving watermelons after carrying out activities greatly affects pulse recovery in postkibra students of SMA Negri 4 Medan. In another study [30] consuming green coconut water before physical activity can affect pulse recovery in athletic athletes.

It can be concluded that an athlete who cannot maintain the regularity of his pulse, the athlete cannot give his best performance, and cannot achieve maximum performance results. So an athlete must maintain his body with regular exercise so that he always has a good pulse regularity in the period before covid-19 with the covid-19 pandemic situation.

## **4 Conclusions and recommendations**

### **4.1 Conclusion**

The results of the research from the title Comparison of Arm Muscle Endurance, Target Accuracy and Pulse of Training for East Java PPLP Archery Athletes in the Pre-Covid-19 Period With the Covid-19 Pandemic Situation it can be concluded that:

1. There is no significant difference in endurance Forearm muscles of athletes before Covid-19 (Pre\_Otot) with the Covid-19 Pandemic (Post\_Otot) situation with a significant level (Sig.> 0.05).
2. There is a significant difference in the target accuracy of athletes before Covid-19 (Pre\_Cetness) with the Covid-19 Pandemic (Post\_Cetness) with a significant level (Sig. <0.05).
3. There is a significant difference in the pulse rate of athletes before Covid-19 (Pre\_Denyut) with the Covid-19 Pandemic (Post\_Teat) with a significant level (Sig. <0.05).

#### **4.2 Suggestion**

1. It is hoped that with the results like the above, the coaches pay more attention to the importance (always maintaining endurance of the arm muscles, accuracy of archery targets and regular pulse of the athletes) by regularly exercising and consuming good nutritious food in the pre-Covid-19 period with a pandemic situation. covid-19.
2. There needs to be a joint commitment in a team in order to get maximum results to really pay attention to the importance of arm muscle endurance, accuracy of archery targets and regularity of the pulse.
3. For athletes PPLP Archeryin East Java, they must know the need to maintain fitness for arm muscle endurance, archery target accuracy and pulse regularity in their respective bodies in order to avoid a decline in conditions goodbefore Covid-19 with the Covid-19 pandemic situation.
4. Forresearchers further, it is necessary to add variables or factors that function to get more accurate results about arm muscle endurance, archery target accuracy and pulse regularity.

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# The Level Of Knowledge And Prevention Of Overtraining In The Province Level Basketball Team

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**Abstract.** The purpose of this study was to determine the level of knowledge and prevention of overtraining at the provincial level basketball team. The method uses quantitative and descriptive. The research targets were 12 female basketball athletes and 2 coaches who participated in Regional Training Center. Data obtained through surveys using multiple choice questions and questionnaires. The analysis technique used the mean, percentage, normality test, and difference test with SPSS 25. The results showed the average knowledge value of athletes was 84.6 (very good) and the prevention of overtraining that had been applied by athletes was 56.41 (fair). Meanwhile, the average value of the coach's knowledge was 80 (good) and the prevention of overtraining that had been applied by the coaches was 75.64 (good). The conclusion shows that there is a significant difference between knowledge and prevention of athletes ( $p < 0.05$ ), but there is no significant difference in coaches ( $p > 0.05$ ).

**Keywords:** Knowledge, prevention, overtraining, athletes, coaches.

## 1 Introduction

The facts show that to achieve optimal performance must go through a good sports coaching system. One of them is structured training [1]. Thus, the level of education and knowledge of athletes and coaches about overtraining greatly affects the training process. It is reinforced by the opinion of Ashadi [2] that factors that can affect optimal sports performance and achievement include athletes and coaches, knowledge and personality, facilities and infrastructure, competition situations, and science related to sports training. So it is important for coaches to always improve their knowledge and skills related to sports training they are engaged in. Because the coach's role is very important in the success of a team, namely in making training programs, managing the training process, and helping athletes prepare for maximum performance.

Thus athletes must do intensive training for a long period, to achieve maximum performance. Of course, doing intensive training regularly also prioritizes exercise to improve physical condition and training of technical skills simultaneously by giving weight gradually. Both of these exercises, if done without paying attention to the ability of an athlete's body, especially when doing physical exercise, can trigger fatigue and have an impact on the athlete's technical performance [3].

Excessive exercise without thinking about the recovery period can be risky poor condition for athletes, namely experiencing decreased performance due to fatigue in training [4]. In exercise physiology, the term used to describe the incidence of excessive exercise that is not balanced with adequate rest is called overtraining [5]. Overtraining is not only caused by overtraining. [6] Carter et al, argue that overtraining is also caused by an inadequate recovery period, lack of good nutritional intake, poor sleep quality, excessive emotional stress in the environment, work and psychology, and lack of communication between athletes and coaches. So that it can disrupt in the body's work system [7].

Disorders that can be experienced due to overtraining are different signs or symptoms for each athlete. [8] Grivas research supports the statement that symptoms of overtraining appear more than 60% in distance runners during their athletic career, and more than 50% during 5 months of the season in professional football players, and symptoms of overtraining occur in 33% for basketball players, underwent 6 weeks of training. Symptoms that arise can hurt the athlete's physical or psychological condition. If it is not handled quickly in the right way, it will have a negative impact on the condition of the athlete.

The impact of overtraining is that it causes chronic fatigue, decreased immunity, increased stress hormones, muscle pain so that you are prone to injury [9]. It is reinforced by the results of Kenta's 2015 research on 628 athletes in Sweden, showing that athletes who experience injuries are caused by or overtraining. even Overtraining can occur reach 20-30% with the more serious cases. So that the athlete's career is at stake, what is worse, athletes can experience early retirement from sports due to overtraining.

Therefore, athletes and coaches need to carry out prevention strategies overtraining an optimal. Because preventing disease is better than cure, especially in cases of overtraining. [6] Carter et al state that there are six best methods to prevent overtraining which include : making an appropriate exercise program; monitoring exercise and recovery; have good sleep quality; adequate water and good nutrition; have good communication between athletes and coaches; education or education about overtraining. Based on the description above, athletes and coaches must know and understand about overtraining, be it about the causes, symptoms that arise, and the impact that will occur. By knowing and understanding this, athletes and coaches can apply prevention overtraining. Therefore, athletes and coaches who have good knowledge about overtraining will also apply prevention overtraining properly.

The problem that exists is the limited literature of research results that show the fact of the level of knowledge about overtraining in athletes and coaches. Therefore, this research is important as follow-up research. The novelty in this study lies in the characteristic aspects of the subject, namely the provincial level athletes and basketball coaches, as well as measuring the level of prevention of overtraining. The results between the knowledge value and the prevention of overtraining will be compared to whether there is a difference or not.

This research was conducted as a rationale for further research or policy-making for basketball athletes and coaches throughout Indonesia regarding efforts to identify and understand the dangers of overtraining, to implement prevention strategies overtraining. By having good knowledge and prevention of overtraining, it is hoped that this will be a positive step in achieving an optimal sports achievement.

## 2 Methods

This study used a descriptive design and survey test methods. The research target is the basketball team at the provincial level. The respondents who participated were 12 female athletes and 2 coaches. The subject criteria are athletes and basketball coaches who are active in participating in the Regional Training Center.

The instrument used in this study is multiple-choice questions to determine the level of knowledge of overtraining, as well as using questionnaires to know the level of prevention of overtraining. The questionnaire has passed the validity and reliability test with the athlete's value (0.985) (0.979) and coach (0.961) (0.962). The questionnaire consists of 39 questions using the Guttman scale. Questionnaire indicators can be seen in the following table.

**Table 1.** Indicator questionnaire

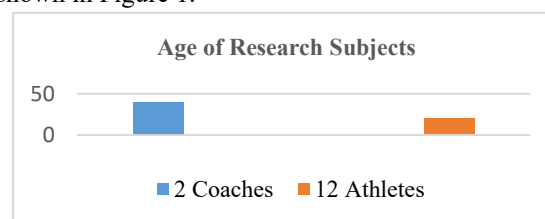
Question Number	Indicator Questionnaire
1 – 8	Periodization
9 – 15	Exercise Monitoring & Recovery
16 – 23	Sleep
24 – 35	Hydration & Nutrition
36 – 38	Communication
39	Education

The data collection technique was carried out in an online survey using Google Form. Distributing the link prevention questionnaire to respondents via the group WhatsApp is one of the methods of collecting data for this research. After the questionnaire data was collected, the knowledge data collection was continued using multiple-choice questions totaling 25 questions. Retrieval of knowledge data, namely through video conferencing individually per respondent, with the application Zoom or Google Meet to assist in displaying questions and answer choices, as well as being able to find out which respondents answered honestly without any help from others.

The research data collection period was carried out in December 2020. After all, data was collected, it was analyzed by calculating the mean, percentage, normality test, different tests using the Independent T-test on normally distributed data, and the Maan-Whitney test on abnormally distributed data with the help of SPSS. version 25.

## 3 Results

After researching an online survey in the form of multiple-choice questions and a questionnaire using Google Form, the following results can be obtained. The profile data of research subjects is shown in Figure 1.



**Fig. 1.** Age of research subjects

Based on the data in Figure 1, it can be seen that the average age of the two coaches is 39 years. While the average age of the 12 athletes is 20.6 years.

**Table 2.** Educational background of research subjects

No	Name	Position	Educational Background
1	LN	Coach	Senior High School
2	IWT	Coach	Senior High School
3	SK	Athletes	S1
4	JH	Athletes	S1
5	JSN	Athletes	S1
6	ACW	Athletes	S1
7	FI	Athletes	S1
8	FS	Athletes	S1
9	ARA	Athletes	S1
10	DKP	Athletes	S1
11	FAS	Athletes	S1
12	MP	Athletes	S1
13	JE	Athletes	S2
14	EK	Athletes	Senior High School

Based on the data in table 2 it can be seen that the last education of the two coaches was high school graduation. Meanwhile, of the 12 athletes, there is 1 athlete with high school education and 11 other athletes who have a university education, either S1 or S2.

The following is the calculation result of data analysis for multiple-choice questions about overtraining. The results of the knowledge value of athletes and coaches about overtraining are shown in the following table.

**Table 3.** Results of athlete's knowledge value about overtraining

Range of Values	Category	Frequency (n)	%
81 – 100	Very Good	9	75%
61 - 80	Good	3	25%
41 - 60	Fair	0	0
21 - 40	Less	0	0
0 - 20	Very Poor	0	0
Average Value	84.67 (Very Good)		

The data shows that most of the athletes' knowledge results are in the very good category with a percentage of 75%. Only 25% in either category. Based on the data in table 3, it can be concluded that the average value of athletes' knowledge about overtraining is 84.67 in the very good category.

**Table 4.** Results of coach's knowledge value about overtraining

Range of Values	Category	Frequency (n)	%
81 – 100	Very Good	1	50%
61 - 80	Good	1	50%
41 - 60	Fair	0	0

21 - 40	Poor	0	0
0 - 20	Very Poor	0	0
Average Value			80 (Good)

The data shows that the results of the coach's knowledge are 50% in the very good category and 50% in the good category. Based on the data in table 4, it can be concluded that the average value of the coach's knowledge of overtraining is 80 in the good category.

Based on the data in table 3 and table 4, it can be concluded that the level of knowledge of overtraining in athletes and coaches is very good. This is very positive because with good knowledge it is hoped that athletes and coaches will also have prevention overtraining good.

**Table 5.** Prevention values results of overtraining in athletes

Range of Values	Category	Frequency (n)	%
81 - 100	Very Good	0	0
61 - 80	Good	6	50%
41 - 60	Fair	5	41.7%
21 - 40	Less	1	8.3%
0 - 20	Very Poor	0	0
Average Value			56.41 (Fair)

Table 5 shows that most of the results of prevention of overtraining athletes are in the good and adequate category with a percentage of 50% and 41.7%. Only 8.3% in the poor category. Based on the data in table 5, it can be concluded that the average value for preventing overtraining for athletes is 56.41 in the fair category.

**Table 6.** Prevention of values for the overtraining in coaches

Range of Values	Categories	Frequency (n)	%
81 - 100	Very Good	0	0
61 - 80	Good	2	100%
41 - 60	Fair	0	0
21 - 40	Less	0	0
0 - 20	Very Poor	0	0
Average Value			75.64 (Good)

Table 6 shows that the results of the prevention of overtraining are coach 100% in the good category. Based on the data in table 6, it can be concluded that the average prevention value of overtraining coaches 75.64 in the good category.

The prevention questionnaire was overtraining divided into 6 strategy groups, namely periodization, monitoring of exercise and recovery, sleep, hydration and nutrition, communication, and education. From the six groups, 39 questions were made. The results of the prevention strategies overtraining that have been implemented by athletes and coaches can be seen in the following table.

**Table 7.** Prevention of overtraining in athletes based on strategies

for Preventing Strategies Overtraining	Percentage (%)	Category
Periodization	87.5%	Very Good
Exercise Monitoring & Recovery	57.29%	Fair

Sleep	40.47%	Less
Hydration & Nutrition	46.52%	Fair
Communication	47, 22%	Fair
Education	58.33%	Fair

Based on the data in table 7, it can be seen that athletes have implemented a prevention strategy with the periodization method of 87.5% in the very good category, training monitoring and recovery of 57.29% in the fair category, sleeping 40.47% in the less category, hydration and nutrition 46.52% are in the fair category, communication 47.22% are in the fair category, and education 58.33% are in the fair category.

**Table 8.** Prevention of overtraining in coaches based on their

Methods Prevention Methods of Overtraining	Percentage (%)	Category
Periodization	100%	Very Good
Exercise Monitoring & Recovery	81.3%	Very Good
Sleep	64.29%	Good
Hydration & Nutrition	54.17%	Fair
Communication	100%	Very Good
Education	100%	Very Good

In table 8 it can be seen that the coach has implemented a preventive strategy with the periodization method which is 100% in the very good category, monitoring of exercise and recovery of 81.3% is in the very good category, sleep is 64.29% in the category good, hydration and nutrition of 54.17% were in the sufficient category, communication was 100% in the very good category, and education was 100% in the sufficient category.

**Table 9.** Differences in the average value of knowledge and prevention in athlete and coach

Comparison of	Min	Max	Mean	Category	
Athletes	Knowledge	72	92	84.67	Very Good
	Prevention	35.90	69.23	56.41	Fair
Coach	Knowledge	76	84	80	Good
	Prevention	74.36	76.92	75.64	Good

In table 9 it can be seen that there are significant differences in the value of knowledge and prevention in athletes, namely 28.19. While the difference in the value of knowledge and prevention of overtraining in the coaches is 4,36. Although the results of the coach value did not differ significantly, did indicate that the level of prevention of overtraining was coaches slightly lower than knowledge. Based on the data in table 9, to determine whether there is a significant difference or not, a comparison test will be carried out.

**Table 10.** Data normality test

Kolmogorov-Smirnov <sup>a</sup>				
		Statistic	df	Sig.
Knowledge Outcomes	Athlete	, 208	12	, 159

	Coaches	, 260	2	.
Prevention Results	Athlete	, 168	12	, 200
	Coaches	, 260	2	.

In table 10, it can be seen that the significance value of athlete's knowledge (0.159) and athlete's prevention (0.200), then the two data indicate that the knowledge and prevention of athletes are normally distributed because the Sig value is  $> 0.05$ . So that for the different tests using the Independent T-Test which will be explained in table 11.

While the significance value of the coaches' knowledge and prevention is unknown, it can be concluded that the two coaches' data are not normally distributed, due to the small number of samples. So that for the different tests using the Mann-Whitney Test which will be explained in table 13.

**Table 11.** Difference and homogeneity

Test of Difference and Homogeneity of		
Variables	Independent T-Test (P)	Levens Test (P)
Knowledge and Prevention of Athletes	0.000	0.020

In table 11 it can be It is known that the results of the test for the difference in knowledge and prevention of athletes are 0,000. It can be interpreted that there is a significant difference between knowledge and prevention of athletes because of the P-value  $< 0.05$ . The table also shows the results of the homogeneity test, namely 0.020, which indicates that the data is not homogeneous, because of the P-value  $< 0.05$ .

**Table 12.** Homogeneity test

One Way Anova		
	F	Sig.
Knowledge and Prevention of Coach	1.078	, 408

The results of the homogeneity test in table 12 show a value of 0.408, which means that the coach's knowledge and prevention are homogeneous because the P-value is  $> 0.05$ .

**Table 13.** Comparison test of

Maan-Whitney Test		
Comparison of		Sig. (2-tailed)
Knowledge and Prevention of	Athletes	.000
	Coach	.439

Based on the results of homogeneity in table 11, shows that the knowledge and prevention data of athletes are not homogeneous. So to strengthen the data, a non-parametric test was carried out with the Maan-Whitney Test. The results of the comparison test in table 13 show that there is a significant difference in the knowledge and prevention of athletes (0.000) because

of the P-value  $<0.05$ . Meanwhile, the comparison between the knowledge and prevention of coach (0.439) did not have a significant difference, because the P value  $> 0.05$ .

## 4 Discussion

Sports achievement is a sports activity that is competitive and rigorous to achieve victory through competition. Because of its very competitive nature, athletes must prepare themselves optimally, both physically, technically, tactically, and mentally. So all of that must be properly trained and maintained during training or matches through the role of a coach [10]. Basketball is a form of sports achievement that demands a competitive role as a description of sports achievement in general. So that to achieve victory in the game of basketball requires good teamwork, and every athlete is required to be able to perform basic basketball techniques perfectly, and must have the optimal physical condition [11].

Most coaches improve athlete performance by increasing training load and training frequency. However, when the results of training or match results are worse, the coach's natural reaction is that they will still increase weight training [12]. [13] have the same opinion, namely that when an athlete sacrifices most of his life in sports for his career success, the athlete will have high ambition so that the athlete will increase his training hours, with the hope of improving performance and achieving much better results. However, when expectations do not match expectations, it will be a factor in the occurrence of stress.

Doing excessive training continuously and not giving enough time for recovery, will trigger overtraining and can cause athletes to experience physical and mental fatigue [14]. Also, overtraining is caused by several factors, namely stress due to exercise, academic stress, environmental stress, parental demands, and psychological disorders of athletes [6]. With this, if athletes experience an imbalance between stress due to exercise or stress not due to prolonged training, coupled with a lack of good nutritional intake, then athletes can experience fatigue, decreased performance, and symptoms of overtraining others [15].

Signs or symptoms experienced by athletes during condition overtraining according to [16] is divided into 2 kinds of physiological symptoms and psychological symptoms. Physically, athletes will experience an increase in resting heart rate, changes in normal blood pressure, excessive weight loss, excessive thirst, obstructed respiration, digestive disorders, and muscle aches. While the symptoms of overtraining psychological, athletes will experience sleep disturbances, depression, emotional and motivation imbalance, loss of self-confidence, easily drowsy or tired, and decreased appetite.

Athletes and coaches are required to know and understand what signs or symptoms are during the condition of overtraining. If athletes and coaches know the symptoms or signs of overtraining, they will make these symptoms a warning sign [13]. So that athletes and coaches do not let the symptoms get worse. Because with the onset of symptoms of overtraining that is left untreated, it will become a symptom that gets worse and will hurt the condition of the athlete [17].

The impact of overtraining is that athletes will experience prolonged chronic fatigue, resulting in decreased performance and decreased immunity, and athletes will be prone to injury or even early retirement from sports. Based on the results of the research, it shows that the level of knowledge of athletes about overtraining is very good, so according to the theory of [18] it can be interpreted that athletes are ready to compete with other athletes to win in a match.



Meanwhile, the coach's knowledge about overtraining was in a good category. By the existing theory, it is said that a coach who has a good level of knowledge will have a positive impact on the quality of training. Because the coach will provide a training program following the principles of training and adapted to the condition of the athlete [19]. If the coach's knowledge is not good, the training is likely based on past skills and knowledge [2]. So that it can cause errors in giving weight or training intensity. This can lead to overtraining and at a bad risk for the athlete's condition during the process of achieving sports achievement [20].

Therefore, athletes and coaches must implement a good prevention strategy, to minimize the incidence of overtraining. In general, the prevention of overtraining is based on self-discovery over a long period through endurance training and a combination of the knowledge of athletes, coaches, researchers, and sports medicine experts [5].

The results of this research data provide strong evidence that even though athletes and coaches have a good level of knowledge of overtraining, it will be useless if it is not balanced with the application of good prevention of overtraining. This will put the athlete's career at risk. Therefore, good knowledge and prevention of overtraining are needed so that athletes can train optimally in safe conditions. The prevention strategies Overtraining that can be done by athletes and coaches according to Carter et al [6] is divided into several best methods, which include:

#### **4.1 Periodization**

To prevent overtraining, it can be done by making an exercise program that is progressive and systematic, wherein in the training program there is no sudden increase in intensity or volume, avoiding giving high volumes in a row, increase the variety of exercises so as not to be monotonous, and certainly provide a sufficient recovery period. If it is needed, it can be done by creating an individual training program for each athlete [21].

#### **4.2 Exercise monitoring**

In addition to making a proper training program, carrying out detailed training monitoring can also help coaches know the condition of their athletes, both in conditions of recovery, stress, even when athletes are injured [22].

To carry out exercise monitoring can be through physiological and psychological monitoring. Biological monitoring can take into account the intensity of exercise and the recovery period by measuring VO2Max, heart rate, and body weight. Also, the RPE session can also be used as consideration for exercise intensity because it can detect the buildup of fatigue experienced by athletes within several days of training [23].

Meanwhile, psychological monitoring can use subjective assessment through several questionnaires that have been validly used in previous research. According to Kusuma [24] the Wellness Questionnaire is proven to be able to help coaches and athletes in monitoring fatigue, especially in team sports. [13] Agung & Tirtayasa in conducting psychological monitoring of athletes using the RESTQ (Recovery Stress Questionnaire for Athletes) questionnaire aims to measure the mental, emotional and physical condition of athletes.

#### **4.3 Recovery**

The principal cause of overtraining is an imbalance between training and recovery. So with athletes doing a good recovery, they can restore the body's metabolic function so that they can return to a more prime condition so that athletes can show their best performance [25]. To restore

the body's condition, it can be done in many ways, including massage, compressed garments, thermotherapy, cryotherapy [26].

The purpose of massage is to help improve blood circulation and repair damaged muscles to recover caused by exercise [27]. Massage can also increase the happiness hormone or endorphins, release tension and relax muscles and increase joint reach [28].

The use of compressed garments is becoming more and more popular, and many people use them during exercise. However, there is evidence that use after exercise can aid recovery and reduce blood lactate concentrations and muscle soreness [29].

Using thermotherapy as recovery can generate sweat to eliminate levels of toxins in the blood, and can increase blood flow to relieve muscle tension [30]. It is recommended to do thermotherapy or steam bath at a temperature of 36 degrees Celsius for 8 to 10 minutes.

Cryotherapy or cold therapy plays an important role in post-workout recovery because it can reduce spasms or muscle damage due to exertion. This cold therapy should not be done for too long, it is good that it is 5-10 minutes [31].

#### **4.4 Sleep**

Sleep is vital when athletes do intense exercise because lack of sleep will hurt the quality of the training session. The results showed that the application of sleep to athletes was in the poor category, so the athlete may experience impaired cognitive function, especially in the ability to concentrate, and can increase fatigue. Therefore, sleep is one of the best and most effective recovery strategies [32].

A good sleep duration recommendation for athletes, in general, is 7-9 hours per day. [32] advises athletes to take a 30-minute nap during training and in a competitive environment, especially in athletes who experience sleep deprivation.

A person will wake up feeling refreshed and fit if he sleeps for the right duration [33]. Reinforced by the results of research by Mah et al [34] showing that the men's basketball athletes at Stanford University experienced a significant increase in performance after prolonging sleep habits. The athlete also reported prolonged sleep habits, which reduce drowsiness and fatigue.

#### **4.5 Nutrition and hydration**

In general, nutrition is very important in the recovery period of athletes after training or competition. Because with adequate nutrition, it can help improve athlete performance, prevent fatigue, increase concentration and strength, and speed up recovery. Each athlete will have different nutritional needs every day because it follows the intensity of the exercise being carried out. In one day, athletes are required to eat no less than three times and still eat breakfast. According to Zahra & Muhlisin [35] to meet nutritional needs athletes must pay attention to many aspects including calorie needs, macronutrients, time, supplements, and hydration.

Hydration is the adequacy of fluids in the body, while dehydration is the lack of fluids in the body. Dehydration can cause decreased performance, weakness in the body, reduced concentration, decreased muscle work, and head strokes. To avoid dehydration, athletes should drink water without waiting for thirst, consume 400-600 ml of water before training or competition, while when training and competing as much as 100-200 ml of water every 15-20 minutes. According to Ashadi [36], to find out that athletes are hydrated or dehydrated, it can be done by testing the color of urine and weighing the body.

#### **4.6 Education about overtraining**

As mentioned in the research of Meeusen et al [15], cases of overtraining can vary from 7-64% and athletes who have experienced overtraining will tend to relapse in the future. Therefore, the coach must guide the athlete by providing direction on how the training program is given, as well as providing information that preventing overtraining can maintain health and can improve performance.

Athletes and coaches can also attend sports-related seminars or training, such as sports nutrition science, training program development, injury management. Also, athletes and coaches can seek information through books, magazines, radio, television, and newspapers, which aim to increase their knowledge [37].

#### **4.7 Communication between athletes and coaches athletes**

Repeatedly athletes face mood swings caused by developing stress outside of training, triggering overtraining. Therefore, communication between athletes and coaches is very important. Good communication, relationships can prevent overtraining by discussing the decline and development of athletes while training. To help coaches correct and know the limits of their athletes' abilities [38].

Based on the results of the study, it shows that the application of athlete communication is in the poor category, which can cause the loss of communication between athletes and coaches. It is like when the coach gives the athlete's head instructions to get enough sleep, consume nutritious foods, and have adequate water. But the athlete does not do what the coach instructs, it can interfere with the training process. Because according to Pradipta [39] the coaches' duty is as a leader, mentor, monitoring, training program planner. Meanwhile, the athlete's job is to do according to the coach's program, be it an exercise program or a recovery program.

## **5 Conclusion and suggestion**

Based on the analysis of research data on the basketball team at the provincial level, it can be concluded that there was a significant difference between the knowledge and prevention values of athletes ( $p < 0.05$ ). Because the average value of the athlete's knowledge about overtraining is higher than the value of prevention. There is no significant difference between the knowledge and prevention values of the coaches ( $p > 0.05$ ). Although the average value of prevention of overtraining in the coach is lower than of his knowledge.

Based on the above conclusions, it is hoped that athletes and coaches will apply the results of their knowledge in implementing prevention overtraining properly. Because with good knowledge and prevention of overtraining, it will have a positive impact on the career of athletes in achieving sports achievements both at the regional, national, and international levels.

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# Paragliding Ground Handling Training Model With a Combination of Belayer, Anchoring and Simple Towing in Above Normal Wind Condition

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**Abstract.** This research to improve students' skills Ground Handling abilities in Paragliding Subjects using the belayer, anchoring, and simple towing methods. Respondents are 18 students of the Sport Science Department who took Paragliding courses. Inclusion criteria were healthy, never had a heart attack. Respondents with height phobia were divided into 3 treatment groups and 1 control group. This research was conducted in two cycles, each cycle consists of two meetings. The results of percentage classical completeness in cycle 1 of 48.2% increase to 73.2% in cycle 2. The initial stage 4 groups that have the ability to master ground handling material in wind conditions above normal with mastery between 6% - 7%, in the middle stage there was the belayer group with a result of 22%, the anchoring group 19%. and the simple towing group 21%, but at the end of the session the results achieved had a significant difference, namely 65% for the belayer group, 52% for the anchoring group, while the simple towing group reached 73% capable, this result ignores gusty fluctuations. Hot and humid weather conditions that can change from time to time when learning data are documented.

**Keywords:** Paragliding, ground handling, ground handling method.

## 1 Introduction

The skill of controlling a parachute on a flat field in Paragliding related to the condition of students in lectures is something that needs to be evaluated continuously, so that the final product of the lecture will get maximum results. The orientation of the skill performance applied by students in the field is evaluated by the effectiveness of the work performance, which is defined as the result of the Paragliding course lecture. The ability to perform in preparation for the flat field before flying, ground handling, during the paragliding flight stage is prioritized to achieve real paragliding performance. In countries that have advanced in paragliding as a sport and tourism it has been shown that a decrease in a practitioner of paragliding during flight is highly correlated with early performance and better ground handling abilities [1], [2]. Therefore, a paragliding student needs to direct mastery of this initial stage, to produce maximum performance during the actual flight later. Paragliding lectures with stages and using the help of tools, including special strategies in Paragliding education, are often used by lecturers who teach courses to increase acceleration or acceleration in learning [2]. The lecture method by adding a step of instruction in standard procedures in lectures includes wearing additional ground handling safety and security devices [2], [3]. Ground Handling with the help of belayer,

anchoring, and simple towing has a positive influence on students and is very effective in improving early flight performance [2], [3], [4]. The lecture stimulus depends primarily on the clarity of speech and the emphasis of the words that come from the lecturer to the students. Clarity of instruction and systematics or sequences of orders must be considered because they both affect the amount of attention and achievement of lecture results [5], [6].

Previous studies of instruction in learning with an emphasis on systematics and clear sequences of orders show that the utterance of every word that comes out of the lecturer can cause changes that may reduce the quality of understanding of each form of command in lectures [4]. However, considerable stress in instruction may be required to provide sufficient learning stimulus to increase command absorption and concentration development during the flight preparation phase [5], [7].

Another related report is that the relationship between paragliding flight readiness and the relationship of emergency during flight has been examined. The main variables of this relationship are ground handling ability, self-control ability and potential leg injury, which corresponds to the maximum mechanical ability of the lower limb to show good flight performance. These psychological and physiological parameters are influenced by body flexibility, muscle and nerve activity, and ligament and muscle joint configuration. Therefore, ground handling skills using belayer, anchoring, and simple towing methods are important. Greater understanding of ground handling and take off in an integrated manner may also benefit students and lecturers. Based on observations of researchers in the field (in Indonesia), it was found that the instructor or assistant instructor of the paragliding club in learning activities is monotonous, instructor-centered, only uses a drill approach, and only emphasizes motor mastery while other aspects are neglected such as intellectual, mental and values. other aerospace. As a result of this, club members tend to be indifferent, lack motivation to learn and practice, feel bored, and lack creativity. Supposedly, it is necessary to plan for paragliding learning and training that is goal-oriented and tries to adapt to the physical and psychological conditions of club members so that they carry out learning and training activities optimally. Another experience from a field study about ground handling and drill takeoff-landing on a broad hill (without any obstacles or obstructions) can be an ideal effort to be used as a place for student learning. However, such an ideal system is very expensive to implement and complicated in Paragliding Sports courses in the Semarang area, where the university is located. Furthermore, because ground handling capability is considered important, it is necessary to understand this effect not only at the first second but also at the end of the actual flight stage. As far as the researchers' knowledge, no study has analyzed ground handling methods with the help of belayer, anchoring, and simple towing.

As a way of solving and overcoming the problems of learning spaces and training fields that have to move around in relation to the wind speed which always changes in each season, it is overcome with belayer, anchoring, and simple towing methods for students in flat terrain conditions and winds above normal. The belayer, anchoring, and simple towing methods are used as teaching tools and practical exercises aimed at deepening ground handling techniques that have been carried out normally in normal winds.

In the current era of science and technology, innovations in tactical methods are no longer carried out by promoting the laminar and gentle wind, which is common in lectures until now. Belayer, anchoring, and simple towing methods are expected to facilitate learning and drilling more frequently so that students can perform and master basic flying techniques faster, but have the potential to reduce high costs for moving lectures.

Based on the description, the authors formulate existing boundaries to be used as a starting point for the discussion in this paper, namely the belayer method, anchoring, and simple towing on paragliding ground handling.

Indonesia is a country with a lot of hills and volcanoes, so the sport of paragliding has grown better, but among this sport little research is related to it, and little is known about the specific behavior associated with it. Adventure recreational sports, mainly practiced on the grounds of tourism, are enjoyed throughout the world, with several studies examining the behavior of adventure recreation users. Most of the overseas researchers and scientists took the adventure model of Ewert and Hollenhorst [8] in their analysis of the data evaluating these activities, while Schuett found the independent variable "activity participation rate" that did not have an appropriate measurement scale. He suggests replacing it with "more lasting engagement" to ascertain how tourists find their interests and develop their skills. There are similar studies, only Li and Ou [9] examined personal or professional background, recreation motivation, and preferences for environmental characteristics of paragliding consumers. Ho, Chung, and Chen used Ewert and Hollenhorst's model to ensure that long-lasting involvement of paragliding practitioners means higher frequency of participation, skill levels and risk awareness [10].

Previous field studies have focused on correlations, differences, and/or preferences for environmental attributes. Several studies have explored demographic and behavioral differences [11] or analyzed the impact of regional development paragraphs on regional economies [12]. Others conducted engagement analyzes with regard to sports injuries [13] and psychological impact. Apart from participatory adventure recreation behavior, many concerns focus on motivation [14].

Few studies have examined the importance of flight preparation especially Ground Handling in the overall flight effort, empirical research has explored less than participation in these activities. Pomfret suggests that future study analyzes of engagement impact participants in a profound way. In addition to completing the gap in theoretical studies, it can also be a basis for developing paragliding activities more broadly in Indonesia [15].

## 2 Method

Based on the narrative described above, in a practical way, the steps of the research carried out are as follows: (1) Conducting preliminary research in the form of a survey of lecturer performance in lecture management; (2) Compiling the initial model design of the learning model, starting to design the planning, implementation, and evaluation of learning; and (3) Making observations in two stages. The sample consisted of 18 male and female students with certain characteristics, healthy with a doctor's certificate, had never had a heart attack and were not afraid of heights. Data collection techniques used in this study were observation (observation), interviews, documents and questionnaires. Observations were made at each stage of the research, starting from the pre-survey stage, 1st observation stage to 2nd observation stage which was more typical. Interviews and questionnaires were used at the pre-survey stage, before the assessment stage. Document analysis is used to collect data, especially in preliminary studies, namely to answer research questions related to planning and implementing Paragliding sports lectures that have been implemented by lecturers.

The next stage, consisting of determining the standard procedure for the implementation of the paragliding lecture / learning program using the belayer, anchoring, and simple towing



methods, which includes 1) observation and field orientation / ground handling field (soil conditions, gravel, tartan, chalk line, grass, drainage channels, soil and environmental moisture conditions, wind direction, wind speed, wind type, and sun heat); 2) preparation of supporting resources and equipment for lectures / learning (personal, moral, individual and administrative tools); 3) carrying out the opening session of lecture preparation (brainstorming, warming up, quiz, recalling apparatus and daily procedures); 4) the core of the lecture (according to the research instrument phase three protocol which is not written in this article); 5) closing the lecture (closing session); 6) analyzing the achievement of lecture objectives and the absorption of lecture material; 7) determine the points of conclusion. Additional notes, that in order to initiate the protocol using belayer, anchoring, and simple towing methods in lectures, re-observation and re-orientation of the lecture environment are carried out. This protocol includes 1) filling in a point to point checklist for inspecting the launching equipment and units to ensure that they are in good condition; 2) observing with focus every movement of lecture participants who carry out ground handling; 3) sensitive to every response made by the paragliding unit (person and glider unit) when forming kites (kiting); 9) resetting the ground handling protocol to normal.

These classroom action research steps aim to develop new abilities and skills, new approaches or a new product of knowledge to solve problems with real-time direct application in the field, in line with Arikunto's [16] opinion that: "classroom action research is a observation of learning activities in the form of an action that is deliberately raised and occurs in a class together ". Furthermore, this research is carried out in a cycle, where one cycle itself consists of 14 days or 2 weeks starting with the first cycle, if there is no significant change in the first cycle then it can be continued to the next cycle until the target of material absorption in lectures can be achieved properly. By using 2 cycles to achieve the classical absorption criteria. This study uses a model according to Suharsimi Arikunto's view that classroom action research has four stages, namely the planning stage, the implementation stage, the observation and reflection stage [16]. Stage 1 (first) is called pre-research, measuring ground handling skills with ground handling performance in winds above normal, to determine the ability of ground handling performance in winds above normal and the results of these tests will be used as guidelines for researchers to conduct research using the belayer method, anchoring, and simple towing.

### **3 Result and Discussion**

The next stage is called the research implementation stage, which consists of cycle I (first), for two weeks students face ground handling lectures with winds above normal, followed by data collection on ground handling skills tests. The test results are announced immediately at the end of the score taking, followed by a discussion of the results of the skills test and there is an opportunity for questions and answers about the lectures that have been carried out. Lecturers are involved in discussion and evaluation of lectures. Observations were made two weeks after the students received a lecture on ground handling with winds above normal, as a researcher who was annoyed by a lecturer, the next task was to collect data to determine changes in student skill abilities. Reflection is carried out on the assessment results data during the lecture process that has taken place in Cycle I, the results are to determine the ability of cycle I and as a guideline that is conveyed to students. If it is found, it is not according to the lecture target, then the next cycle is carried out, namely Cycle II. In Cycle II all protocols were carried out in accordance with Cycle I, Cycle II was carried out for two weeks and then the student ability data were taken.

At the end of the test, the test result value is read, which is used as a benchmark to determine the increase in ability after Cycle II is carried out, at this stage a reflection of the results is also carried out.

There are several notes, namely 1) in the field observation and orientation activities or ground handling sites, it is noted that the dry soil conditions are ideal for learning / lecturing paragliding, the dewy grass tends to be wet until around 9 am so the new field is ready and ideal for lectures at that time, the channel clean drainage from standing water is safe for mal-orientation that leads to trenches, less than ideal soil and environmental conditions in the hours before 9 am, wind direction, wind speed, wind type, ideal sun heat; 2) the preparation of supporting resources is supported by 3 assistants from senior paragliding activists, while 5 units of lecture / learning equipment and individual equipment are available and are classified as inadequate both in quality and quantity, however administratively they are completely available ; 3) carry out the opening session (opening session) of lecture preparation consisting of brainstorming, warming up, quizzes, recalling apparatus and daily procedures carried out by the lecturer correctly and systematically but the students' attention is less focused; 4) at the core of the lecture (according to the stage three research instrument protocol which is not written in this article) was carried out ineffectively because it was constrained by the number of gliders and the lecture area used was quite wide while the lecturers were without loudspeakers; 5) closing the lecture at the closing session was recorded quite effectively with questions and answers related to the material, however, the shady situation under the tree made some students less focused. There are observation points as follows: 1) the preparation stage for performing / showing religious attitudes and behavior before starting a series of activities; 2) carry out self-security measures in a convincing manner, which include: -Using a helmet to glue the safety rope with a "click" sound; tidy up shoes to clothing parts thoroughly; stretch the glider carefully, with an efficient and steady motion; perform a careful physical inspection of the glider, line, both raisers and toggle; wearing the harness by making sure the chest strap, leg strap, main strap are connected to the connector until you hear a "click" sound; ensure sure performance of the raiser interconnection movement with the harness; carry out the environmental orientation of launching ground including wind direction and field punctuation in the form of wind shook and crepe paper strands; (As a note, that this component was carried out steadily by the lecturers, but less steadily by almost all students at the beginning of the study). In the next stage, Kiting with the following components of observation: -participants perform / show a serious / steady attitude and behavior, starting the glider lift with steps and movements that efficiently adjust the glider to form the glider wall with the glider's nostrils facing upward relatively steadily and convincingly; - Carry out the glider control steps while gradually moving up, showing a confident and focused attitude towards the glider and the body position of the glider in a convincing manner, within a determined period of time (gradually) which includes: Ensuring maintaining the stance and positioning of the footrests when the glider moves towards above and form a canopy; Shows a calm and flexible attitude and movement towards each glider's movement adapting to the movement of the wind; Keeping the line tension still in position forms a canopy unit against the body, within the specified time; Adjusting the lower and re-tensing of the glider line unit followed by a calm and reasonable reversal of the body. Repeating point 4) steadily according to the specified stages; Lower the glider calmly and steadily until it reshapes the glider's wall on the ground while keeping the line.

## 4 Conclusion

Based on the results above, it can be concluded that the ability to construct new knowledge; while the implementation of this learning model is the implementation of the lecture plan carried out to jointly study the determined competencies, which are formulated in the paragliding field lecture scenario which includes the main activities of carrying out the opening activity ( opening session) class preparation (brainstorming, warming up, quizzes, recalling apparatus and daily procedures); 4) the core of the lecture; 5) closing the lecture (closing session). The evaluation carried out includes the evaluation of the process and results. Process evaluation serves to obtain information about capacity building. Evaluation of the results is functioned to obtain information about the student's ability to master lecture material. The results of action research in this lecture are the first that the belayer, anchoring, and simple towing method can improve learning outcomes of Ground Handling. This is evidenced by an increase in the average from cycle 1 to cycle 2 with the percentage of classical completeness in cycle 1 of 48.2% increasing to 73.2% in cycle 2, with details that can be reported is that at the initial stage 4 groups have the ability to master ground handling material in wind conditions above normal with mastery of achievement between 6% - 7%, in the middle stage session there were differences, namely the belayer group with 22% yield, and 19% ancoreing group. and the simple towing group 21%, but at the end of the session the results achieved had a significant difference, namely 65% for the beleyer group, 52% for the ancoreing group, while the simple towing group achieved 73% success, this result ignores gusty fluctuations. hot weather conditions and humidity that can change from time to time when the learning outcome assessment data is documented. It is hoped that it can increase the effectiveness of Paragliding lectures at the University.

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# The Effect of High Intensity Interval Training in Improving Aerobic Capacity

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**Abstract.** There are many kinds of exercise that can be used to improve aerobic capacity including High Intensity Interval Training (HIIT). The main purpose of this research was to analyze the effect of HIIT in improving aerobic capacity. This was a quantitative research with non randomized control groups pretest posttest design. This research was conducted at 30 male college students. Group 1 (15 players) was given high intensity of HIIT using V drill, 20m yard square, squirm, 40 yard lateral shuffle, 10 cone snake drill, 40 yard sprint for eight weeks period with frequency three times a week. Group 2 (15 players) was given a conventional exercise. Instrument of this research was multistage fitness test. Paired sample t test was used to analyze data. The result of this research seem that there was a significant improved of aerobic capacity after being given high intensity of HIIT. The conclusion can be stated that HIIT has improved aerobic capacity significantly.

**Keywords:** High Intensity Interval Training, aerobic capacity, high intensity.

## 1 Introduction

Performance enhancement of athletes has become an interesting topic of discussion and research area in sport science. There are many research that resulted better solution regarding performance in sport. However, the problem of athletes' achievement are still going to analyze by sport scientists in order to achieve sport performance effectively and efficiently. Physical condition of athletes has important role in achieving sport performance. Recently, there are so many methods of physical condition that can be used to improve athletes' physically. High Intensity Interval Training (HIIT) is one of training method of physical condition that can be used to improve anaerobic capacities. In addition, it can be used to increase aerobic capacities of athletes. HIIT is a method of cardio training that can applied to athletes in developing muscle volume, therefore it can increase power, speed and agility.

HIIT is one of the physical training methods that use a short training period but with the type of strenuous training which make the heart rate increase faster, therefore oxygen consumption become increases too. In addition, the metabolic processes in the body will be faster and the fat used for burning energy becomes more and more [1]. This increased of metabolic process does not only take place when exercising, even if the metabolic process will continue quickly. This condition is called Resting Metabolic Rate (RMR) which can be triggered

because of the effect of excessive oxygen consumption when training. This effect can cause the body to continue burning fat and producing energy even though it is in a state of rest.

Some previous studies have been conducted of HIIT method in improving some of athletes' physical conditions. HIIT method is able to increase power, speed and agility for basketball players with an average age of 20.8 years old [2]. HIIT training also reported that it increases of VO<sub>2</sub> max and improves the performance of soccer players significantly [3]. Furthermore, other studies designed to determine the effects of HIIT training on lower extremities and upper extremities strength in basketball players with ages 18 to 23 years, it shows that the HIIT training has a significant increase of strength compared to the control group [4]. Based on some theories and previous studies, therefore the purpose of this study is to analyze the effect of HIIT exercise in improving aerobic capacity.

## **2 Methods**

This study was a quantitative with quasi-experimental research method. This study used a Non-Randomized Control Group Pretest-Posttest Design. This study was conducted at 30 male college students with mean age  $\pm$  20.5 years old. The samples of the study were divided into 2 groups with 15 students of each group. Group 1 was given treatment of HIIT with high intensity (80% - 95%) using V-Drill, 20-Yard Square, Squirm, 40-Yard Lateral Shuffle, 10-Cone Snake Drill, 40-Yard Sprint [5] for six weeks period with frequency of three times a week. The treatment was started at intensity of 80% for the first week, then every two weeks after it increased by 5% until the 8th week to 95%. Group 2 (15 students) was given a circuit training. Instrument of this study was a multistage fitness test, it was taken before giving treatment (pretest) and after 8 weeks training (posttest). The data was analyzed using paired sample t test with SPSS 20.0 series.

## **3 Result and discussion**

The results of this research showed that HIIT exercise have a significant increased in the aerobic capacity. It can be seen that VO<sub>2</sub>max improved from 42.08 ml/kg/minutes (pretest) to 48.21 ml/kg/minutes (posttest). It increased of 14.6% with P <0.05. The following data were presented in Figure 1, Figure 2 and Table 1.

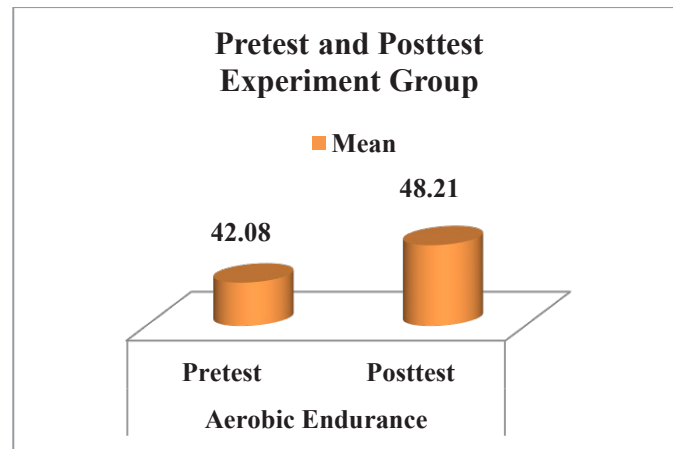


Fig. 1. Pretest and post test data of group 1

As clearly show in the Figure 1 that there was a significant improved of aerobic endurance of Group 1 after being given HIIT exercise program, it increased approximately 6.13ml/kg/minutes from pretest to posttest.

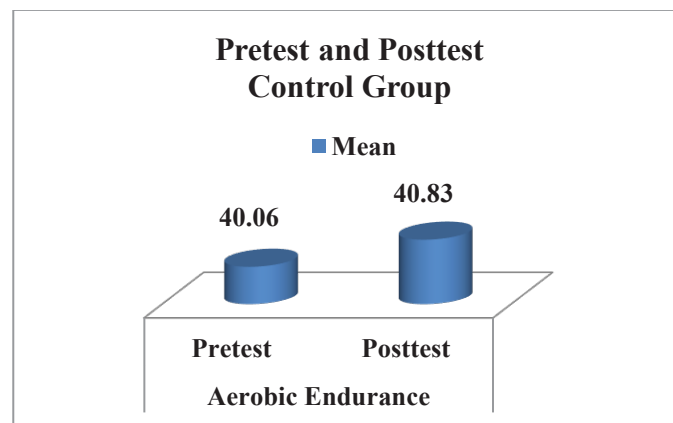


Fig. 2. Pretest and post test data of group 2

As can be seen from Figure 2, there was a slightly increased of aerobic endurance approximately 0.77ml/kg/minutes of Group 2. The VO<sub>2</sub>max increased from 40.06 ml/kg/minutes to 40.83 ml/kg/minutes.

**Table 1.** Paired samples test

Variable	Pair	Mean	N	t	df	Sig.
Aerobic Endurance Experiment Group	<i>Posttest – Pretest</i>	6,14667	15	3.813	14	0,002
Aerobic Endurance Control Group	<i>Posttest – Pretest</i>	0,37333	15	2.817	14	0,014

Another crucial finding that depicted at Table 1 indicated that there was a significant increased of HIIT training program in improving aerobic capacity with  $p < 0.05$ .

HIIT training method in this study used the types of exercises consisting of 6 forms of high-intensity interval training: V-Drill, 20-Yard Square, Squirm, 40-Yard Lateral Shuffle, 10-Cone Snake Drill, 40-Yard Sprint [5]. Jogging was carried out during recovery between high-intensity interval training or active recovery.

The result of this study was supported by another studies which found that HIIT method can improve power, speed and agility for basketball athletes [2]. The SAQ training program can increase speed, agility, and quickness [6]. Furthermore, the results of this study are relevance to previous studies that found High-intensity Interval Training (HIIT) exercises have a significant increase in Aerobic Capacity for athletes [7]. In addition, HIIT training program are able to improve endurance and speed of athletes [8].

Furthermore, HIIT indicates as a better exercise in improving cardiorespiratory fitness in healthy children and adolescents compare to moderate intensity continuous training [9]. HIIT can be as an efficient model of training that can improve cardiorespiratory fitness, but it's still unclear effecting on body composition [10]. HIIT may increase in certain important variables of aerobic and anaerobic [11]. Young athlete may have benefit to use HIIT because it requires less time of training period per session compare to training for sport specific fitness. The limitation of this study is that.

## 4 Conclusion

The conclusion of this study can be stated that there was a significant improved of High Intensity Interval Training (HIIT) in improving aerobic capacity. High Intensity Interval Training can be used as an alternative method of training to increase athletes' Aerobic Capacity. Future study that can be suggested is to conduct research using HIIT compare to other exercise in increasing aerobic capacity and anaerobic power.

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**Conflict of Interest.** There is no conflict of interest between authors.

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# Was it Right New York Knicks Coach's Decision to Recruit a Point Guard?

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**Abstract.** The aims of this study was to analyze New York Knicks Coach's decision in recruiting a point guard. In the 2019-2020 season, NY Knicks ended up in ranked 25 of 30 NBA teams. NY Knicks is ranked 29th for FG% and 24th for 3PA and 3P%. NY Knicks need a shooter to strengthen the team. But interestingly, the coach recruited a point guard. In the first 25 games in 2020-2021 season without this point guard, NY Knicks recorded 11 wins and 14 loses and is in 9th place on the eastern conference. In the next 25 games after new point guard joined, NY Knicks recorded 14 wins and 11 loses and is in 7th position. This means that NY Knicks' game has increased and has the potential for the playoffs. The research method uses descriptive quantitative. The data source is taken from the NBA official website.

**Keywords:** Basketball, New York Knicks, NBA

## 1 Introduction

Basketball is a game played by 2 teams with each team consisting of 5 players. The objective of each team is to score as many points as possible by putting the ball into the opponent's basket, and to prevent the opposing team from scoring points [1]. Basketball was created by Dr. James Naismith, who at that time was a graduate student and instructor at Springfield, Massachusetts in 1891 [2]. Since then basketball has grown around the world until now. The United States is the center of world basketball, where there is the most prestigious basketball league, the National Basketball Association (NBA) [3]. There are 30 teams competing for the NBA title [4]. The 30 teams are grouped into 2 regions, namely eastern conference and western conference, each of which consists of 15 teams [5].

The NBA has very complete statistical data and can be accessed publicly on the NBA's official website. Statistical data is very useful in modern sports. Match data can be used for the preparation of appropriate training programs, strategy formulation, and player recruitment [6]. Yarrow and Kranke argue that the collection of statistical data analysis data can provide appropriate feedback for talent scouts, coaches and athletes in improving the performance of athletes and teams [7].

NBA statistics for the 2020-2021 season are always updated. The 2020-2021 NBA season is slightly behind its usual schedule every season. Apart from that, the format of the match has also changed. The NBA Board and the National Basketball Players Association, Tuesday local time approved the basketball league in America for the 2020-2021 season starting December 22 after previously discussed in detail. This prestigious basketball league will host 72 regular

season matches. This number has decreased compared to the previous number which reached 82 matches [8].

A total of 30 teams competes for the NBA title. One of the teams involved is the New York Knicks. In the 2019-2020 NBA season, the New York Knicks are ranked 25th out of 30 teams competing [9]. The New York Knicks didn't even qualify for the Playoffs. In the 2020-2021 NBA season, the New York Knicks showed improved performance and entered the top 8 in the eastern conference. However, there is still a problem experienced by the New York Knicks, namely shooting problems. At the end of 2020, the New York Knicks was ranked 27th for field goal made [10], 15th for 3 pointers made, and 29th for 2 points percentage [11]. From these data, it can be assumed that the New York Knicks need a reliable shooter as a solution. However, the New York Knicks coach recruited the veteran point guard on February 8, 2021 [12]. This decision is interesting to study through research.

The point guard is the player's position in basketball. Point guards usually have a shorter stature when compared to players in other positions. However, point guards must have good skills, especially dribbling, passing and leadership. It's not uncommon for point guards to be team captains. The next position is shooting guard. This position requires complete shooting skills, from three points shot, midrange shot, layup, and under basket [13]. From the explanation of the two positions, it is clear that the shooting guard has the duty and obligation to the shooting record of the team. The decisions taken by the New York Knicks coach are all the more interesting. The purpose of this study is to examine the decision of the New York Knicks coach who prefers to recruit point guards over shooting guards.

## **2 Method**

The method used in this research is descriptive quantitative. The data used is secondary data obtained from the NBA's official website, namely the New York Knicks match data for the 2020-2021 season. To be precise, the data on the 10 games the NY Knicks played with at the start of the season and 10 games with the new point guard. What is observed in this research are 9 indicators games statistics. Those indicators are: data of 2 points attempt (2PA), 2 points made (2PM), 2 points percentage (2P%), 3 points attempt (3PA), 3 points made (3PM), 3 points percentage (3P%), field goal made (FGM), field goal attempt (FGA), and field goal percentage (FG%). In addition, data on the New York Knicks' victories and defeats will also be presented in 20 matches in the 2020-2021 season. The data were analyzed using descriptive statistics

## **3 Results and Discussion**

The 2020-2021 NBA season started more backwards when compared to previous seasons. This is the impact of the pandemic. The 2020-2021 NBA season starts on December 22, 2020 and the first game of the New York Knicks is on December 23, 2020. These 10 games have not recruited a new point guard. Here is the data for the first 10 games of the New York Knicks in the 2020-2021 season based on 9 Indicators:

**Table 1.** New York Knicks First 10 Games in 2020-2021 Season

Games	2PM	2PA	2P%	3PM	3PA	3P%	FGM	FGA	FG%
1	27	57	47.4	12	28	42.9	39	85	45.9
2	24	54	44.4	8	29	27.6	32	83	38.6
3	30	58	51.7	16	27	59.3	46	85	54.1
4	20	54	37.0	14	25	56.0	34	79	43.0
5	29	52	55.8	3	36	8.3	32	88	36.4
6	30	56	53.6	12	27	44.4	42	83	50.6
7	36	64	56.3	7	21	33.3	43	85	50.6
8	37	65	56.9	8	22	36.4	45	87	51.7
9	25	69	36.2	9	27	33.3	34	96	35.4
10	26	53	49.1	6	21	28.6	32	74	43.2
$\Sigma$	284	582		95	263		379	845	
mean	<b>28.4</b>	<b>58.2</b>	<b>48.8</b>	<b>9.5</b>	<b>26.3</b>	<b>36.1</b>	<b>37.9</b>	<b>84.5</b>	<b>44.9</b>

From table 1 it is known that the New York Knicks had an average of 2 points made of 28.4 with an accuracy of 48.8 percent. Meanwhile, an average of 3 points made is 9.5 with an accuracy of 36.1 percent. While overall, the average field goal made was 37.9 with an accuracy of 44.9 percent. The accuracy of 2 points, 3 points, and field goal is relatively low when compared to the top NBA teams. In the first 10 games, the New York Knicks experienced 5 wins and 5 defeats. If the New York Knicks want to qualify for the play offs, especially if they are chasing the NBA title, of course, it requires a reliable shooter or shooting guard who can contribute points of 2 points or 3 points with high accuracy.

However, the New York Knicks coach instead brought in a point guard who could be considered a senior player rather than bringing in a shooting guard. The point guard in the 2019-2020 NBA season played for the Detroit Pistons team. Its statistical record in the Detroit Pistons is 18.1 points per game, the average field goal made is 7.4 with an accuracy of 49%, the average point score of 3 points is 0.9 with an accuracy of 30.6 percent [14]. The points per game are quite high, but three points made and the accuracy is low. Meanwhile, the problem faced by the New York Knicks is 3 points attempt and 3 points made. Right on February 8, 2021, the New York Knicks officially recruited the point guard. Table 2 shows the 10 first games with the new point guard.

**Table 2.** New York Knicks First 10 Games After a New Point Guard Joined

Games	2PM	2PA	2P%	3PM	3PA	3P%	FGM	FGA	FG%
1	27	59	45.8	10	28	35.7	37	87	42.5
2	38	74	51.4	6	24	25.0	44	98	44.9
3	33	58	56.9	12	28	42.9	45	86	52.3
4	25	49	51.0	17	34	50.0	42	83	50.6
5	26	60	43.3	7	27	25.9	33	87	37.9
6	27	60	45.0	6	18	33.3	33	78	42.3
7	27	68	39.7	11	29	37.9	38	97	39.2
8	32	51	62.7	19	37	51.4	51	88	58.0
9	28	57	49.1	12	24	50.0	40	81	49.4
10	31	60	51.7	13	26	50.0	44	86	51.2
$\Sigma$	294	596		113	275		407	871	
mean	29.4	59.6	49.3	11.3	27.5	41.1	40.7	87.1	46.7

The inaugural match with a new point guard took place on February 9, 2021 against the Miami Heat and lost [15]. The point guard played for 20 minutes 20 seconds scoring 14 points. Pretty good contribution in the first game even though his team got a defeated. The following is data on 10 New York Knicks games with the new point guard.

Based on table 2, it can be seen that 2 points made are 29.4 with an accuracy of 49.3 percent. Meanwhile, the average 3 points made was 11.3 with an accuracy of 41.1 percent. While overall, the average field goal made was 40.7 with an accuracy of 46.7 percent. All of these indicators have improved when compared to the first 10 games at the start of the season. In these 10 matches, the New York Knicks have won 7 and lost 3. For more details, see the following table.

**Table 3.** Data Comparison

	2PM	2PA	2P%	3PM	3PA	3P%	FGM	FGA	FG%
New York Knicks First 10 Games in 2020-2021 Season									
$\Sigma$	284	582		95	263		379	845	
mean	<b>28.4</b>	<b>58.2</b>	<b>48.8</b>	<b>9.5</b>	<b>26.3</b>	<b>36.1</b>	<b>37.9</b>	<b>84.5</b>	<b>44.9</b>
New York Knicks First 10 Games After a New Point Guard Joined									
$\Sigma$	294	596		113	275		407	871	
mean	<b>29.4</b>	<b>59.6</b>	<b>49.3</b>	<b>11.3</b>	<b>27.5</b>	<b>41.1</b>	<b>40.7</b>	<b>87.1</b>	<b>46.7</b>

It is clear that there has been an increase in 2 points made, 2 points attempted, 2 points percentage, 3 points made, 3 points attempted, 3 points percentage, goal made field, goal attempt field, and goal percentage field. From the comparison of these data, we cannot see the point guard's contribution to the score obtained by the New York Knicks. The following are the point guard statistics for the first 10 matches.

**Table 4.** Point Guard First 10 Games with New York Knicks Data

MP	FG	FGA	FG%	3P	3PA	3P%	FT	FTA	FT%	AST	PTS
20:20	5	9	55.6	2	3	66.7	2	2	100	3	14
19:58	7	11	63.6	0	1	0	0	0		6	14
23:37	3	9	33.3	0	1	0	2	2	100	3	8
16:33	1	10	10	0	1	0	2	2	100	2	4
18:44	1	8	12.5	0	1	0	2	2	100	2	4
27:10	6	15	40	2	4	50	2	2	100	8	16
27:35	7	11	63.6	2	2	1	2	2	100	6	18
37:42	6	11	54.5	1	3	33.3	4	4	100	11	17
32:09	6	14	42.9	2	3	66.7	0	1	0	5	14
29:06	6	15	40	1	5	20	0	0		1	13
$\Sigma$	48	113		10	24		16	17		47	122
mean	4.8	11.3	42.5	1	2.4	41.7	2	1.7	94.1	4.7	12.2

The point guard's record is quite good with an average of 12.2 points, 4.7 assists, 94.1% free throw accuracy, but the average field goal made is 4.8 with an accuracy of 42.5 percent and an average acquisition of 3 points 1 with an average of 3 points attempt 2.4 is still quite low even though the accuracy of 3 points is 41.7 percent. The point guard's performance is still below his record when he played at the Detroit Pistons last season. Indeed, adjustments are needed with the new team. This may be one of the performance factors that have not been

maximized even though the coach has given quite a lot of minutes of play, namely 25 minutes 29 seconds.

Basically, the point guard's job is to organize attacks, disrupt the opponent's defense, and give the ball to players who have a big chance of scoring points. Although in certain teams the point guard can be a mainstay in scoring points. This depends on the player's capabilities, not solely based on position. From the data presented above, it cannot be concluded whether the New York Knicks coach's decision to recruit a point guard is not appropriate. This is because the 2020-2021 NBA season is still ongoing. The point guard's overall contribution to the team is inconclusive at this point. The data presentation above can be an early illustration of the New York Knicks' performance in the 2020-2021 season. The trend of the New York Knicks' performance increases and has the opportunity to qualify for the playoffs.

To answer research questions, further study is needed after the 2020-2021 NBA season is over. Not only seen from the match statistics for the New York Knicks and the point guard. But it also needs statistical analysis to determine the player's contribution to the New York Knicks. The analysis that can be used is the Bayesian linear regression model [16].

#### 4 Conclusion

Whether correct or not the New York Knicks coach's decision to recruit the point guard cannot be analyzed at present. The 2020-2021 NBA season is still running. This initial stage is only to give an idea of the different statistics for the New York Knicks in 10 games without a new point guard and 10 games with a new point guard. Statistical data shows improvements in all aspects of shooting. However, the point guard's contribution cannot be analyzed yet. Complete data for the 2020-2021 NBA season is required. Further data collection and appropriate analysis will be carried out so that the objectives of this research can be achieved.

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# The Sports Scientist Challenge

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**Abstract.** Sport as a social practice and as a field of science. Sport related to health, fitness and technology. The aspects of sports including education, training, and recreation side. Sports medicine to sports philosophy developed the possibility of scientific implementation to the latest and updated practice based on scientific norms that are linked as multidisciplinary. The methods used are hermeneutics (reviewing various literature to capture the essence) and heuristics (opening new avenues for new studies). The clarification and justification of various sports phenomena is continuously carried out by sports scientists. The COVID-19 is one of the extraordinary challenges of sports scientists to improve various sports activities. Locally, nationally, regionally and internationally scientists need to agree on a comprehensive and in-depth study of suggestions for organizing individual sports, community sports, and elite sporting events in an atmosphere of maintaining compliance with health protocols against the Covid-19 pandemic.

**Keywords:** Sports scientist, clarification, justification, COVID-19 pandemic.

## 1 Introduction

Sport is an activity that involves the body, and thus it is easy to identify the interests that come with it: health. At first, sports were more of a leisure time activity, then they developed and were also intended as activities that transform the patriotic spirit of nationality, positive activities to build superior character, and even as a method of psychological therapy. Not only physical health, sport has built a positive image among nations, represents mental health which also spurs various industries as well as an arena for creativity and innovation of many things. In short, sports fill substantive things in life.

Sports Science has a relatively shorter history compared to other disciplines such as philosophy, law, economics, and so on. The field of science under it is still relatively new. Therefore, it is very important for Sports Science to build theoretical foundations as a scientific discipline. Something that is very important and vital for Sports Science - as well as other sciences such as political science, medicine, literature and others - is that sports science provides a system of scientific research, teaching, training, and the constructive integration of other sciences in it.

The role of philosophers and the importance of philosophical views on the phenomenon of sports and sports science (representing other object areas, such as environmental issues, politics, etc.) can thus be summarized in two main processes: clarification and justification. In the context of sports, the question of clarification (“what do you mean?”) Is relevant for examining issues of truth or the nature of objects /phenomena of interest to philosophers. Clear and logical conceptual argumentation is essential in order to arrive at a position where



the philosophical thinking involved can be effectively agreed upon, or at least have an understanding of what is disagreed with.

Sports scientists also need to have the same tendency. Clarification of various phenomena that exist around sports science to be scientifically analyzed and to justify various key themes to enrich literacy about them. Although this paper has a small and simple contribution, the process of clarifying and justifying the atmosphere of the COVID-19 pandemic in relation to scientific theoretical developments in sport needs to be put forward along with the practice of organizing events.

## 2 Study Challenges

The methods used are hermeneutics (reviewing various literature to capture the essence) and heuristics (opening new avenues for new studies). Hermeneutic to capture *objective geist* (deepest meaning, the nature of values) contained in the object of research. Heuristics is next to the analysis results can open new avenues in reconstructing The characteristic of the object of study in Sports Science is the phenomenon of human motion. This phenomenon of movement in the context of sports becomes very complex because it contains biological, psychological, and anthropological content. Sport is a specific form of human movement behavior. The direction and purpose of people exercising, including the time and location of the activities carried out vary. This shows that sport is a phenomenon that is relevant to social life and cultural expression, including in this case the typical tendencies of ideology, profession, organization, education and science. Meanwhile, the nature of universality shows that sports diversity is influenced by socio-cultural diversity and specific geographical conditions [1]. In addition, sport can be used as a social laboratory for social science in general. But Carlson et al [2] emphasized that the combination of sports and science is still very problematic and requires a lot of study.

The involvement of updates on the status quo of sports science always brings challenges to this study. In the "Declaration of Sport", UNESCO defines sport as "any physical activity in the form of a game that contains a struggle against natural elements, other people, or oneself" [3]. What KDI-Keolahragaan [4] mentioned about various types of sports based on their functions and objectives, namely educational sports, health sports, rehabilitative sports, recreational sports, and competitive sports, reflects the breadth of the contents of the UNESCO definition of sport, which at the same time shows its limited breadth from the material object of sport science.

The keyword in the field of "sport" is human body movement. Mind-based sports - such as chess - must precondition physical activity. This is a standard, taking into account the level and focus of the physical activity (endurance, flexibility, strength, etc.). To date, there are five branches of "mind sports" recognized by the International Olympic Committee (IOC): go, draft, poker, bridge and chess, which are recognized as sports for the above reasons. The International Mind Sports Association is even specifically held to accommodate international competitions for four mind sports whose "playing field" is a board: go, draft, bridge, and chess (can be seen at [www.imsaworld.com](http://www.imsaworld.com)). The distinction between "mind sports" such as chess with, for example, basketball, is that the chess result is not a physical-intensive activity like basketball [3].

Mind sports are not substantively differentiated from body sports, but can be seen as the other side of a perceptual unity (to borrow the concept of the phenomenology of the Merleau-

Ponty body) with the world at hand (eg chess and the board). Optimization of the body before, during and after playing chess also always requires constant optimization of the mind. The level of dominance at the conscious / reflective stage alone makes it defined as mental sports or not [3].

National sports are sports based on Pancasila and the 1945 Constitution of the Republic of Indonesia which are rooted in sporting values, Indonesian national culture, and responsive to the demands of sports development [5]. In the next article, the national sports system is all aspects of sports that are interrelated in a planned, systematic, integrated and sustainable manner as one unit which includes regulation, education, training, management, development and supervision to achieve national sports goals (article 3). In chapter 2, articles 3 and 4 of the same law, it is stated that national sports have the function of developing physical, spiritual and social abilities as well as forming a dignified national character and personality; as well as national sports aimed at maintaining and improving health and fitness, achievement, human quality, instilling moral values and noble morals, sportsmanship, discipline, strengthening and fostering national unity and integrity, strengthening national resilience, and uplifting the nation's dignity and honor. From some of these articles (and the entire contents of the law), it can be urged to identify the distinctive features of Indonesian sports which in this study must also be considered in congruence. Openness to theoretical findings or scientific applications as in other sciences, is of course a conventional requirement as well as an individual scientific attitude that continues to be implemented in the development of sports science [3].

When the middle of the 20th century sport was recognized globally as one of the world's scientific studies, various focus activities became increasingly escalative and intensive. Sports science side by side with various other scientific disciplines spur innovation and creation never stop filling life with various activity trinkets, goods, services, and various kinds of fruits of knowledge. Sport science and various related sciences work hand in hand to fill scientific challenges to spur the creative dimension of this science. The birth of sport as an independent science in the late 1990s in Indonesia gave rise to impetus (impetus) for scientists to increasingly contribute on all fronts in producing scientific-creative findings. Despite the attractiveness (and strength) of the sports metaphor, can sport, as a representation in science, overcome strong scientific standards. In this case, the test of whether sports science should be considered 'scientific', in terms of characteristics, relevance and position, can lead to a problematic diagnosis, as well as an optimistic cure. For example, the problems of instrumentalism, normativity and relativism seem to overshadow the potential for discipline. At the same time, the importance and impact of the subject can put sports science in an advantageous position, in relation to science. In this regard, Wing [6]wrote: 'games, competitions and sports are good categories to cut through and thus connect disciplines that are thrown on one side or the other of the gap between the humanities and the sciences. Malone et al [7] state that the future of applied sports science research must develop active research practitioners through academic collaboration and challenge the 'status quo' to achieve the highest standards of scientific rigor.

However, the scientific progress of the policy was on hold starting in 2020. The World Health Organization (WHO) on February 11, 2020 named what is called "severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)" this as "COVID-19", and rightly so. a month later the WHO decided it was a global pandemic outbreak. WHO has released data dated April 9, 2020, that the number of medical workers who have contracted the corona virus (COVID-19) is more than 23,000 people worldwide. This number is the exact number that is reported. There are many more data that have not been reported because there is no specific data system on this matter. [8] Quantitative data at any time until 2021 is still worrying, so the

COVID-19 pandemic continues to be enforced. According to Kompas (28/03/2020) the impact of the COVID-19 virus occurred in various fields such as social, economic, tourism and education. Circular (SE) issued by the government on March 18, 2020, all indoor and outdoor activities in all sectors are temporarily postponed to reduce the spread of corona, especially in the education sector. On March 24, 2020, the Minister of Education and Culture of the Republic of Indonesia issued Circular Letter Number 4 of 2020 concerning Implementation of Education Policies in an Emergency for the Spread of COVID-19. One of the impacts to date has been in the field of sports.

The following section explores the substantial challenges of sports scientists, as scientists who have a strategic role to play in the application of their scholarship to the fields that employ them. Values such as adaptability, hard work and dedication, curiosity, collaboration, and resilience are essential to succeed when becoming a sports scientist in a new environment, or in an institution with no tradition in this field.

### 3 Substantial challenge

Before the pandemic, Le Meur and Torres-Ronda [10] mentioned 10 challenges for sports scientists, which involve the application of sports science in high-performance sports and professional sports:

- (1) Understand the unique context and challenges yourself.  
Sports scientists are expected to provide support to performance and medical staff, particularly through the implementation of monitoring strategies and readiness assessments. One of the first challenges of course is to understand the context and culture of the sport / club.
- (2) Build trust.  
Starting from simple things, sports scientists must master communication with different teams by strengthening confidence in understanding the ins and outs of each team involved.
- (3) Maximize athletes' support.  
Athletes are the most important part. The existing facilities, technology, and various resources need active involvement of athletes with constructive, adaptive and flexible communication.
- (4) Make good use of technology.  
Sports scientists now have the potential to provide a lot of feedback to coaches as technology evolves today. An understanding of how to master technology to the responsibility of each role must be strengthened.
- (5) Handling tsunami data.  
Data handling becomes very challenging, especially when the volume of data and / or the number of players being monitored is large. The higher the data volume, the greater the capacity requirement for filtering, cleaning, organizing, analyzing, and presenting robust database-based information.
- (6) Keeping things simple.  
The more data that is collected, the more difficult it is to keep the information to the point and easy to digest. Concentrate on the information the audience needs.
- (7) Does not "put the chariot before the horse".

Protocols of scientific studies are often a simplification of reality. The complexity of the problem which is attempted to understand in sports science should always encourage deciphering the uniqueness of the situation file at hand before formulating any recommendations.

- (8) Contribute to the vision of the organization.  
Humility, honesty, hard work, quality in work, and patience are paramount. Applying exercise science in elite sport is about how scientists can contribute to strengthening institutions by maximizing performance and helping people optimize their decision-making on a daily basis.
- (9) Manage your pace.  
Take the time to examine priorities, principles and how scientists will manage them at their speed. Have a great desire to prove to people that they made the right choice choosing you, to meet their expectations and try to provide solutions and understandable answers to their questions.
- (10) Maintain proper balance.  
Managing a balance between fun work and personal life is important, as high-performance sports work is often unstable, unpredictable and emotionally challenging. Balance productivity with personal problems such as exercise, family and other things can recharge energy.

All health protocols for sports activities during the Corona COVID-19 pandemic, compiled by the International Olympic Committee (IOC) and the authorities of each country, must refer to the regulations set by the World Health Organization (WHO). The health protocol used by each sport must also be in accordance with the respective International Federation (IF). There are several things that must be considered in the WHO guidelines for sports protocols, namely the risk of transmission, location of activities, number of spectators, and venue management. It has been decided that the Tokyo Olympics will be held in July-August 2021 or postponed from the original schedule which was supposed to be July 2020. The Tokyo Olympics schedule was postponed because the corona virus pandemic has not subsided (<https://tirto.id/fGkm>). The World Health Organization (WHO) recently provided guidelines for people who want to exercise in the midst of the Covid-19 pandemic. WHO says that the recommended exercise is for 150 minutes or 2.5 hours each week. Previously, the WHO recommended that adults aged 18-64 get at least 150 minutes of moderate exercise or a minimum of 75 minutes of vigorous exercise each week, and previous recommendations were made for healthy adults. The new recommendations now cover people living with chronic conditions or disabilities.

The Indonesian government through the Ministry of Youth and Sports issued a circular with Number 6.11.1 of 2020 concerning the Health Protocol for the Prevention of COVID-19 Transmission in Youth and Sports activities. In this circular, several sports activities in public places can be carried out again, of course, with various conditions. The same thing is also applied by professional athletes such as in the field of football to continue to maintain stamina and hone skills (<https://kominfo.go.id/>). The easiest reason to digest for shifting events has more to do with their economic potential. This can be seen, for example, from the contribution of the tourism sector to the nation's economy, including in terms of the number of foreign tourists visiting Indonesia, which has increased significantly from 10.41 million (2015), up to 12.01 million (2016), 14.04 million. (2017), and 15.81 million (2018).

If what Howe [14] says is true, that "all sports are games, and all games are contests", then the most risky challenge for sports scientists is at the time of the current pandemic. The postponement of the Tokyo Olympics (as well as the PON in Papua) from 2020 to 2021 are

just a few examples that sport is following the current contest mood. At the end of his article Howe concludes that maintaining 'sport' as an exclusive search for the fastest, strongest, and so on may help keep sport as an elite activity, but is counterproductive to the goal of increasing sports participation and structured physical movement activity, whether we call it 'sport' or not. . Given the increasing immobility of the individual in modern society, the better choice seems to be to encourage any movement and to allocate our social resources to do so. This seems to be an applicative form of "sportification" of all things as mentioned by Bo Carlsson [15] which will contribute to social science in general and to the analysis of social change and human social conditions. So taking the concept of sportsmanship seriously, as well as a way to understand society and popular culture would be a useful approach to 'handing the baton' over to scientific embrace.

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# The Effectiveness of Periodization of Linear Exercises on the Lop Skills of Young Badminton Players

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**Abstract.** Training methods that have high effectiveness in improving the lop skills of young badminton players is needed. The power of young badminton players has not yet appeared. This study was to determine the effectiveness of linear periodization on the lop skills. The linear training periodization has the character of continuously increasing without decreasing so that physical readiness is needed. Research methods this research is a quantitative study with an experimental approach using the One-Group Pretest Post test Design to test the effectiveness of linear training periodization in young badminton players. The research shows; 1) There is an increase in the results of lop training using a linear periodization pattern of 0.470, which means there is a difference between the initial test and the final test. 2) Giving lop training using linear periodization in this study did not significantly affect the lop skills of young badminton players.

**Keywords:** Linear training periodization, lop skills, young badminton player.

## 1 Introduction

The 1992 Olympics increased participation in badminton [8], so that professional badminton players from various non-basic badminton countries emerged. Badminton coaches initiate coaching from the Early Age group / U11, Children / U13, Beginners / U15), Youth / U17), Youth / U19), Adults [7]. That coaching for athletes is to improve skills and maximum achievement [2].

Young badminton players are novice players / U15. Developed players must be able to train hard, have a solid defence, and improve skills [5]. Badminton player skills include hitting techniques, clear / lop, drop shot and smash, and various kinds of service, netting, drive and return service.

The lop stroke is a basic hitting technique that was first introduced to players at the beginning of badminton practice. The skill of making a clear shot is that every return or stroke made from the dominant side of the body from the back of the field to the back of the opponent's field, the shuttlecock will fall in a position not far from the backline and has a high value [6]. The more scores collected, the higher the score of the lop skill of a badminton player.

Exercise is the primary tool to improve the quality of the functioning of the human organ systems, making it easier for athletes to improve their movements [3]. A training load accompanies good training [10]. *Training load* is a motor stimulus that can be regulated and controlled by coaches and athletes to improve the quality of the various body equipment available. Training in the short and medium-term is regulated in periodization, namely linear periodization [1].

Periodization of linear training is a weight training method where the training load is increased gradually, and the load is increased continuously without any decrease. The performance will improve only if the athlete trains to his maximum capacity against the workload, which increases gradually and is progressively more significant than the conditions at hand [4].

According to the American College of Sports Medicine (ACSM), the intensity of aerobic exercise should reach the target zone of 60% -90% of the maximum heart rate (MHR) frequency; this range of area is usually referred to as the Training Zone. The intensity of light exercise reaches 60-69% MHR, moderate reaches 70% -79% MHR, and high reaches 80% -89% MHR. Exercise intensity can be increased by increasing training load, jumping movements, or speeding up exercise movements [9].

The maximum pulse rate can be determined by prediction and measurement, namely 220 minus age [11]. Exercise with intensity while paying attention to reps, sets and rest times. The basis for determining reps, sets and rest is the athlete's age and the maximum number of reps that can be done by the athlete (RM).

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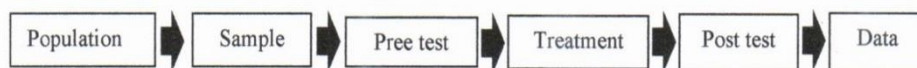
**Table 1.** The basis for determining reps and sets of exercises

Repetition	Percentage 1 RM
1	100%
2	95%
3	86%
4	78%
5	70%
6	61%
7	53%

Moderate intensity exercise achieves a pulse rate of 70% -79% MHR. The MHR of badminton player U15 is 220-15: 205, meaning that training is identified between 144-162 pulse beats per minute

## 2 Methods

This research is a quantitative study with an experimental approach using the One-Group Pretest Posttest Design to test the effectiveness of linear training periodization in young badminton players. The population and sample of this study were 14 male U15 players of Gatra Semarang Badminton Club in 2020 who were taken purposively. The instrument used was the lop instrument.



**Figure 1.** Reseach Method

### 3 Result and Discussion

The results of lop training with linear periodization were tested using the lop instrument. The test was carried out two times, namely the initial test and the final test. The test results are presented in Table 2

**Table 2.** Data description from Lop Test Results for U15 Players

Sample	Pre-test results	Post-test results
x1	34	36
x2	23	31
x3	27	18
x4	18	28
x5	32	23
x6	20	23
x7	29	29
x8	34	33
x9	26	26
x10	29	27
x11	21	33
x12	22	25
Total	315	332

After getting an overview of the data, then the data is processed to produce a statistical picture; the results are as follows:

**Table 3.** Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Pre_Lob	12	18,00	34,00	26,2500	5,49587
Pos_Lob	12	18,00	36,00	27,6667	5,10496
Valid N (listwise)	12				

The statistical description table, a prerequisite test is then carried out, which includes;

1) *Normality test data*

The prerequisite for analysis is that the data distribution must be expected, so first, the expected level of the data is tested using the Kolmogorov-Smirnov Goodness of Fit Test assisted by a computer program. The summary of the results of the analysis of the normality test can be seen in Table 4.



**Table 4.** Summary of Normality Test Results - Kolmogorov-Smirnov Test

N		Pre_Lob 12	Pos_Lob 12
Normal Parameters <sup>a,b</sup>	Mean	26,2500	27,6667
	Std. Deviation	5,49587	5,10496
Most Extreme Differences	Absolute	0,140	0,102
	Positive	0,140	0,070
	Negative	-0,108	-0,102
Test Statistic		0,140	0,102
Asymp. Sig. (2-tailed)		.200 <sup>c,d</sup>	.200 <sup>c,d</sup>

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

Table 4 shows that the Kolmogorov-Smirnov Z significance for the pre-test is obtained Z2 count 0.140 with a probability of 0.200, and the final test result (post-test) is obtained Z2 count 0.102 with a probability of 0.200. Both of them show probability numbers greater than ( $>$ ) the level of significance ( $\alpha = 0.05$ ) so that the data distribution does not deviate from its normal curve, or it can be stated that the data is normally distributed.

### 2) Variance Homogeneity Test

The homogeneity test is used to determine the homogeneity of the data or not from all research variables. The homogeneity test was calculated using the Chi-Square test. The data is said to be homogeneous if the significance is more significant than 0.05. The results of the homogeneity test can be seen in Table 5.

**Table 5.** Homogeneity test of variance

	Pre Lob	Pos Lob
Chi-Square	1.333 <sup>a</sup>	1.333 <sup>a</sup>
df	9	9
Asymp. Sig.	0,998	0,998

The results of the homogeneity test showed that the significance value for the initial test (pre-test) was obtained  $X^2$  count 1.333 with a probability of 0.998, and the post-test results obtained  $X^2$  count 1.333 with a probability of 0.998. Both of them have a significance of  $n > 0.05$ , and it can be concluded that the initial test and the final test have a homogeneous data variance so that it can be continued with a parametric test.

### 3) Hypothesis testing

The effect test uses the t-test—the amount of t can be compared with the t table. If t count  $\geq$  t table, then the hypothesis is accepted; otherwise, the hypothesis is rejected if t count  $\leq$  t table. The summary of the test results is presented in the following table, starting from the paired

sample statistics, paired sample correlations and paired sample test. More details can be parsed based on the following table 6:

**Tabel 6.** Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre_Lob	26,2500	12	5,49587	1,58652
	Pos_Lob	27,6667	12	5,10496	1,47367

Based on the table of paired samples statistics, it is known that the results of the sample loop have increased, from 26.2500 to 27.6667

**Tabel 7.** Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Pre_Lob & Pos_Lob	12	0,237	0,459

Based on table 7, it is known that the correlation between the initial test and the final test is 0.237 so that there is a significant relationship.

**Tabel 8.** Paired Samples Test

		Paired Differences				t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference			
					Lower	Upper		
Pair 1	Pre_Lob - Pos_Lob	-1,41667	6,55686	1,89280	-5,58270	2,74936	-0,748	11 0,470

The table of paired samples test, it can be seen that the significance (2-tailed) is 0.470 greater than 0.05. So it can be concluded that there is a difference between the initial test and the final test of the badminton player U15 PB Gatra Semarang. Furthermore, to determine the effect of the stroke pattern training on the lop, compare the t count and t table. From table 8, it is known that the t-test results are 0.748 while the t table with df 11 with a significance level of 5% is obtained a number of 2.201, meaning that t is smaller than the t table, so it can be said that the hypothesis is rejected, meaning that lop training using linear periodization is not given a significant influence on the results of lop badminton player U15 of Gatra Semarang Badminton Club.

The results of this study illustrate that there is a difference between the pretest and post-test results of the lop hit; that is, there is an increase of 0.470. The t-test result is  $0.748 \leq t$  table which is 2.201, and the hypothesis proposed in this study is rejected. So it can be stated that

there is no effect of giving lop training using linear periodization on the lop skills of young badminton players. This happens can be analyzed on the factors that influence it.

#### 4 Conclusion.

Based on the results of the research data, it can be concluded that

- 1) There is an increase in the results of lop training using a linear periodization pattern of 0.470, which means there is a difference between the initial test and the final test.
- 2) Giving lop training using linear periodization in this study did not significantly affect the lop skills of young badminton players.

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# The Effect of Icky Shuffle and Diagonal Quick Slalom Exercises Using the Ladder Drill Method on Agility

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**Abstract.** Player of PS. Pemda Surakarta –U-19 have less agility. The research objective was to determine the effect of the icky shuffle and diagonal quick slalom exercises using the ladder drill method. The research use the experimental method. Data were taken through pretest and posttest. The sample was 20 players of U-19 soccer players of PS. Pemda Surakarta. The results 1) There is an effect of icky shuffle training using the ladder drill method on the agility, 2) There is an effect of diagonal quick slalom training using the ladder drill method on the agility, 3) The ladder drill diagonal quick slalom is better at increasing agility. Conclusion: The icky shuffle ladder drill exercise and diagonal quick slalom ladder drill exercise both had an effect on increasing agility in U-19 soccer players of PS. Pemda Surakarta, with an average difference in posttest of 0,44 seconds.

**Keywords:** : exercise, agility, ladder drill.

## 1 Introduction

One of the most important components to support the performance of soccer athletes on the field is that it requires a high level of agility, some forms of activity on the field that require agility when dribbling the ball quickly towards the goal past several opponents who oversee areas with certain formations. Agility is very decisive in order to break through to avoid obstacles from the opponent in order to enter the opponent. In addition, agility is an important aspect for athletes in order to maintain balance and reduce the risk of injury when running on the field. Of course, this physical component must use the right training method in order to achieve the previously determined or desired goals. One method is to use a ladder drill.

Practice ladder continuously using the equipment that is included in the ladder which is on a flat plane or floor. Ladder training is used to increase speed, agility and coordination over time, if done every day it can improve leg performance. Ladder drill is very helpful for players to improve speed, agility, and coordination. Ladder training also helps the trainer determine the various variations of the exercises that are in the ladder training so that the exercise is not boring. Ladder exercises also help in improvising various aspects of the movement. There are various kinds of movements in the ladder drill depending on what you want to be the target or goal in each exercise. Anyone can practice the ladder exercise with simple movements, such as with strong forward, backward, and sideways movements, lifting the knee high while running sideways.

The movements in the ladder drill used to achieve the objectives of the study are the icky shuffle ladder drill and diagonal quick slalom. The icky shuffle is carried out by means of a movement that starts from the left side behind the ladder, then the right foot goes first followed by the left foot, then the right foot exits to the right of the first box accompanied by the left foot advancing forward, then the right foot follows the left foot, and the left foot. exit to the left side of the box, and so on. Whereas the diagonal quick slalom starts with standing from the left side of the back of the ladder then small jumps into the first box, then exits to the right side, then enters the second box, then exits to the left side, and so on while still fast small jumps using both feet in a row. at the same time. These two training methods using ladder drills can be another option for a coach to increase the agility of the players because this method is considered quite effective.

In the observations of researchers at PS. The local government of Surakarta on Saturday, February 22, 2020, the players have a low level of agility, meaning that there must be appropriate and routine training methods to be able to increase the agility of the players. According to the head coach of PS. The local government of Surakarta, Fajar Aryoko, indeed the agility of the players is not good because within a week, the players are only given agility training once out of three exercises, and even then they only use cones, not infrequently even in a week they are not given at all.

## 2 Methods

This study used a quasi-experimental research method, meaning that the sample was not quarantined or not boarded out. According to Nana Syaodih Sukmadinata (2012: 194) experimental research is the most complete quantitative research approach, in the sense that it fulfills all the requirements for testing cause-effect relationships. To test the effect or causal relationship of one or more things or variables. The research design used in this study was a Two Group Pretest and Posttest Design, namely a research design that contained a pretest before being given treatment and a posttest after being given experimental treatment which was carried out in two groups. Then group 1 was given icky shuffle treatment using the ladder drill method and group 2 was given diagonal quick slalom treatment using the ladder drill method.

This study uses two variables, namely the independent variable and the dependent variable. The independent variable (independent variable) or variable X is a variable that is seen as the cause of the emergence of the dependent variable which is suspected to be the result. Meanwhile, the dependent variable or variable Y is the predictive variable (effect), which varies according to changes in the independent variables. According to Sugiyono (2010: 30), based on the relationship between one variable and another, the variables in this study are as follows:

This variable is often referred to as the stimulus, predicator, and antecedent variable. The author determines the independent variables in this study are Icky Shuffle Exercise (X1) and Diagonal Quick Slalom Exercise (X2). The dependent variable is the variable that is influenced or which is the result of the existence of the independent variable in accordance with the problem to be investigated, so what will be the dependent variable is the PS Soccer Player Agility. Regional Government of Surakarta U-19. According to Margono (2004: 118), population is all data that is of concern within a specified scope and time. The population of this study were PS soccer players. The local government of Surakarta U-19, with a total of 20

players. Margono (2004: 121) states that the sample is part of the population. The sampling technique used in this study was the total sampling technique, which included all PS players. The local government of Surakarta U-19 consists of 20 players.

The sampling technique used in this study was the total sampling technique, which included all PS players. The local government of Surakarta U-19 consists of 20 players. All samples were subjected to a pretest to determine the treatment group, then the results of the pretest scores were ranked from the first to the last rank. Then paired (matched) with the AB-BA pattern in which there were two groups, group one was given the ladder drill treatment with the icky shuffle model and group two was given the ladder drill treatment with the diagonal quick slalom model. The sample distribution technique in this study uses ordinal pairing. Ordinal pairing is the division of the group into two with the aim of both having the same or the same abilities, Sugiyono (2007: 61), the ordinal pairing stage is that after the sample does a pretest, the pretest results are arranged based on ranking and paired (matched) with the AB-BA pattern.

The research instrument is a tool used to measure observed natural and social phenomena (Sugiyono, 2012: 148). The test will be used to measure the agility of PS soccer players. Regional Government of Surakarta U-19, namely the Illinois Agility Run Test. This test aims to measure the agility of a person / athlete. The results of the study using the Illinois Agility Run Test instrument showed the validity and reliability of 0.90 and 0.94.

Data analysis techniques include: 1) normality test, 2) homogeneity, 3) t-test analysis technique. The normality test in this study uses the chi squared formula (Sutrisno Hadi, 2003: 317), which is to find out whether the data distribution deviates from the normal distribution. The calculation of data normality in this study used Kolmogorov Smirnov with the help of SPSS. The homogeneity test is useful for testing the similarity between groups of data. The homogeneity test was carried out by the F test with the help of SPSS. The homogeneity test is meant by dividing the largest variance by the smallest variance obtained. The data analysis technique used was the Paired Sample t-test analysis with the help of SPSS 24.

### 3 Result and Discussion

The data used to analyze the research data were the agility of PS soccer players. Pemda Surakarta U-19 before and after being given the icky shuffle ladder drill training and diagonal quick slalom ladder drill. It is found that the amount of pretest data is 20. The minimum value obtained is 15.82 and the maximum value is 18.33. The number of values that can be obtained is 339.69 with an average of 16.9845. The standard deviation obtained is 0.47165 with a variant of 0.456. The description of the pretest research results is also presented in the frequency distribution by first determining the number of classes  $(KI) = 1 + 3,3 \log N = 1 + 3,3 \log 20 = 5$ ; range  $(R) = \text{maximum value} - \text{minimum value} = 18.33 - 15.82 = 2.51$ ; and class length  $(P) = R / KI = 2.51 / 5 = 0.502$ .

Posttest data obtained as many as 20. Minimum value 14.05, maximum value 17.19, the amount obtained is 304.98 with an average of 15.2490, a standard deviation of 0.76489 with a variant of 0.585. The description of the posttest research results is also presented in the frequency distribution by first determining the number of classes  $(KI) = 1 + 3,3 \log N = 1 + 3,3 \log 20 = 5$ ; range  $(R) = \text{maximum value} - \text{minimum value} = 17.19 - 14.05 = 3.14$ ; and class length  $(P) = R / KI = 3.14 / 5 = 0.628$ .

The normality test is intended to see whether the data obtained is normal or abnormal. The criteria for testing the normality of the data obtained are, if the sig value is  $> 0.05$  or 5%, the data obtained is declared normal, and if the sig  $< 0.05$  or 5%, the data obtained is declared abnormal. The normality test using the One Sample Kolmogorov Smirnov Test obtained the pre-test sig value of the icky shuffle group  $0.124 > 0.05$ , thus it can be said that the pretest data is normally distributed and the posttest sig value of the icky shuffle group is  $0.159 > 0.05$ , thus it can be said that the posttest data is normally distributed. Likewise, the pretest results of the diagonal quick slalom group had a sig value of  $0.129 > 0.05$ , meaning that the pretest data were normally distributed and also the posttest sig values of the diagonal quick slalom group were  $0.103 > 0.05$ , meaning that the posttest data were normally distributed. The results of this analysis were used as a consideration in further analysis using parametric statistics.

The homogeneity test is intended to determine whether the data that has been obtained is homogeneous or not different, the criteria used to determine the homogeneity of the data obtained is if the significance value is more than 0.05, it can be said that the two variants are homogeneous. The results obtained from the pretest data sig value of  $0.708 > 0.05$  and the posttest data  $0.348 > 0.05$ , it can be concluded that the group has homogeneous variance.

Data collection for the pretest and posttest Illinois Agility Run Test was carried out twice, taking the best time. The results of the research on the level of agility of PS soccer players. The local government of Surakarta U-19 through agility training with Icky Shuffle and Diagonal Quick Slalom using the ladder drill method is described as follows:

Based on the results of the research analyzed using SPSS 24, it was found that the icky shuffle group pretest had the minimum value = 15.82, the maximum value = 18.33, the average = 17.042, the standard deviation was 0.73507, while for the icky shuffle group posttest the value minimum = 14.25, maximum value = 17.19, average 15.47, standard deviation = 0.85282. Based on the results of the research analyzed using SPSS 24, it was found that the pretest of the Diagonal Quick Slalom group had the minimum value = 15.91 maximum value = 17.85 average = 16.927 with standard deviation = 0.64450 while for the posttest group Diagonal Quick Slalom the minimum value = 14.05, the maximum value = 16.03 average = 15.03 standard deviation = 0.63266.

The analysis of the improvement in the results of the ability to dribble was carried out to determine how much the treatment in the icky shuffle group and the diagonal quick slalom group was able to increase the agility results. The results of the calculation of increased agility results can be seen in the below. From the above, it is found that the percentage increase in agility results in the group given icky shuffle training obtained a change of 1.572 with a percentage of 9.22%, while the group given the diagonal quick slalom exercise gained an increase of 1.897 with a percentage of 11.20%. For more details, the following diagram is presented for the increase in agility results.

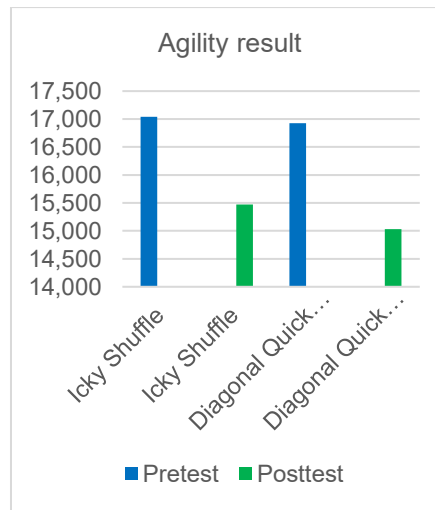


Fig. 1. Diagram of increasing agility

The difference test of the two mean posttest data in this study was used to determine whether there was a difference in the results of the agility ability between the icky shuffle group and the diagonal quick slalom group after being given different exercises. Where the icky shuffle group was given the icky shuffle exercise while the diagonal quick slalom group was given the diagonal quick slalom exercise.

The hypothesis used: There was no difference in the posttest results between the Icky Shuffle group and the Diagonal Quick Slalom group after being given different exercises ( $H_0$ ). There is a difference in the posttest results between the Icky Shuffle group and the Diagonal Quick Slalom group after being given different exercises ( $H_a$ ).

In this study using a confidence level = 95% or ( $\alpha$ ) = 0.05. The results of the calculation of the difference between the two mean post test data are presented in the below: The number of samples for each group is 10 and  $t = 2.26$ , with the following decision-making criteria:  $H_0$  accepted if  $-t_{table} \leq t_{hitung} \leq t_{table}$  atau  $sig \geq 0,05$ .  $H_0$  rejected if ( $t_{hitung} < -t_{table}$  atau  $t_{hitung} > t_{table}$ ) atau  $sig < 0.05$ . From the t-test result above, it can be seen that the t-count is 1.310 and the t- ( $df = 9$ ) = 2.26, the significance value of p is 0.348. Because t count 1.310  $< t = 2.26$  and  $sig. 0.348 > 0.05$ , meaning that there is no difference in posttest results between the Icky Shuffle and Diagonal Quick Slalom groups after being given different exercises or the Icky Shuffle and Diagonal Quick Slalom groups both have a good effect on the agility results of PS soccer players. Regional Government of Surakarta U-19.

Based on the analysis, it shows that the icky shuffle group has an average posttest of 15.469 seconds, and the diagonal quick slalom group is 15.029 seconds, with an average difference of 0.44 seconds. Thus, there is no difference between the icky shuffle and the diagonal quick slalom for increasing the agility ability of PS soccer players. The local government of Surakarta U-19, or icky shuffle and diagonal quick slalom training both have an influence on the agility ability of PS soccer players. The local government of Surakarta U-19 can be identified through the posttest between the icky shuffle and diagonal quick slalom training groups.

This study aims to determine the effect of the icky shuffle ladder drill and diagonal quick slalom ladder drill on the agility of PS soccer players. Regional Government of Surakarta U-19 in 2020. A player who has good agility has several advantages, including: easy to make



difficult movements, not easy to fall or injure, and supports the techniques he uses, especially the dribbling technique (Joko Purwanto, 2004 : 41). The characteristics of agility can be seen from the ability to move quickly, change direction and position, avoid collisions between players and the ability to dodge opposing players on the field. The ability to move changes direction and position depending on the situation and conditions faced in a relatively short time and quickly.

Based on the results of the t test, it shows that the ladder drill icky shuffle exercise and the diagonal quick slalom ladder drill exercise have the same effect on increasing agility in PS soccer players. Pemda Surakarta U-19, with an average difference in posttest of 0.44 seconds. Based on the research data processing, it can be seen that the initial conditions of the two groups, namely the experimental group 1 and the experimental group 2, did not have a significant difference. Evidenced by the results of the t-test, the value of t count = 0.372 with sig = 0.714 > 0.05. It can be concluded that there is no difference in the results of increasing agility between the experimental group 1 and the experimental group 2 at the pretest (before treatment) on the players.

After the pretest was carried out, the treatment process was given where the experimental group had 1 ladder drill icky shuffle and the experimental group 2 ladder drills diagonal quick slalom. Each group was given treatment in the same period of time where the experimental group 1 ladder drill icky shuffle passed 15 ladder drill boxes, while the experimental group 2 ladder drills diagonal quick slalom passed 15 ladder drill boxes and with the same repetitions and sets. After the treatment was completed in 14 meetings, a posttest was carried out.

Giving training results obtained from the two groups, namely the experimental group 1 ladder drill icky shuffle and the experimental group 2 ladder drill diagonal quick slalom to PS soccer players. The Regional Government of Surakarta U-19 in 2020 both had an impact on agility results but did not differ significantly. Although not significantly different, the provision of diagonal quick slalom ladder drills had better results than giving exercises with the icky shuffle ladder drill group. This is because the diagonal quick slalom ladder drill is more effective and optimal for training the results of agility in soccer players. Because with the diagonal quick slalom ladder drill exercise, the movement is more or less the same as the existing test instrument compared to the icky shuffle ladder drill, because with that, a level of speed of moving can be done effectively. Repeating an exercise movement is very important. By repeating a movement continuously, skill movements can be mastered automatically. A skill that is mastered well will make the movements more effective and efficient.

Whereas in the ladder drill icky shuffle exercise, the movements carried out are only fast movements and do not have explosive power like the movements in the research instrument. However, in this case the ladder drill icky shuffle exercise has advantages in terms of agility and foot speed in moving.

### 3 Conclusion

Based on the results of data analysis, description, examination of research results, and discussion, conclusions can be drawn, namely: 1) There is an effect of icky shuffle training using the ladder drill method on the agility of PS soccer players. Regional Government of Surakarta U-19 with t count 16.753 > t 2.26 and sig. 0.000 < 0.05, with a percentage increase of 9.22%, 2) There is an effect of diagonal quick slalom training using the ladder drill method on the agility of PS soccer players. Regional Government of Surakarta U-19 with t count

17,758> t 2.26 and sig. 0.000 <0.05, with a percentage increase of 11.20%, and 3) Quick slalom diagonal training using the ladder drill method is better at increasing agility in PS soccer players. Penda Surakarta U-19 rather than ladder drill icky shuffle, with an average posttest difference of 0.44 seconds.

Based on the research conclusions above, there are several suggestions that can be conveyed, namely: 1) For PS soccer players. The Regional Government of Surakarta U-19 should continue to strive to improve agility skills, so that it will improve the ability to play soccer and achieve maximum achievements, 2) For coaches, to increase the agility of their athletes, in order to provide interesting and not monotonous training variations in agility training, 3) For trainers, it is better to improve agility by choosing diagonal quick slalom exercises with the ladder drill method, remembering that this is better for increasing leg speed, body control, and kinesthetic awareness, and coaches can apply icky shuffle exercises with the ladder drill method so that players don't feel saturated, 4) For other researchers, they should develop and perfect this research with better training methods.

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# The Power Structure Relationship Handball Athletes using Sociometry

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**Abstract.** This research is based on the fact that athletes can make choices even in interpersonal relationships. The data in this study were obtained from 15 male handball athletes in Central Java, Indonesia. In general, the interpersonal relationship and cohesiveness between athletes is quite wide seen from the selection results on the sociogram. Even though there were several team members who fell out of the overall communication structure. Although based on the choice matrix and index selection, there were three athletes who got a zero index selection score where none of the three athletes chose to be friends during training or to be the leader or captain of the Handball male team. It is expected that over time and the development of the team, more athletes will be selected as team leaders and enter into subgroups that have average popularity.

**Keywords:** sociometry, sports team, assessment power structures relationship.

## 1 Introduction

Sports clubs are one of the places where the process of activities outside the formal education process is carried out [1]. The sports club is also a place for athletes to develop their abilities in technical, physical, and even social skills [2]. With regard to social aspects, many studies have discussed the relationship between the effectiveness of an environment in a particular sport, its relationship and activities even with athletes' participation [3]. The activities of a sports team require cooperation, support, harmonization and sportsmanship, therefore it is logical to expect the transfer of these values to the social environment of sports participants [4]. Good harmonization of team members or players in an interpersonal relationship leads to success in terms of cooperation in the field. Knowledge of the relationships between individuals on a sports team can be a valuable source of information for coaches [5]. The most important pedagogical task in selecting members of a sports team is how to create a harmonious and pleasant social environment for the players psychologically [6]. In addition, the cohesion of a sports team is very important in the development of team performance, therefore in a team or group we can find positive relationships as a sympathy, friendship and cooperation from good work efficiency [7]. The association with handball, with knowledge of the factors that influence interpersonal relationships, enables the handball coach or athlete to influence them to eliminate unwanted behavior. In addition, thanks to the awareness of forming and monitoring the right attitude in the team, the coach is able to improve the interpersonal situation of a player as well as in the team [8]. By doing so, the general atmosphere within the handball team will improve, so that it is correlated with the effectiveness of team activities in achieving the highest achievement goals. Handball itself is a

team sport that is included in the game sport category. Besides being easy to learn, handball is based on natural human motor movements, making it possible to quickly become popular in the world [9]. In measuring the relationship between athletes, a method is needed that can be used to determine the social structure and communication between the athletes. Overall, the relationship between athletes and the cohesiveness between athletes is more oriented to the responsibility of the athletes themselves in relation to their performance on the field [10]. In this regard, sociometry is used as a method that has been widely used to measure both the social structure, communication and interpersonal relationships of a group [11]. The main objective of this study was to determine the relationship characteristics of athletes and group structure on the male handball team, especially when determining training partners and team leaders. In handball, the interpersonal relationship factor is very important in building the social structure of the team so that it allows the creation of the right conditions for a team to achieve the highest goals [12].

## 2 Material and Methods

In this study using sociometry as a method used to assess the characteristics of the relationship between athletes based on the principles and methods set out in the work of Wäsche 2017, Herbison 2018, Timushkin 2018, Sopa 2018 and Dontsov 2018. The survey data in this study consisted of 15 athletes male handball. The survey data includes the questions asked in the following table.

**Table 1.** Questions for sociometry research.

Question?	Answer Options
Which of your team members would you choose to spend time training with? * choose 3 of your friends	Answer (symbolizes a strong desire to cooperate with others)
If you were asked to appoint a team captain, who would you choose? * choose 3 of your friends	Answer...

The instrument above is a development of a sociometric test previously conducted by Vashliaeva Irina Viktorovna, Volovik Tatiana Vladimirovna, and Shuraleva Natalia Nikolaevna with the research title "Sociometry of a Volleyball Team". The data collected by sociometric questionnaires is still difficult to analyze and understand (read) if it has not been processed. In order for the sociometric data to be easy to understand, the data is presented in tabular form (sociometric matrix) and image form (sociogram).

After the sociometric questionnaire was filled in, then it was collected and processed to obtain an overview of the data. The research data will then be analyzed by analyzing the index, compiling tabulation tables, and making sociograms. Enter the data obtained from the sociometric questionnaire into the table provided that number 1 is for the first choice (1), number 2 for the second choice (2), number 3 for the third choice (3). The select direction tabulation data is calculated as follows: for the first choice (1) is given a score of three (3), for the second choice (2) is given a score of two (2), and the third choice is given a score of one (1).

### 3 Results and Discussion

The next step is based on the data obtained in this study, then the next step is to analyze the responses from the athlete's answers by making a sociometric matrix. In table. 2 We assign research subjects with initial names in the first column and assign numbers consecutively.

**Table 2.** Sociometry Matrix

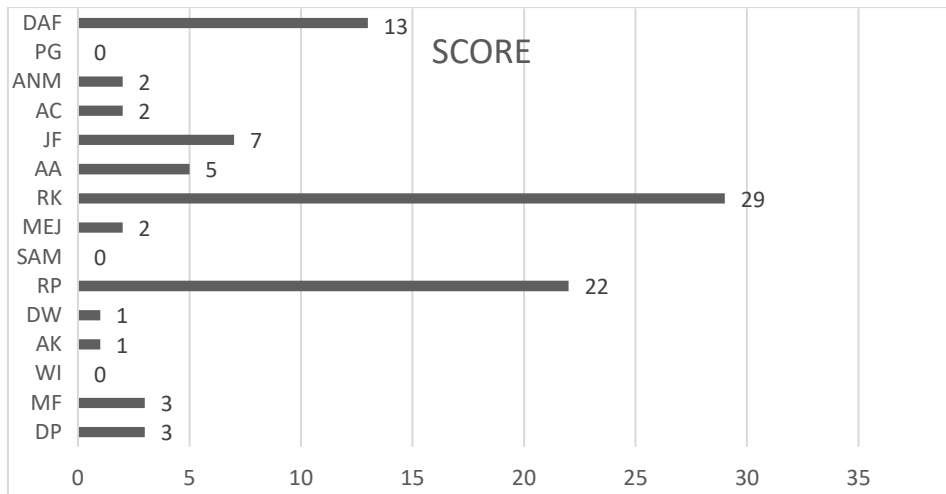
No	Subjects (voter)	Age	Selected															
			DAF	PG	ANM	AC	JF	AA	RK	MEJ	SAM	RP	DW	AK	WI	MF	DP	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1	DAF	22	X				3		1			2						
2	PG	19		X			3		1			2						
3	ANM	18	3		X			1								2		
4	AC	18	1			X		2						3				
5	JF	20	3				X		1			2						
6	AA	18			2			X					3				1	
7	RK	25	2						X	3		1						
8	MEJ	22	3						1	X		2						
9	SAM	19					3		1		X	2						
10	RP	23	2				3		1			X						
11	DW	21				2	1			3			X					
12	AK	23							1			2		X			3	
13	WI	19	3						1			2			X			
14	MF	20	3						2			1					X	
15	DP	21	3						1			2						X
<b>Number of options 1 (number 1)*3</b>			3	0	0	0	3	3	2	0	0	6	0	0	0	0	0	3
<b>Number of options 2 (number 2)*2</b>			4	0	2	2	0	2	2	0	0	16	0	0	0	2	0	0
<b>Number of options 3 (number 3)*1</b>			6	0	0	0	4	0	0	2	0	0	1	1	0	1	0	0
<b>Number of Voters</b>			<b>13</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>7</b>	<b>5</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>22</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>3</b>	<b>9</b>

Based on the choice matrices in table 2. and table 3., it can be seen that the male handball athletes who have the highest selection index are 3 (three) athletes, the first athlete is RK with an index score of election status (29), then followed by RP with a total score (22), and the 3rd place with the most election index score is DAF with an election index score (13). Whereas athletes who have the lowest selection index are PG with a total score (0), SA with a total score (0), and WI with a total election index score (0).

Henceforth based on the selection matrix and selection index in table 3. and fig. 1 shows that the interpersonal relationship between male handball athletes is quite good, even though there are three (3) athletes who get a selection index score of zero (0) where none of the three athletes choose to be friends during training or become the leader or captain of the Handball team. Meanwhile, athletes who have the highest selection index score to be friends during training and who are considered capable of leading the team are athletes with a score of (29), namely RK.

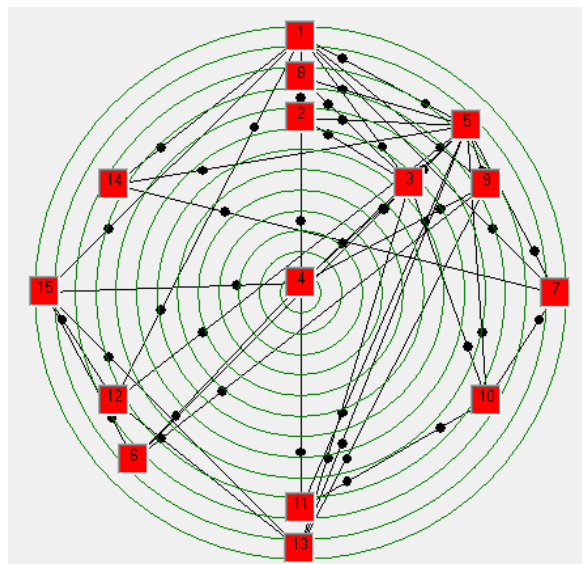
**Table 3.** Index Selection Status Male Handball Team

No.	Subjects Name	Score	Nxp	Index CS
1	DAF	13	45	0,288888889
2	PG	0	45	0
3	ANM	2	45	0,044444444
4	AC	2	45	0,044444444
5	JF	7	45	0,155555556
6	AA	5	45	0,111111111
7	RK	29	45	0,644444444
8	MEJ	2	45	0,044444444
9	SAM	0	45	0
10	RP	22	45	0,488888889
11	DW	1	45	0,022222222
12	AK	1	45	0,022222222
13	WI	0	45	0
14	MF	3	45	0,066666667
15	DP	3	45	0,066666667



**Fig. 1.** Team members score selection chart

In general, the cohesiveness and harmonization relationship between athletes or players in the Male Handball Team is quite extensive, where it can be seen from the interpersonal relationships and communication that occurs including almost all members of the team / athlete. Henceforth in the selection of the sociogram shown in the fig. 2. allows to provide a comparative analysis of the structure of the interpersonal relationships in the Male Handball Team and can provide a visual representation of who is suitable to be the leader or captain and show interpersonal relationships taking into account the popularity of each team member based on the matrix and the election status index.



**Fig. 2.** Sociogram elections

In general, the cohesiveness and harmonization relationship between athletes or players in the Male Handball Team is quite extensive, where it can be seen from the interpersonal relationships and communication that occurs including almost all members of the team or athlete. Although based on the choice matrix and the selection index, there are three athletes who get a selection index score of zero (0) where none of the three athletes choose to be friends during training or become the leader or captain of the Handball team. It is expected that over time and the development of the team, more athletes will be selected as team leaders and included in the subgroups that have average popularity.

#### 4 Conclusion

Based on these results it can be concluded that the use of sociometry can measure cohesiveness, harmonization, interpersonal relationships between members of Male Handball Team. Specifically, this sociometry test is aimed at athletes with whom he wants to train together, finding the team social structure and hierarchy of each team member (team leader) using the sociometry test method proposed by Jacob L. Moreno. The results of this study provide a comparative analysis of the structure of the interpersonal relationships in the Male Handball Team and can provide a visual representation of who deserves to be a leader or captain and show interpersonal relationships by considering the popularity of each team member based on matrices and index selection status.

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# Sport Volunteering in the 11th ASEAN School Games 2019: Implementation and Constraints

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**Abstract.** The purpose of this study was to describe the implementation of the 2019 ASEAN School Games volunteering program and the constraints faced by volunteers during the event. In conducting this study, the researchers used a qualitative approach. The instruments used in this study were observation, interviews, and documentation. The subjects of this research include the chairperson of the 2019 ASEAN School Games's organizing committee, the volunteer coordinator for the 2019 ASEAN School Games, and 10 volunteers of the 11th ASEAN School Games. The results showed that the organizing committee of the 11th Asean School Games was not optimal in making preparations as well as managing sport volunteers that brought about various constraints for sport volunteers. Therefore, the organizing committee is expected to be better in the future in terms of managing sports volunteers, including in the recruitment process.

**Keywords:** Implementation, Sport Volunteer, ASEAN School Games.

## 1 Introduction

One of the international level sporting events that is held annually is the ASEAN School Games or commonly referred to as ASG. This sporting event was attended by high schools in the Southeast Asia region such as Indonesia, Brunei Darussalam, Singapore, Thailand, Vietnam, Malaysia, Philippines, Laos, Cambodia, and Myanmar. The ASEAN School Games are held in turns in each country involved. Indonesia is recorded to have hosted the 4th ASEAN School Games in 2012 in Surabaya, East Java. In 2019 Indonesia will again host the 11th ASEAN School Games and will be held in Semarang, Central Java from 17 to 25 July 2019. As the host, Indonesia should prepare everything optimally. The implementation of the ASEAN School Games in 2019 involved the Ministry of Youth and Sports of the Republic of Indonesia (Kemenpora), the Central Java Provincial Government, and the Central Java Youth, Sports and Tourism Office (Disporapar), and several universities. Preparations that must be considered include the preparation of facilities and infrastructure, administration, accommodation, and last but not least, sports volunteers.

As the host, the sport event organizer must have a standard sports administration as well as the preparations made as mentioned, including the organizational structure of the organization, competent sports personnel, work plans and programs, financing units, implementation schedules, administration and management systems, service systems, as well as security and safety systems.[1]. In the effort of succeeding a sports event such as the ASEAN School Games, sports volunteers who are willing and able to work well are needed,

so that the recruitment process for sports volunteers is crucial and needs to be carefully prepared.

It seems that the recruitment of sports volunteers needs to be done so that the volunteers who work later meet the predetermined criteria or standards. In carrying out the recruitment process, it needs to be considered that volunteer involvement is not only driven by individual factors but also by the institutional context (for instance, sport organization, sport event; Penner, 2002). In order for the implementation of activities to run smoothly and according to plan, support from the institutional context is needed to motivate sports volunteers [2].

Sports volunteer are an important part of a prestigious sporting event because with sports volunteers, a sporting event becomes more meaningful. Becoming a sports volunteer is not easy, especially for large events such as the ASEAN School Games which is an international class event. To become a sport volunteer, the candidates must fulfill all the requirements such as having the ability to speak foreign languages, especially English, being able to communicate well, having an interest in sports, knowing things in the sport that he/she is interested in, and so on.

Volunteers themselves make a big contribution in a sports event. With the presence of volunteers, the organizing committee's workload will be less and are well accommodated. Volunteers and staff or organizers will always be needed continuously to work together and function as a team. Without work assistance from the volunteer team, sports events will not run well because they have a significant role in managing a sport event[3].

At initial observations, the researchers found several discrepancies in the implementation of the 2019 ASEAN School Games Volunteering, negative statements emerged from volunteers that would cause constraint such as volunteers did not understand their duties, did not know what to do during the event, did not understand the actual rundown of the event so that volunteers were often misled in the event. The distribution of information provided was also unclear and not specific. when the implementation was not in accordance with the direction, the schedule of activities suddenly changed, there was a mismatch between the regulations and rules announced by the committee and the facts occurred in the main event.

Volunteers have a big influence on the success of the implementation. The constraints experienced by volunteers would surely affect the quality of the event. Mowen et al. (2005) examines the stability of constraints over time. They compared constraint studies from the Cleveland area from 1991 and 2001 and analyzed changes in perceived constraints over time. Despite finding small differences in demographics between the two samples, the perceptions of constraints remained very similar over time. In the results of the study, it was stated that many volunteers experienced constraints on the part of structural constraints, such as a lack of time, money, transportation, etc. [4].

Based on the background of the above problems, the researcher aims to find out how the organizing committee implemented the 2019 ASEAN School Games volunteering and to find out what constraints the volunteers experienced during the 2019 ASEAN School Games.

## 2 Method

This research method used in this study was a qualitative research approach. The instruments used in this study were observation, interviews, and documentation. The results of the research were then analyzed by reducing data, presenting data, and drawing conclusions.

### 3 Result and Discussion

The results of this study contain the implementation or application of the 2019 ASEAN School Games committee and the constraints experienced by the 2019 ASEAN School Games volunteers during the activity. The research data were obtained from 12 respondents who were the subjects of this study that comprised 1 committee, 1 volunteer coordinator, and 10 volunteers for the 2019 ASEAN School Games.

#### 3.1 Implementatin of Sport Volunteering in 11th ASEAN School Games 2019

**Recruitment.** The recruitment mechanism implemented is through the delivery of sports volunteer recruitment information to campuses or universities in the Semarang area. This is done because the main target for volunteering is students who are competent, especially in the field of sports. Previously, the committee held a coordination meeting with the Ministry of Youth and Sports regarding the number of volunteers needed. Furthermore, the local committee holds a coordination meeting with universities in Semarang to discuss the requirements or criteria that have been set.

The determined requirements for sport volunteers include mastering foreign languages, especially English as an international language, then understanding the sports that would be contested in the 2019 ASEAN School Games and knowing the location of sports venues in Semarang because their duties are not only as a liaison officer but also as a forefront in promoting the world of tourism in Central Java, especially the city of Semarang. Referring to this, Indonesia as the host certainly not only has the motivation to become the overall champion but also wants to show and introduce the richness of tourism and culture in Indonesia. Thus, Indonesia will be better known by all countries in the Southeast Asian region. Sports volunteers are required to have the ability to introduce Indonesia through sports events and build awareness of visitors so that they can perceive Indonesia with all its wealth into a good brand image for the development of all sectors in this country [5].

The volunteer recruitment process was administered in about two months. The recruitment process included the information announcement to schools, universities, and public, the administration selection, and the volunteer tests. Students who register are required to take part in the selection, each campus has determined several stages of selection which are carried out according to the procedures or criteria set by the committee.

Based on the requirements, students / prospective volunteers have no difficulty in registering but there were several complaints that arose from students / prospective volunteers, it was said that the recruitment was administered in a non-transparent manner since many volunteer candidates could pass the recruitment process even though they did not meet the predetermined criteria for reasons that did not make sense. In other words, it was also found some candidates that did not pass the recruitment process even though they were competent and met the criteria or standard that had been approved by the organizing committee due to the quota limitation.

**The Duties of a Sport Volunteer.** The volunteers who passed were then placed in various work groups such as the accommodation division, which served as liaison officer between the participants and the hotel. The accommodation division duties in detail, such as providing hotel room information that has been prepared by the organizer to the participants. Next, the consumption division, the consumption division is in charge of managing the meal schedules of the participants. The transportation division is supposed to prepare vehicles/shuttles that

will be used or needed during the event such as making communication with bus drivers so that they are always alert in providing transportation services for participants and team's officials. The sports division is in charge as a companion for the participants or contingents such as picking up the contingent, informing meal schedules, finding training places, directing locations or places that participants want to visit, becoming tour guides while on city tours, and assisting or accompanying the return of the contingent. This task is given to volunteers who have been adjusted to the volunteers' abilities, but some volunteers still do not know and understand the tasks given because the committee does not provide the term of reference of the volunteer's task and duties.

The term of reference is then very important before volunteers carry out their duties. By providing clear directions & guidance, volunteers would be able to accomplish their duties properly and will have a good effect on the event as stated that guidance and training focuses on the suitability of volunteer work according to the volunteer duties can increase the satisfaction of all components in an event [6].

**Volunteer Enhancement Training.** The volunteer enhancement training held was not in accordance with what the volunteers expected. Some volunteers who attended the training session were not satisfied because the material provided was not suitable with what was happening in the field, especially for some volunteers who had never volunteered at a sporting event. The volunteer enhancement training was carried out for two days by presenting materials that were too general and not specific. The volunteers were only given a general description of the tasks and events and were more impressed like an intermezzo. The training materials provided were only related to the number of participants, the countries involved, the venues to be used, the transportation to be used, and the route for taking the eternal flame torch where these activities are not actually the duty of a volunteer.

The researcher then concluded that there was a mismatch between the committee's plan during the volunteer enhancement training and the actual event context. This was shown by the fact that there were still many volunteers who were misled and misguided regarding their respective main duties and functions while working. Supposedly, the organizing committee should prepare the main duties and functions of each volunteer in detail so that there would not be any constraints at work [7].

**Sport Volunteer Management in ASG 2019.** Before the committee started working with the volunteers, especially in the 11th Asean School Games 2019, it should be highly beneficial for the committee to spend some time with them to figure out who they were as people. Getting to know what brought them there, what was their driving force, what did they like/dislike. Knowing them better might really help the committee in not just knowing what strategies would work best with them but also make them feel heard. However, it turned out that the coordinator of volunteers or the committee of ASG 2019 did not implement what they should do. It was found from one of the interviews with the volunteers as stated below;

*“We were not given any kind of special training for volunteers to understand specific roles and tasks, there was no good coordination between volunteer coordinators and volunteers. We were only given a softfile to learn which contained the jobdesk of each division and even then it was given suddenly. The match schedule for each contingent was also informed suddenly so that we had difficulty providing optimal service both on the field and outside the field”.*

Another important point is to have clear objectives & roles for the volunteers. The committee must avoid as much as possible any vagueness around what the volunteers are expected to do. This would make sure they know what they should do and what is expected of them to deliver. It will also help the committee avoid any confusions and also make volunteers feel comfortable as they would have a clear understanding of what they are supposed to deliver over a period of time. Yet, the reality in the field showed some improper manner as revealed below;

*“At the time of volunteer training session, we were not given written rules regarding what a volunteer could do and what a volunteer could not do while on duty. The rules and norms as a sports volunteer are only given orally during the training, so we cannot learn them in detail and comprehensively”*

This was reinforced by the discovery of several volunteers who did bad things such as smoking while on duty, leaving without permission during working hours, and asking participants / contingents for tips. Thus, it can be concluded that the volunteer management pattern in ASG 2019 cannot be said to be well-managed because there is still a mismatch between what should be done and the facts that occur in the field.

**Sport Volunteer Facilities.** The committee provided some volunteer kit to support the volunteers during the event, such as two polo shirts, transportation money, sporty vests, bags, hats, and ID cards. The committee did not specifically prepare a place to stay for volunteers. However, the committee prepared several hotel rooms that can be used or functioned as transit rooms for volunteers during the event. Therefore, most of the volunteers chose to return to their homes due to the limited accommodation facilities for volunteers.

The transportation facilities provided by the committee were also very minimal. In other words, the committee only provided buses or shuttle for use during event such as picking up participants from the hotel to the venue or vice versa. Most volunteers used private vehicles, unless during the event there were empty seats so that volunteers could join the bus/shuttle to accompany the participants.

### 3.2 Volunteers' Constraints in 11th ASEAN School Games 2019

**Language Constraint.** Constraints that occurred during the event were that some volunteers experienced problems in language, or we called it as language constraint when communicating with participants from foreign countries. This was due not only to the volunteers' limited English skills, but also the participants' limited English skills. Most of the language constraint in communicating was experienced by volunteers when they assisted Thailand, Myanmar, Vietnam, the Philippines, Laos and Cambodia. To overcome this language constraint the participants and volunteers were assisted by the google translation application. Meanwhile, volunteers accompanying participants from Malaysia, Singapore and Brunei did not experience difficulties because they could communicate using Malay and even some of the participants wanted to learn Indonesian language.

**Communication Constraint.** Miscommunication often occurred between volunteers and the committee. This is because the information provided by the committee was often late and not accordance the reality on the field, which makes volunteers confused. Information that should have been passed on to the contingent became ineffective and tended to be too late.

Miscommunication also occurred among volunteers. Some of the interviewed volunteers said there were frequent delays in information provided and there were lacks of coordination, as it was happened to volunteers in sports and transportation division related to contingent / participant pick-up schedules.

**Facilities Constraint.** Constraints related to facilities included housing for volunteers, sport venues, and transportation. This is vital for a sport event. Some volunteers did get hotel room facilities, but the numbers of hotel rooms were very limited. Those who were lucky to get a hotel room because one of the contingents left early so that the room could be used and that too had to alternate with other volunteers. Many volunteers did not get a place to stay, such as experienced by one of the volunteers. It was said that there were 18 volunteers who were supposed to have only one room left, which made some of them prefer to return to their homes or boarding houses.

One of the volunteers from Sepak Takraw said that the venue used was the one used from the previous event, the 18th Asian Games. Venue is the most important thing in a sports event, without the availability of venues, a competition will not run smoothly. The venues used must also meet international standards because the ASEAN School Games is an international event. The availability of venues that are according to standards will add positive value to Indonesia as the host, which can show that Indonesia is also able to compete to display and provide sports facilities. Thus, it would also have an influence on the development of sports itself.[8].

**Transportation Constraint.** Transportation was one of the constraints that happened during the 2019 ASG event. The availability of transportation for participants and the committee seems insufficient to facilitate. This showed that the committee was not quite ready to provide transportation services for the participants and the committee. Some volunteers have complained about pick-up buses / shuttles that were often late due to the lack of availability. The use of transportation was quite important to provide transportation services for participants to travel from the hotel to the venue and vice versa, as well as taking participants to tourism spots in Semarang and surroundings.

Based on these findings, the researcher can conclude that volunteers have significant constraints in terms of transportation and communication, as accumulated in the following diagram.

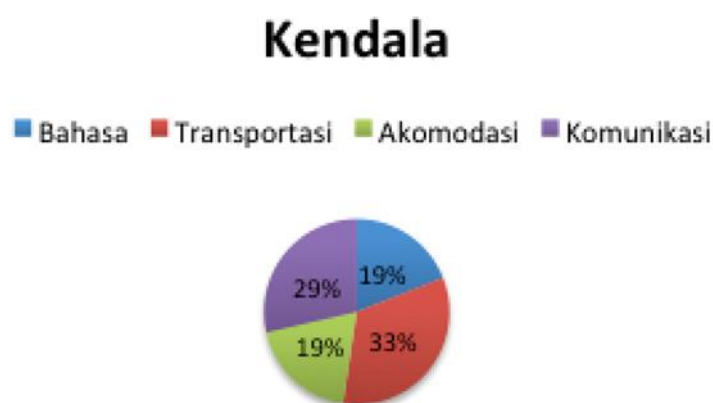


Fig. 1. Volunteers' Constraints in ASEAN School Games 2019

Constraints that arose would certainly reduce the effectiveness and success of an event. To minimize the constraint that occurred, the committee should pay more attention to the direction and guidance for sports volunteers, especially in terms of facilities and transportation, so that volunteers would work optimally and felt satisfied because they had been part of the success of a large event. As the existing theory states that volunteers are satisfied with what they are doing because of several factors that are directly controlled by the event organizer including transportation, food and accommodation, as well as other factors such as workload (Doherty, 2003; Elstad, 1996; Ralston et al., 2004)[9] and as revealed by Houlihan (2001, p. 1)[10] " as a source of empowerment for citizens and as civil society institutions in the sports and recreation professions, they themselves have a significant contribution to make ".

#### 4 Conclusion

Based on the findings discussion of research, it can be concluded that in the 2019 Asian School Games event, the committee did not apply the rules or regulations of sports management including in terms of managing sport volunteers. It brings about several constraints for volunteers. These constraints include confusion of volunteer duties, confusion of the schedule of event given, communication, transportation and housing facilities.

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# The Potential of Sport Development with Quality Control Physical Education Program

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**Abstract.** The research objective to analyze the relevance and quality of the content of physical education learning materials with the basic motor skills of sports coaching. This type of research is descriptive qualitative. The research subjects were Physical Education Teachers and Sports Trainers. The research instrument used a questionnaire and data analysis techniques with a qualitative analysis approach. The results of the study, the learning material is less relevant to the basic concepts of sports development. Material development is less oriented towards the needs of basic sports movements. Learning management is not supportive of children's motor potential for sports development. The quality and content of the material do not yet support children's motor skills as the basis for sports development. There is no quality control document in the form of guidelines for developing and managing materials, guidelines for motion analysis, guidelines for measuring basic motion, and guidelines for guiding sports talents.

**Keywords:** Physical Education, Quality Control, Sports Development.

## 1 Introduction

Sport contributes to developing the values of sports by producing quality human resources. Sports coaching is part of developing the quality of Indonesian people to improve health, fitness, mental, personality and sportsmanship as well as increasing achievement for national pride (Jamalong, 2014). Sports as a guideline for the values of life become the basis for sports development at the next stage, namely the development of sports as recreation, sports as education, and sports for achievement. (Sirait et al., 2021). The development of sports with the aim of achievement is an important part of enhancing the dignity of the nation and contributing to enhancing the nation's image in the international world. Performance sports are able to provide a promotional function for the nation's existence in world competition.

The sports development system in Indonesia has experienced a significant decline, this is indicated by the decline in Indonesia's sports achievements in the activities of the Sea Games, Asian Games, Olympic Games as well as regional and international single event activities. The achievements in Southeast Asia, Asia and the world events are indicators of the weakness of the performance sports coaching system. This is because the coaching process is not sustainable at every stage of coaching. The occurrence of discontinuity in the regeneration system in training athletes causes regeneration to be hampered. Therefore an alternative tiered coaching system is needed starting from an early age through physical education media in schools (Said Junaidi, 2019)

Achievement sports development system is carried out through various strategies so as to produce high and consistent performance products. Performance sports development is a nursery system that engages athletes with achievement goals. (Rudiansyah et al. 2017). The performance sports development system can be carried out through several stages and each stage must have relevance to the next stage so that collaborative synergy occurs. Coaching can be carried out by empowering sports clubs, developing national and regional sports coaching centers and carrying out tiered and sustainable competitions (Wibowo & Hidayatullah, 2017).

The phases in the coaching system can be carried out from multilateral development stages to high achievement by applying the pyramid model concept. The pyramid model coaching positions physical education activities at the lower level, namely the phase to develop children's physical and motor capacities in general. Physical learning is considered as an effective medium to instill the basics for physical and motor development in children. Measured and programmed physical and motor development will support the process of coaching athletes in the next phase. The next phase after the multilateral training stage is coaching to determine the potential for sports talents in groups of children who have talents and interests.

Physical education program as the basis for sports coaching is one of the potential alternatives to develop sports achievement. Schools have great potential in terms of stimulating the development of student motor skills (Ericsson, 2016). The model of training for sportsmen in schools has a very effective value, for forming high-achieving athletes and for recruiting prospective athletes. (Noor Akhmad, 2019). According to Enung (2006), in accordance with the development phase, good sports activities for students in physical education lessons are activities that have characteristics; (1) provide a variety of movement experiences (multilateral training) in the form of games and competitions; (2) stimulating the development of all five senses; (3) developing imagination / fantasy; and (4) moving to the rhythm / song and story (Hidayah, 2011).

The implementation of the physical education program has not been implemented as expected in supporting the sports coaching system. This is because the implementation of learning is still oriented towards conventional learning methods so that students do not have the opportunity to experience various skills. Previous research has shown that early childhood physical education has not been able to achieve the objective to develop the abilities of early childhood cognitive, affective and psychomotor (Pechtel & Pizzagalli, 2011). This is because the learning process is still focused on the role of the teacher, and learning activities are still centered in the classroom. This condition results in children's learning feeling bored, so that the physical education being taught is less meaningful. (Sandey Tantra Paramitha, 2018)

## **2 Methods**

This research design deals with what is understood, interpreted by the research subjects. (Burhan Bungin, 2011). Qualitative research can show people's life, history, and organizational functional behavior. (M. Djunaidi dan Fauzan A, 2012). Furthermore, this study is to obtain data on the behavior of the people being observed including descriptions and notes on the results of the interviews. The instrument used was an interview guide. The research focus is on the potential of sports coaching with quality control of physical education programs. The subjects of this study were elementary school physical education teachers and sports coaches. The data source comes from information on the physical education program

teacher. The technique of collecting data by interview. Data analysis techniques through the stages of data condensation, data display, and conclusion drawing / verification.

### **3 Result and Discussion**

The curriculum is designed by policy makers through a careful analysis process and according to student needs. In accordance with the applicable provisions that all teachers at all levels of school must have a learning program curriculum document and it must be implemented. All teachers have curriculum documents that are archived in the school administration system. The curriculum document is used as the basis for implementing learning programs carried out by teachers in schools. This is in accordance with the opinion which states that the curriculum is one of the most important components that determine the unit of the education system. The consequence is that implementers in schools must manage the curriculum well, so that the learning outcomes will be more effective (Thaib, Razali M., 2015). All physical education teachers have a curriculum document and are used as the basis for developing a learning program plan (RPS). In addition to curriculum documents, teachers have learning supporting documents, namely semester learning plans arranged based on the curriculum. Whereas for the RPS systematics it is compiled based on the material contained in the curriculum text and in accordance with the applicable guidelines at the elementary school level.

The scope of the material in the curriculum is arranged based on the basic competencies (KD) that are in the structure of the curriculum material. The teacher has carried out learning based on the Student Work Sheet (LKS) book. In the worksheets, materials that can be used by teachers as learning materials for physical education programs have been compiled. The material listed in the curriculum document according to the physical education teacher is in accordance with the child's ability level based on the grade level. The content of the curriculum material is arranged systematically based on the stages of students' abilities. The information obtained shows that some students can do the material presented by the teacher even though many of the students are inactive and do not do it right. The material presented in the physical education program is not all in accordance with the facilities owned by the school. Some schools do not have facilities and equipment in accordance with all the material listed in the curriculum document. Some materials must be modified according to the facilities owned. It is not uncommon for the material listed in the physical education manual not to be realized because it is not supported by the existing equipment and facilities at the school.

The material presented in the physical education learning program has only been oriented towards material attainment as listed in the LKS book without paying attention to the standards of motoric development for children. Material development is less oriented towards the needs of basic sports movements. Not all teachers do material analysis related to the effect of material on motor development. Some teachers implement material in the physical education curriculum without paying attention to the impact of accompanying motor development. Not all teachers have a standard of motor development which is expected to be part of sports coaching. The material presented is more focused on developing students' physical fitness. While theoretically the material for physical learning programs is not only for physical fitness but also for building children's motor skills. Good children's motor skills can prepare children for the next phase, namely the regeneration phase of sports for those who are gifted and have potential

Some teachers do not have the motion analysis forms and tables that are needed in sports coaching. So that the material presented is limited to the implementation of the material in the curriculum. Some teachers do not have data to assess at each meeting whether the material being taught has a significant impact on children's motor development. There was no form found for material quality control in the learning process. The teacher does not carry out the process of observing students' motion. There is no quality control document in the form of guidelines for developing and managing materials, guidelines for motion analysis, guidelines for measuring basic motion, and guidelines for guiding sports talents.

According to the sports coach, there is no strong link between the material of the Jasmai education program in elementary schools and the motor needs of children in developing sports. The material taught has not made a real contribution in developing the basic needs of motor sports. According to the sports coach, the standard of motor skills for nurseries has a higher level of difficulty, so the learning material should be increased in complexity according to the child's age level.

#### 4 Conclusion

Schools and teachers have a curriculum text that is documented and used in the learning program. Learning through semester learning plans. The scope of the material is based on basic competencies. The material is in accordance with the child's ability and the content of the curriculum material is arranged systematically. Students can do the material and there are students who are not active and do not do it right. The material presented is not all in accordance with the facilities owned by the school. The material presented is oriented towards student worksheets. The standard of motoric development of children is not given enough attention. Not all teachers conduct material analysis on motor development. Implementing the material without paying attention to the impact of the accompanying motor development. Teachers do not yet have a standard of motor development according to the needs of sports coaching. The material focuses more on developing students' physical fitness and does not yet have the goal of building children's motor skills. The teacher does not have the motion analysis form needed in sports coaching. Teachers do not have instruments to assess the impact of the material on children's motor development. There is no material quality control form in the learning process. According to the trainer, the material being taught has not made a real contribution in developing the basic needs of sports. The standard of sports nursery ability has a higher level of difficulty.

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# Effect of Sponsor-Event Fit on Company's Decision to Sponsor Sport Event

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**Abstract.** According to Speed, Richard, and Thompson, one of influencing factors of company to sponsor sport event is sponsor-event fit. This factor shows how congruence is event vision and company goal, where they will, not only, share their assets but also share their visions. This descriptive quantitative research used survey as its method with variables were goal, logo, suitability, market, brand positioning, and company's decision. Population were decision maker of companies which ever become sport event, such as head of company, finance manager, and marketing manager. With purposive sampling method as sampling technique, this research also used modification 4 points likert scale questionnaire as its instrument. From analysis data which used regression analysis, significance data showed .021 and its  $< .050$  so sponsor-fit event have effect on the company's decision.

**Keywords:** Sport Management, Sport Sponsorship, Sport Event

## 1 Introduction

Along with the times there are many ways to do marketing and promotion. Competition between companies in marketing their products is the main reason, so that companies have different strategies from one another. This happened as a result of the higher growth of the company. According to Fauzi and Suhadak, high company growth reflects the broader reach of the company and shows good company performance due to an increase in company assets or sales [1]. One of them is the company's decision to sponsor sports events. Sponsorship has the role of a popular marketing communication tool used in marketing communications to communicate with consumers. According to Meenaghan, sponsorship is defined as an investment, either in cash or in-kind, in an activity, whether individual or event, which later serves as a key to accessing potential commercial aspects of these activities by investors [2]. In addition, sponsorship is also a commercial transaction, in which the donor expects remuneration from the recipient of the funds and both parties agree to give and receive each other [3]. According to Lamb et al, sponsorship can also be defined as a marketing activity in which the organization gets the right to use the company, product or brand name and logo with a contract of monetary giving and other support to the organization [4]. Therefore, sponsorship can be defined as promotional or marketing activities carried out by a company in the form of cash or products owned to obtain an advantage for the company and to support the activities of an organization. According to Lidia Evelina<sup>3</sup>, the benefits of sponsorship include that the company gets a good image and its name is increasingly recognized among the public and can collaborate with other parties for the company's needs. In addition, through the use of

sponsorship, companies can reach their consumers and enrich consumers' knowledge about the company's own brands. With the increase in similar companies the way of marketing for each company is different and the company's decision to sponsor events because this is one way in a marketing strategy to reach the target market the company wants to reach [5].

An event is an activity held to commemorate important things throughout human life, either individually or in groups bound by custom, culture, tradition, and religion which is held for certain purposes and involves the community environment which is held at certain times. Then sport can be defined in general as a person's physical and psychological activity which is useful for maintaining and improving the quality of one's health. So, a sports event can be defined as an activity related to a person's physical and psychological activities held in various sports fields and at certain times [6]. According to Lumintuarso, sports events contain two aspects as important factors that ensure the rolling of the sports industry, namely how to build sports (internal) and how to sell sports (external). The internal aspect involves community participation and infrastructure tools (tools), as a sports event builder (entertainer), while the external aspect includes the public, the media, and partners, as a quality sports event seller [7]. Sports events are also a very interesting activities to be used as sponsors media for companies because they are heavily covered by the media. According to Olejniczk and Alcher, sports sponsorship can be interpreted as an effort to form a strategic relationship between a company and sports property as a means of communicating brand messages to the general public, players or certain events [8]. Sports sponsorship can also be described as a business relationship between a sponsor and a sports entity for mutual benefit<sup>8</sup>. So, sports sponsorship can be interpreted as a relationship or collaboration with other parties as a means of conveying a product or brand to a company to be introduced to the general public through a sports event to obtain the same benefits. Because success in a sports event does not only focus on how to manage the organizing committee and the events at the event, but the involvement of sponsors also has a very influential role in the success of a sports event. Therefore, it is necessary to have a deeper discussion regarding which factors have the most influence on company decisions in sponsoring sporting events. This discussion can be used as input for sports event organizers and the government to pay attention to these factors in order to collaborate with various sponsors. However, to cooperate with the organizing committee, each company that will sponsor an activity must have the criteria and determining factors in making decisions whether to cooperate in a particular event. According to Speed and Thompson [9], one factors that influence company to become sponsor for sport event is the fit of sponsor and event. This factor shows how congruence is event vision and company goal, where they will, not only, share their assets but also share their visions. Ambient aromas that are assessed to be coherent with the retail context (for example, floral fragrance at a flower shop) may have a beneficial impact on choice processes, according to recent research on olfactory clues [10]. Odors that are out of place might be irritating. Source effects research has also emphasized the importance of source similarity as a factor of attractiveness [11]. McCracken's meaning transfer model highlights the necessity of continuity between the source's meanings and the product's intended meaning [9]. Sponsorship researchers<sup>12</sup> have emphasized the importance of a link or "fit" between the sponsor and the sponsored event. Fit can be assessed on several different levels (e.g., functional characteristics, symbolic characteristics). We will not, however, explore the many bases of fit for the sake of brevity; instead, we will model perception of fit between sponsor and event using a single build. To avoid tying this construct to a specific degree of fit, we think of fit in a broad sense. Without limiting the variables used to evaluate fit, this construct gets into the respondent's views about the event and sponsor coupling, as well as the degree to which the pairing is perceived as well-matched or a good fit.

## 2 Methods

This research is a quantitative descriptive study conducted to provide a more detailed description about the effect of sponsor-event fit to the company's decision to sponsor sports events. In this study, there are five independent variables and one dependent variable. The dependent variable of this study is the company's decision to sponsor sports events. The independent variables of this study are Goal's Fit, Logo's Fit, Matching between Event and Company, Company's Support, Brand Awareness. The population in this study were all companies throughout Central Java. However, there are company limitations in this study, namely industrial companies, sports industry companies, individual companies, companies that have sponsored corporate sports events that are willing to be respondents in this study. This study used a non-probability sampling technique is purposive sampling with a sample consisting of directors or company leaders, the administration and finance, and the marketing department. The research instrument used is an instrument that has been used by Speed and Thompson with the necessary modifications in the form of a checklist using a 4-point Likert scale with assessment points, namely Strongly Agree, Agree, Disagree, and Strongly Disagree. Regression techniques are used to test if there is any effect of sponsor-event fit to the company's decision to sponsor sports events.

## 3 Result and Discussion

### 3.1 Result

After processing the data, the results of the T test show a significance value  $<.05$  or have a value of  $T \text{ Count} > T \text{ Table}$ , so there is an effect of variable X on variable Y. By using the formula  $T \text{ table} = t (\alpha / 2; nk-1)$  it is obtained table results of 2.032. The significance value above is 0.021 which means the significance value  $<.05$  and has a T count value of 2.413 and a T table value of 2.032 which means the value of  $T \text{ Count} > T \text{ Table}$ , it can be seen that there is an influence of sponsor-event fit on the results of the company's decision to sponsor sporting events.

**Table 1.** Regression Analysis.

Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	25.219	5.294		4.764	.000
	Event Yang Sesuai dengan Produk atau merk perusahaan	1.027	.426	.364	2.413	.021

### 3.2 Discussion

It can be observed from the results of the data processing that the company considers sponsor-event fit when giving sponsorship. This consideration is made to align the aims of the firm with the upcoming events, one of which is to ensure that the company's name or brand is



familiar to the event's target market. Sponsoring sporting events, according to Olejniczk and Alcher, can develop a strategic link between a corporation and a sports property, as well as communicate the brand message to the wider public. A strategic match between a sponsoring corporation and a sporting event [13], or a functional or image-based match, is what fit is informally defined as [12]. Fit has often been referred to as congruence when analyzing parallels in context between two people [14].

According to schema theory, assimilation effects occur as the fit between a sponsor brand and a sport event brand increases, shifting the event's quality to the sponsor brand [15]. By affecting other variables such as cognitive and affective responses [15], as well as sponsor receptiveness and honesty [17], sponsorships with a high fit with an event will raise brand attitudes [16] and increase the likelihood of the sponsor brand's purchasing intentions. Sponsors pay money to reap the benefits of great brand image transfer during an event, which is heavily influenced by a good fit between the event and the sponsor [18]. Customers may transfer some of the positive connotations and traits from the event to the sponsor if the sponsor is thought to have a strong functional or image-based match with the event [9]. It is said to be operationally fit when participants wear the sponsoring goods during an event (for example, sport shoes), whereas image fit occurs when the event's image is identical to that of the sponsoring brand.

According to the brand extension literature, an effective brand extension is more likely when the original brand and the brand extension are in some way compatible, because greater fit activates category-based processing, resulting in the transfer of the original brand's assessments to the extension [19]. In a similar line, greater perceived congruence between a sponsor and a sporting event may lead to sponsorship categorization [20]. When there is a high level of congruence, images and assessments linked with a well-known event such as the World Cup can be utilized to evaluate the sponsoring brand and sponsorship efforts. Due to the unplanned pairing [21], incongruence, or a lack of congruence, between a sponsor and a sporting event, prompts cognitive elaboration on the sponsorship. Increased elaboration, as a result of the negative valence of low congruence, not only generates more negative views and comparisons, but also makes them more available as inputs in a subsequent sponsorship assessment, resulting in a less favorable attitude toward the sponsorship and a decrease in brand equity [22]. As a result, unless the sponsoring company is seen to be congruent with the sponsored event on some level, even a well-executed sponsorship campaign with consumer-friendly, positive features may not result in positive image transfer. In the worst-case situation, consumers may reject the brand due to confusing brand positioning and sponsored behavior [22].

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# Determinants of Pulmonary Function Parameters: A Cross-Sectional Study Among Elite Athletes in Central Java, Indonesia

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**Abstract.** Our study aimed to define the determinants of athletes' Force Vital Capacity (FVC), Force Expiration Volume (FEV<sub>1</sub>), and Peak Expiratory Flow (PEF). We conducted a cross-sectional study involved 134 athletes from 14 different sport disciplines. We observed age, sex, resting heart rate, body mass index, skinfold thickness, hypertension, and smoking status. The present study revealed that different sports disciplines influenced pulmonary function based on FVC, FEV<sub>1</sub>, FEV<sub>1</sub>/FVC, and PEF. These findings add to evidence that there is a significant difference in pulmonary function among sports disciplines. Accuracy sports discipline observed had the highest score in the FEV<sub>1</sub>/FVC and PEF, while weightlifting showed the lowest FVC and FEV<sub>1</sub>. Ball game disciplines showed the highest score in FVC and FEV<sub>1</sub>/FVC. The present study concluded that the disciplines of sports were related to the pulmonary function test results. We observed that ball games had higher FVC and FEV<sub>1</sub>/FVC.

**Keywords:** pulmonary function; athletes; determinants; spirometry; sports.

## 1 Introduction

The pulmonary function test is the routine test for athletes that provides the ventilation volumes' parameters [1]. The test has become indispensable for preventing, diagnosing, and evaluating various respiratory impairments and analyzing the athlete's performance [1]. Previous studies reported that there is a higher level of pulmonary function parameters, such as vital capacity (VC), forced vital capacity (FVC), forced expiratory volume in one second (FEV<sub>1</sub>), and peak expiratory flow (PEF) in athletes compared to non-athletes [1–3]. The ventilation volume also varied among athletes based on sports; water sports and activities tend to have higher ventilation volume [1, 3, 4]. The study also concluded that pulmonary function performances are related to the athletes' physical performance [5].

Pulmonary function parameters in athletes also influenced by age [6, 7], body composition, history of lung and heart diseases, and physical activities [3, 8]. Regular physical activities will increase pulmonary function [9, 10]. Anthropometric parameters are also related to pulmonary function [11].

There are well-established determinants of pulmonary function parameters; however, little is known in Indonesian elite athletes' setting. The present study aimed to explore the determinants of pulmonary function test parameters, i.e., FVC, FEV1, and PEF among elite athletes that participated in the training center in Central Java, Indonesia.

## 2 Methods

The present study conducted a cross-sectional study involved 134 athletes (mean age: 23.0±7.09 years old) attending the routine physical examination in the training center preparation facing the 20<sup>th</sup> Indonesia national Olympic games. Study population involved fourteen kind of sports, i.e., archery (n=9), motor racing (n=4), shooting (n=9), weightlifting (n=7), beach volleyball (n=3), roller sport (n=10), gliding (n=8), basketball (n=6), taekwondo (n=11), wushu (n=15), boxing (n=2), hockey (n=20), baseball (n=16), and softball (n=14). Then, we categorized the sport disciplines as weightlifting; accuracy sports for shooting and archery; martial arts for taekwondo, wushu, and boxing; ball games sports for beach volleyball, basketball, hockey, baseball, and softball; racing sports for roller sports; and sports with instruments for motor racing and gliding.

All subjects that participated as athletes for more than two years were recruited in the study. While athletes with a history of lung and heart diseases and suffered from respiratory tract infection as well as pathological electrocardiographic appearance were excluded from the study.

### 2.1 Procedures

Present study was approved by the institutional review board Faculty of Medicine, Universitas Diponegoro, under the ID number 12/EC/KEPK/FK-UNDIP/I/2020. Study participants were informed regarding the study's measurement procedures and signed a consent to participate in the study. Demographical data such as age, sex, smoking status, and training history were acquired by questionnaire—no alcohol and caffeine consumption for 12 hours prior to the test. The measurements were conducted in the Sports Laboratory Center, Faculty of Sports Science, Universitas Negeri Semarang, with a temperature range between 18°C and 22 °C), atmosphere pressure of 760 mmHg, relative humidity range 30-60%. Pulmonary functions were measured by spirometer Pony FX (Cosmed, Roma, Italia). The parameters conform to the American Thoracic Society (ATS) / European Respiratory Society (ERS).

Spirometry test was done for athletes in the sitting position, used casual and comfort cloth, and used nose clips to avoid airflow leakage. Tests were done for three trials for every athlete and the highest value of FVC, FEV1, and PEF. The results of the pulmonary function parameters test were adjusted by anthropometric parameters, age, and sex. Weight and height of athletes were also measured to determine the body mass index (BMI). Percentage body fat was also measured using a bioimpedance body analyzer (BC-418 segmental body composition analyzer, Tanita, Illinois, USA). We also measured blood pressure as well as the resting heart rate.

## 2.2 Data analysis

Numerical data with normal distribution presented as mean±SD, while non-Gaussian distributed data presented as median± interquartile range (IQR). Categorical data presented as frequency. A p-value <0.05 is considered statistically significant.

## 3 Result and Discussion

Table 1 showed us the subject's demographical characteristics of sex and smoking status. There was a significant difference in sex proportion in the ball games group. Male athletes were significantly dominant in the ball games group. Smoking status was also significantly different in the martial arts and sport disciplines which use instruments (*P* value<0.05). All athletes in the martial arts were non-smoker, while a few non-martial arts athletes, i.e., 13.2%, were smokers. The proportion of sport with instruments athletes as smokers was higher than non-smokers.

**Table 1.** Subject's characteristics

Sports Category		Sex				OR <sup>†</sup>	Smoking				OR <sup>†</sup>
		Male		Female			No		Yes		
		n	%	n	%		n	%	n	%	
Weightlifting	No	74	58.3	53	41.7	3.49	115	90.6	12	9.4	3.83
	Yes	2	28.6	5	71.4		5	71.4	2	28.6	
Accuracy	No	65	58.0	47	42.0	1.38	101	90.2	11	9.8	1.45
	Yes	11	50.0	11	50.0		19	86.4	3	13.6	
Martial arts	No	62	58.5	44	41.5	1.41	92	86.8	14	13.2	<b>0.87*</b>
	Yes	14	50.0	14	50.0		28	100.0	0	0.0	
Ball games	No	40	47.6	44	52.4	<b>0.35*</b>	111	88.8	14	11.2	0.88
	Yes	36	72.0	14	28.0		9	100.0	0	0.0	
Sports with instrument	No	71	56.3	55	43.7	0.78	117	92.9	9	7.1	<b>21.67*</b>
	Yes	5	62.5	3	37.5		3	37.5	5	62.5	
Race sport	No	70	56.6	54	43.5	0.86	110	88.7	14	11.3	0.89
	Yes	6	60.0	4	40.0		10	100.0	0	0.0	

<sup>†</sup>Chi-square test. \**P* < 0.05

Table 2 showed us the subject's characteristics of age, blood pressure, HR, fat percentage, and BMI. All subject's characteristics were different among the sports category except systolic blood pressure.

**Table 2.** Age, blood pressure, fat percentage, and body mass index based on sports category

Sports Category	Age <sup>‡</sup>	SBP <sup>‡</sup>	DBP <sup>‡</sup>	HR <sup>‡</sup>	Fat percentage <sup>‡</sup>	BMI <sup>‡</sup>
Weightlifting	24.00±5	110.00±20	80.00±10	<b>24.00±49**</b>	<b>78.00±38**</b>	<b>31.87±11.60**</b>
Accuracy	20.00±10	110.00±20	70.00±10	78.00±12	<b>63.50±38**</b>	24.02±5.13
Martial arts	20.00±6	110.00±10	<b>70.00±15**</b>	78.00±8	<b>35.00±12**</b>	<b>20.71±2.54**</b>
Ball games	<b>22.00±4**</b>	110.00±20	70.00±10	78.00±11	38.50±20	21.89±3.21

<b>Sports with instrument</b>	<b>45.00±15**</b>	115.00±18	<b>80.00±10**</b>	79.00±16	<b>106.50±44**</b>	<b>27.10±8.54*</b>
<b>Race sport</b>	<b>17.50±2**</b>	110.00±13	80.00±10	79.00±12	<b>32.50±25*</b>	21.23±3.17

‡independent t test; \*P < 0.05 \*\*P < 0.001

BMI: body mass index; DBP: diastolic blood pressure; HR: heart rate; SBP: systolic blood pressure.

Table 3 revealed that FEV1 was significantly influenced by age, while FVC was significantly influenced by sex.

**Table 3.** Pulmonary functional parameters based on age, sex, and BMI

Variables	FVC	FEV1	FEV1/FVC	PEF
Age	0.529; 0.055	<b>0.146; 0.126**</b>	0.490; -0.060	0.884; -0.013
Male	96.12±12.03	104.00±19	112.00±9	101.00±27
Female	<b>87.02±12.01**</b>	92.00±17	113.50±8	99.50±24
BMI	0.191; 0.114	0.111; 0.138	0.077; -0.153	0.714; -0.032

BMI: body mass index;

The pulmonary function test results were significantly different in some sports categories (Table 4). The highest performance of FVC was found in the ball games group, i.e., 95.48±11.96%, while the lowest was in the weightlifting group, i.e., 77.4±11.30%. Accuracy sports discipline had the highest parameter in FEV1/FVC and PEF. In almost all kinds of pulmonary function parameters, weightlifting groups were significantly difference as the lowest in the FVC, FEV1, and PEF (Table 4).

**Table 4.** Pulmonary functional parameters based on the Sports category

Sports Category	FVC	FEV1	FEV1/FVC	PEF
<b>Weightlifting</b>	<b>77.43±11.30**</b>	<b>88.00±12**</b>	116.00±7	<b>93.00±32*</b>
<b>Accuracy</b>	89.50±10.83	98.00±20	<b>115.50±7**</b>	<b>112.00±24**</b>
<b>Martial arts</b>	88.61±11.38	96.50±17	114.00±9	98.00±29
<b>Ball games</b>	<b>95.48±11.96*</b>	101.50±19	<b>109.50±11**</b>	98.00±27
<b>Sports with instrument</b>	92.75±13.28	98.50±23	113.00±9	106.50±28
<b>Race sport</b>	97.70±13.26	100.50±15	111.00±8	103.50±26

\*P < 0.05

\*\*P < 0.001

The present study revealed that different sports influenced pulmonary function based on FVC, FEV1, FEV1/FVC, and PEF. These findings add to evidence that there is a significant difference in pulmonary function among sports disciplines. Accuracy sports discipline observed had the highest score in the FEV1/FVC and PEF. Weightlifting showed the lowest score in FVC and FEV1. Ball game disciplines showed the highest score in FVC and FEV1/FVC. However, we realized that these findings still had confounders since the athletes' heterogeneity characteristics, such as higher BMI in weightlifting athletes and a higher proportion of male athletes and younger age in the ball games, might influence the pulmonary function. Age, sex, and BMI were the most pivotal determinants of the pulmonary function parameters[12, 13]. We must be concerned regarding these findings, in which FVC results are also influenced by female athletes and FEV1 influenced by the younger athletes, as shown in Table 3.

The current study also observed that different disciplines of sport related to the pulmonary function are in line with the previous study [14, 15]. A previous study also concluded that multicomponent exercises affect pulmonary function, even in diabetic subjects [16]. A dominant focus on respiratory muscle exercise like yoga increased pulmonary function [15].

A previous study revealed that physical fitness involved the pulmonary function related to high blood pressure; however, in the current study, we did not find this condition, perhaps of limited athletes being observed [17]. The duration of sports in which athletes conducted was also associated with the pulmonary function parameters [18].

## 4 Conclusion

The present study concluded that the disciplines of sports were related to the pulmonary function test results. We observed that ball games had higher FVC and FEV1/FVC. We also observed that age, sex, and BMI influenced the pulmonary function test, suggesting that future study must be done to elucidate factors related to the pulmonary function test parameters in different sports types comprehensively.

**Conflicts of interest.** The authors declared that there are no conflicts of interest.

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# Skills Analysis on the Set-Upper Movement in Volleyball

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**Abstract.** The success of attacks in volleyball is determined by set-upper. The aim was to analyze the movement of the upper pass including footwork, arm motion, body movement, and hand motion. This qualitative research with survey methods has population where 15 female volleyball athletes and two set-upper were involved as samples using a purposive sampling technique. The Kinovea program was used to analyze and the results showed that the angle of the foot showed the correct movement, where the foot makes an angle and lowers the body to position it just below the ball object. The angle of the arm is well demonstrated in preparation for pushing the ball object both forward and backward, movement of the body parts as a whole shows positive motion, especially the ability to flex the body in the movement of the backset. The angle of the hand shows a very good movement of the ball.

**Keywords:** Volleyball, set-upper, sport biomechanic.

## 1 Introduction

Volleyball is a sport that is popular with the general public. This is proved by the frequent competitions that are held in cities and villages, men and women, young and old. Sports competed from the village, district, regional to national levels. The one of success factors of attacks in volleyball is determined by set-upper. This player even becomes the central attack in getting points. Often a volleyball team wins matches because it has good set-uppers. The set-upper player is a volleyball player in a team who has the ability to pass and toss the ball to the players in one team so that it can be hit by the attacking player (spiker) to get points. The job of the set-upper is not easy, he must be smart in determining which attacking player decisions should be passed to get points, as well as considering and outwitting the opposing team in an attempt to stop the attack (blocking). The technique commonly used is overhead passing with a forward (front set) and backward (backset) bouncing direction. The strategic role of set-upper players in the volleyball game requires a study related to analyze passing movement skills for set-upper players to get point faster based on biomechanical principles. The purpose of this study was to determine and analyze the movement of the upper pass including 1) footwork, 2) arm motion 3) body movement and 4) hand motion.

The principles of mechanics of human motion when carrying out sports activities are studied in biomechanics. Science concerns the body of living things and is a combination of applied mechanical disciplines. The application of biomechanics in sports is carried out to analyze movements so that the results of this analysis can be used to improve techniques

effectively. Effective motion patterns will produce good technique. Coaches can analyze the efficiency of an athlete's movement and try to determine if the athlete can perform more movement.

## 2 Literature Review

**Biomechanic.** Biomechanics is closely related to a body movement or what is known as a motoric. The process of an initial movement starts with simple or gross motor movements to combination or fine motor movements. An athlete has passed this phase at an early age until he becomes an athlete. In its development, a movement can become more effective by using mechanical principles. Biomechanics is the study of the function and structure of biological systems using mechanical methods. The biomechanical approach to sports is more focused on sports actors (athletes), but the biomechanical approach to sports can also extend to the behavior of immovable objects such as footwear, surfaces (fields), and sports equipment that can affect athlete's performance. With advances in biomechanical analysis, technology can be done with the help of computers. Biomechanical analysis performed using a computer is usually done by examining the results of recorded training sessions or competitions conducted by athletes. From the results of biomechanical analysis, the data obtained is in the form of velocity and the angles of the athlete's joints during movement. The results of the analysis determine whether the athlete already has a good technique or not. Therefore, the importance of biomechanical analysis in sports is to increase the effectiveness of a movement that can be used by a coach to athletes. So that biomechanical analysis can produce professional athletes to advance sports in Indonesia and be able to compete with other countries.

**Volleyball.** Volleyball is a popular game in Indonesia. Volleyball is one that is used by the community both in achievement sports, educational sports, and recreational sports. Games that as a whole involve fast and strong body movements [1], played together in a team [2], and uses very narrow space (81 square meters for each team), requires very fast and dynamic action, technical characteristics, tactical, and allows non-verbal communication between players on the field [3]. This game is fun [4] because it can adapt to various conditions that arise, can be played any number (2-6 people), can be played on any surface, both indoors and outdoors, can be played at all ages, between genders, and volleyball requires few ground rules, little equipment, and is a popular recreational sport. The hallmark of the game of volleyball is bouncing the ball so it doesn't fall on the floor. Volleyball requires mastery of basic techniques in order to be able to play it well, namely movement skills that aim to solve a certain movement problem in the most economical and useful way. There are six basic techniques of volleyball: serve, take attacks, hit, pass, block, and receive serve. Servicing is the first shot [5], but its shape has resembled a spike on a jump serve [6]. The jump serve is widely used by both indoor and beach volleyball players [7], and the success of serving techniques in play are the main variables in the success of the match [8]. The basic techniques are almost the same form and the goal is the technique of receiving service and the technique of receiving the attack. this is known as the forearm pass and overhead pass [5]. The forearm technique is also known as the forearm pass or the bump [4].

**Set-Upper.** The overhead pass technique developed into a technical specialty, namely setting, including front-set, backset, lateral set, jump setting, one-hand set, forearm set [9]. The front-

set is a set-upper technique where the ball is bounced in the direction of the bounce in front of the set-upper. A backset is a technique of passing in which the ball is bounced back to the set-upper. The game of volleyball is a sport where individual success is achieved by harmonious collaboration from the efforts of other players [10] so that training sessions should be introduced. Play training sessions help athletes read the game and focus on what they see, when, and why [11]. Athletes are expected to be proficient in encoding specific domains and have the ability to predict games efficiently [12].

### 3 Methods

This research uses qualitative research with survey methods. The population in this study was 15 female volleyball athletes from Central Java for PON PAPUA 2021. Two set-upper players were involved as samples of this study using the purposive sampling technique. The Kinovea program tool is used to analyze front-set and backset motion based on biomechanical principles.

The video recording is processed using software to get motion photos. These photos are the result of video capture and made into frame-by-frame images. Each athlete's motion was photographed and then analyzed using Kinovea software to obtain the angle of movement of the legs, body, arms, and hands.

### 4 Result and Discussion

The results of the analysis of the baiting movement skills research are presented as follows:

#### 4.1 Front-Set Motion

**Preparation.** The player starts the preparatory movement with an upright body position with the leg angle bent 100 degree. The result of this movement is that the body is brought under the ball so that the ball is within reach. The elbow flexes at 121 degree and the wrist performs an extension motion at an angle of 140 degree. These two movements are the position of the arm-motion toward the ball.

**Performance.** Forward or front-set is performed by extending the legs to form an angle of 155 degree and straightening the arms forward at an angle of 136 degree. Push both legs and arms ending with straight fingers with the arms resulting from the flexion of the wrists.

**End.** The final movement is to bend the legs into 140 degree as an effort to compensate for the forward power of the body and body weight.

#### 4.2. Backset movement

**Preparation.** The player begins the preparatory movement with an upright body position with the angle of the leg bent 90 degree. The result of this movement is that the body is brought under the ball so that the ball is within reach. The elbow flexes at 128 degree and the wrist performs an extension motion at an angle of 156 degree. These two movements are the position of the arm-motion toward the ball.

**Performance.** Backset is done by bending the body backward in an arc at an angle of 150 degree with straight legs and arms. The arm follows the flex of the body by extending the arm

up and back at an angle of 123 degree and ending with a straight radius burst with the arm resulting from the flexion of the wrist.

End. The final movement by bending the legs into 120 degree as an effort to compensate the body's power back and body weight so that it is balanced and does not fall.

### 4.3. Discussion

Passing is a specific technique where a good physical condition is required. Seen fast and strong leg movements as a foundation and determine the right body position to reach the ball. Strength and flexibility of the abdomen play an important role in maintaining the balance of motion, even seen dominant in the backset movement. The strength of the arms and fingers as a medium of contact with the ball is important about the ability and speed of the ball to reach the attacking player. The body movements in the preparation, implementation and final stages that are done well and are supported by qualified physical conditions produce good movement and result in the set-up.

## 5 Result and Discussion

Based on the results of data analysis, it can be concluded that the movement shows that it approaches the correctness of motion technique. Bouncing the ball that is good for the set-upper player results from the mastery of footwork skills, body flexing ability, arms thrust, and finger cracking.

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# The Effectiveness of Attack with Epee Weapon in Fencing Competition in Kendal Regency Year 2020

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**Abstract.** This study aims to determine the percentage of the effectiveness of attack techniques using epee weapon used by athletes in fencing competition at the regional level in Kendal in year 2020. The research sample were 4 junior female athletes who succeeded in the semifinals and finals. The results showed that attack technique effectiveness include 1) the counter-attack technique was 85.71%, 2) the wrist attack technique was 75%, 3) the circular flash technique was 71.42%, 4) the one-step attack technique was 66.67%, 5) the direct attack technique was 62.50%, 6) the beat attack technique was 60%, 7) the waist remise six circle technique was 56.25%, 8) flash technique was 54.54%, 9) waist remise six flash technique was 33.33%, 10) compound technique was 31.25%, 11) technique down to eight leg pricks, was 30%, 12) leg prick technique moved to six, was 25%, 13) double-flash attack technique was 20%, 14) two-strike technique was 0%.

**Keywords:** Effectiveness, Attacking Technique, Fencing, Epee Weapon.

## 1 Introduction

Fencing is a martial arts that uses weapon and develops into a cultural art that emphasizes skill techniques such as cutting, stabbing, or deflecting enemy weapons by optimizing hand dexterity (Atri Widowati & Graffite Decheline, 2018).

Although there are many techniques in fencing, not all of them are applied by athletes when competing with opponents. The fact that what happens in the arena is that a fencer sometimes does a stab that is not right at a legitimate target so that the attack does not produce points, this situation is used as an advantage by the opponent to get points. The attack is easily deflected by the opponent. Some fencing athletes tend to only perform one attack technique without wanting to vary the attack technique even though the technique does not generate points in a match.

The fencing attack movement is built starting with a full forward position, the forward legs are balanced with the buttocks which must be stable together with the arms, the hands are fully extended and pointing towards the opponent with power and hind leg repulsion. (Faidillah Kurniawan 2010:57).

According to Alie Humaedi (2016: 41) effectiveness is the level of achieving a certain goal, both in terms of results and efforts as measured by quality, quantity, and timeliness according to certain procedures and measures. Therefore, by using statistical analysis of technical effectiveness the coach can find out what techniques are effective for generating points, so that the coach can guide his athletes to use the right techniques when competing.

The trainer can understand the function and benefits of evaluation by using statistical data. The trainer is no longer just evaluating by simply making observations without any statistical data. This data is also useful to support the training program that will be created later. Therefore, researchers want to carry out research at regional level fencing competitions in Kendal Regency in 2020 to determine the effectiveness of attack techniques using epee weapon when athletes use them in competing.

Epee is one of three types of fencing weapons that differ in match equipment, weapon shape, and target area suitability. The epee weapon is the same length as the floret, but heavier, with a larger protector (to protect the hand from the touch of a legitimate opponent's weapon) and a more rigid blade.

The attack movement is initiated by a straightening motion of the arm that holds the sword, which reaches out with the tip of the sword to aim and stab the opponent into the target area. Fencing requires puncture accuracy as explained by Mochamad Sajoto (1988: 59) that, "accuracy is one's ability to control free movements towards a target, this means can be a distance or perhaps a direct object that must be targeted".

Direct attack techniques, in this type of EPE weapon, players can immediately attack because there are no provisions for attack rights such as for the types of floret and saber weapons. So whoever is fast with the tip of the weapon piercing the legal surface then the athlete gets the points (Dede Syamsul Ma'Arif, 2015:3).

A one-step strike technique, this movement begins with positioning the "stance" which is commonly known as the ready position in the fencing, the feet are approximately fifteen inches between the front and rear legs at a 90 degree leg angle. The position of the heel of the front and back foot is on the same line. The front leg is straight pointing towards the enemy / opponent, while the back leg is rotating at an angle of 90 degrees. (Faidillah Kurniawan, 2010:52).

Redoublement attacks, this movement is commonly where the player performs the attack twice in one movement quickly without pausing footsteps or bending the hands. As explained by Rogers (2013:64) "A redoublement from the lunge, or by lunging or flèche after returning to guard".

flash is a movement the fencer makes by running or jumping from an en garde position and landing on the hind legs (Rakita dan Shteynbakh, 2013:106).

The attack circle technique is a movement that is carried out under the opponent's command which is usually called a compound, with the direction of the tip of the weapon coming out or in (Faidillah Kurniawan, 2010:59). Compound is evasion by avoiding the opponent's weapon, from the side the weapon is linked to and then raising it to the opposite side.

The counter-attack technique can be described as a defensive move by fencing that successfully deflects a sword / weapon strike from the target area, preventing a legitimate touch (Faidillah Kurniawan, 2010:59).

The wrist strike technique is performed when their opponent steps forward but slightly open the upper, right, left, and lower wrists with a close distance the weapon is moved lengthwise with the stab direction of the open wrist and close to the tip of the weapon. (Rogers,2013:154).

Beat attack is a beat that is done by opening the three fingers that hold the weapon and closing it again by flexing the wrist, to give a sharp blow to the blade of the opponent's weapon. (Rogers,2013:40).

Based on an interview with Gerardus Felix Bolang as the coach of BPLOP Central Java on July 23, 2020, the were some information as follows,

- 1) circle six waist remise is the development of a modern fencing technique with the main movement of this technique where the weapon from a position inside the target area moves to the outer area of the target area by moving the tip of the weapon from the inside out through the bottom of the opponent's weapon to form a circle (circle).
- 2) technique down to eight leg pricks is carried out by lowering the tip of the weapon from the position of the seven to eight stab or from the four to the eight with the direction of the stab of the opponent's leg. In the process of displacement, the tip of the weapon is attempted to form a semicircle so that it is difficult for the opponent to avoid the fencer with the aim of puncturing not the thighs but the legs of the knees to the opponent's shoes.
- 3) leg prick technique moved to six is one of the attack techniques where a stab towards the leg is only a trick for the opponent. Scams are designed to attract defensive action towards the point of being attacked. Usually used as a distraction to force your opponent to focus more energy and focus on a certain area. To weaken the strength of the opponent in another area, the point of the weapon is fixed towards the opponent's feet, then when the opponent responds to block the athlete's weapon, the direction of the weapon is focused on a sixth circular motion in which the position of the weapon is moved to the area outside the target area by moving the tip of the weapon from below to move up past the bottom opponent's weapon so that it forms a circle. Then the tip of the weapon is pointed upwards to attack with the target chest to stomach.
- 4) The flash movement with a circle is carried out when performing a flash or jumping technique where the athlete's weapon is straightened to lure the opponent to parry. If the opponent is hooked by the trick, the athlete moves the tip of the weapon to the outside area as well as in the opponent's target plane (forming a small circle with the tip of the weapon from the inside out or from the outside in).
- 5) The waist remise six flash also includes a one-two technique where the flash with the weapon is moved towards block six is used as the main movement in this technique, if the movement fails or is blocked by the opponent, the athlete remakes by moving the tip of the weapon to the target area of the opponent.

The attack technique movement twice and then flash is a variation of the redoublement technique which is performed when the athlete uses the attack technique twice in a match but does not reach the target area so the athlete adds the flash movement to this technique.

## 2 Method

**Type of Research.** This study used a survey method, with a percentage descriptive form. Sugiyono (2013) states that the survey method is used to obtain data from certain natural (not artificial) places. In collecting data, researchers circulate questionnaires, tests, structured interviews and so on (treatment is not like in experiments). Suharsimi Arikunto (2013) states that descriptive research is research that is intended to investigate the circumstances, conditions, or other things that have been mentioned, the results of which are presented in the form of a research report.

**Time and Place of Research.** The research data was collected at Kebondalem Stadium, Kendal Regency, Central Java. Then this research was carried out on February 15 and 16, 2020.

**Population and Sample.** In conducting this research, researchers used all fencing athletes, both junior and senior female athletes who took part in the Fencing Championship in Kendal Regency in 2020, totaling 30 athletes. Then the researchers determined the sample by selecting junior female fencing athletes who made it into the semi-finals to the finals, totaling 4 athletes.

**Technique in Collecting the Data.** In this study, the researcher was assisted by two colleagues who were in charge of recording and taking notes all activities and results in the competition, both in the form of points and the techniques used by athletes in carrying out attacks. Then the researcher conducted an analysis of the results of the observations and records made during the fencing competition.

**Technique in Analyzing Data.** Analysis of the data used in this study using percentage descriptive statistics. According to Sugiyono (2009), descriptive statistics are statistics that are used to analyze data by describing or describing the collected data as it is without making generalized conclusions or generalizations. The formulas used in this study are:

$$DP = \frac{n}{N} \times 100\%$$

Criteria :

- Dp : Descriptive Percentage  
 n : Number of attacks earned points  
 N : The total number of attacks  
 100% : The percentage rate level

### 3 Result and Discussion

Based on the observation carried out on each junior female fencing athlete competition data from the semifinals to the finals related to the epee weapon attack technique, there are 14 indicators such as direct attack technique, one-step attack technique, two-strike technique, flash technique, coumpound technique, counter-attack technique, wrist attack technique, beat attack technique, waist six remise circle technique, downward eight leg stab technique, six move leg stab technique, circular flash technique, waist remise six flash technique, and redoublement then flash technique. The descriptive analysis of the research data is as follows:

**Table 1.** Children demography status

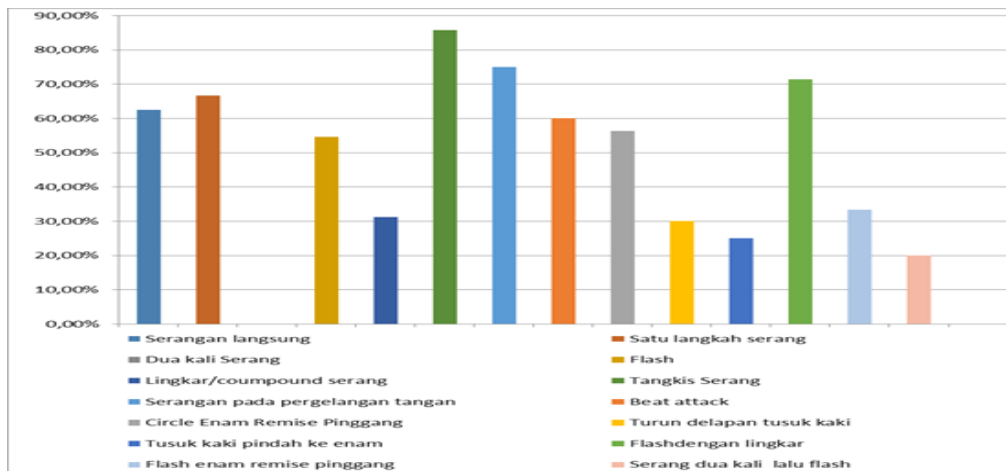
Nb.	Attack Techniques	Number of attacks earned points (n)	The total number of attacks (N)	$DP = \frac{n}{N} \times 100\%$	Result (%)
1.	Direct Attack	10	16	$DP = \frac{10}{16} \times 100\%$	62,50%
2.	one-step attack technique	12	18	$DP = \frac{12}{18} \times 100\%$	66,67%
3.	two-strike	0	9	$DP = \frac{0}{9} \times 100\%$	0%



4.	<i>Flash</i>	6	11	$DP = \frac{6}{11} \times 100\%$	54,54%
5.	<i>coumpound</i>	5	16	$DP = \frac{5}{16} \times 100\%$	31,25%
6.	counter-attack technique	18	21	$DP = \frac{18}{21} \times 100\%$	85,71%
7.	wrist attack technique	3	4	$DP = \frac{3}{4} \times 100\%$	75%
8.	<i>Beat Technique</i>	6	10	$DP = \frac{6}{10} \times 100\%$	60%
9.	<i>waist remise six circle</i>	9	16	$DP = \frac{9}{16} \times 100\%$	56,25%
10.	Turun ke delapan tusuk kaki	3	10	$DP = \frac{3}{10} \times 100\%$	30%
11.	Leg Stab	1	4	$DP = \frac{1}{4} \times 100\%$	25%
12.	circular flash technique	5	7	$DP = \frac{5}{7} \times 100\%$	71,42%
13.	waist remise six flash technique	1	3	$DP = \frac{1}{3} \times 100\%$	33,33%
14.	redoublement + flash technique	1	5	$DP = \frac{1}{5} \times 100\%$	20%

Based on the calculation of the table above, the results showed that direct attack has a percentage value by 62.50%, one-step attack has a percentage value by 66.67%, two-strike has a percentage value by 0%, flash has a value a percentage by 54.54%, coumpound attack has a percentage value by 31.25%, counter-attack has a percentage value by 85.71%, wrist attack technique has a percentage value by 75%, beat attack has a percentage value by 60%, waist six remise circle has a percentage value by 56.25%, Turun ke delapan tusuk kaki has a percentage value by 30%, Leg Stab has a percentage value of 25%, circular flash technique has a percentage value by 71.42%, waist remise six flash technique has a percentage value by 33.33%, and redoublement + flash technique has a percentage value by 20%.

As for more details, it can be seen in the following diagram to explain the percentage level of attack techniques using epee weapon on female junior athletes from the most effective to



**Fig. 3.1** Percentage of Attack Techniques Used by The Athletes

From the results of these studies, the results of the effectiveness of attacks with epee weapon were obtained from the highest to the lowest as follows:

- 1) The counter-attack technique with the total number of points that entered 18 points from the 21 techniques of attack that was carried out so that it had the largest percentage compared to the other 13 techniques, namely 85.71%. Many athletes use defensive techniques when they are in an advantageous position when the opponent is weak, such as when the opponent makes an attack but is constrained by distance so that it does not reach the target.
- 2) The attack technique on the wrist gets 3 points from the 4 attack techniques on the wrist that are carried out, so that the percentage of the effectiveness of the technique is 75%. This technique has a large percentage even though only 3 points were successfully performed because of the 4 techniques performed only 1 technique failed compared to doing many techniques but did not get points, then the wrist attack technique was said to be effective.
- 3) The flash technique with a circumference with the number of points entering as many as 5 points from the 7 flash techniques with the circumference performed, so that it has an effectiveness percentage of 71.42%. This technique is said to be effective because it has a large percentage even though the flash technique with a circumference is only used by 2 athletes in this match.
- 4) The one-step attack technique succeeded in obtaining 12 points from 18 trials so that it had an effectiveness percentage by 66.67%. The one-step attack technique is effective to use and easy to apply, although sometimes the distance from the opponent is often an obstacle.
- 5) Direct attack technique managed to get 10 points from 16 attempts. The direct attack technique has an effectiveness percentage of 62.50%. Direct attack techniques are quite effective when athletes take advantage of passive and hesitant opponents in attacking, or in other words, giving the opponent too freedom to attack the target area.

The next attack techniques that have a moderate level of effectiveness are as follows:

- 1) Beat attack technique managed to get 6 points from 10 attempts so that it has an effectiveness percentage of 60%. Beat attack technique is quite effective to use when outwitting your opponent by hitting the opponent's weapon.
- 2) The circle six waist remise technique obtained 9 points from 16 attempts so it has an effectiveness percentage by 56.25%. The circle six waist remise technique is quite effective because many athletes use this technique.
- 3) The flash technique was able to get as many as 6 points from 11 attempts carried out so that it had an effectiveness percentage by 54.54%. The flash technique is less effective in use by athletes because the points achieved are less than the number of techniques used. Athletes find it difficult to use the flash technique because the movement is not easy to demonstrate, especially if the athlete has short leg posture or less than optimal leg repulsion when doing the flash.

Attack techniques with a low level of effectiveness are as follows:

- 1) The waist remise six flash technique succeeded in obtaining 1 point from 3 attempts so that it had an effectiveness percentage by 33.33%. The waist remise six flash technique is less effective to use because it is rarely performed by athletes so that the points obtained are classified as low.
- 2) The technique of turun ke delapan tusuk kaki succeeded in obtaining 3 points from 10 attempts so that it had an effectiveness percentage by 30%.
- 3) The tusuk kaki pindah ke enam technique gets 1 point out of 4 attempts so it has a percentage by 25%. This technique is rarely used by athletes because athletes tend to be hesitant and not maximal in doing it. They also failed to get points due to the movements that were difficult to make and easy for the opponent to intercept.
- 4) The redoublement + flash technique managed to get 1 point out of 5 attempts so that it had an effectiveness percentage by 20%. The double strike technique is ineffective because many athletes use it infrequently and do not earn points proportional to the number of attempts performed. Athletes fail to get points due to inappropriate movement.
- 5) The fifth attack technique that has a low level of effectiveness is a two-strike technique that does not get any points from 9 attempts so that it has a technique effectiveness percentage of 0%. The two-strike technique is used by many athletes but fails to get points because the athlete has difficulty in determining the distance from the opponent.

## 4 Conclusion

**Conclusion.** Based on the results of research and discussion in the previous chapter, it can be concluded that there were fourteen attack techniques used by athletes in the Fencing competition in Kendal Regency year 2020. The most effective attack technique was counter-attack technique which has a percentage value by 85.71%. The second was the wrist attack technique on which has a percentage value by 75%. The third was the circular flash technique which has a percentage value by 71.42%. The fourth was the one-step attack technique which has a percentage value by 66.67%. The fifth was the direct attack technique which has a percentage value by 62.50%. The sixth was the beat attack technique which has a percentage value by 60%. The fifth was the waist remise six circle technique which has a percentage value by 56.25%. The eighth rank was the flash technique which has percentage value by 54.54%. The ninth was the waist remise six flash technique which has a percentage value of

33.33%. The tenth rank was the compound attack technique which has a percentage value by 31.25%. The eleventh was the turun ke delapan tusuk kaki which has a percentage value by 30%. The twelfth was teknik tusuk kaki pindah ke enam which has a percentage value by 25%. The thirteenth was the redoublement + flash which has a percentage value by 20%, and the fourteenth or the last was two-strike technique which has a percentage value by 0%.

**Recommendation.** Based on the results that have been obtained from this research, there are several suggestions that can be conveyed:

- 1) The coaches are expected to guide athletes to maintain techniques that are already effective in gaining points.
- 2) The coaches are able to improve or develop less effective techniques when exercising and can apply the results of this study as a reference in developing an exercise program.
- 3) Athletes are expected to be confident in using the techniques that have been practiced in training season so that they can get optimal points during competition.

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# The Effect Of Aerobic Exercise On Body Weight and Body Fat Percentage

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**Abstract.** Overweight is the accumulation of excessive or abnormal fat that can interfere with health. The right exercise program is very influential in reducing fat levels and body weight of people who are overweight. The writing method starts from problem identification, literacy study, data analysis, building alternative problem solving, and conclusions. Losing fat and weight are common goals for doing aerobics. Aerobic exercise to acutely increase energy and lipid utilization but can increase lean tissue, metabolic rate and thus indirectly aid fat and weight loss. From the results of the review, there is a supervised aerobic exercise program. The results showed an increase in aerobic fitness and body mass index did not always change significantly because muscle mass also increased along with decreasing fat mass. In conclusion, a programmed aerobic exercise program has an effect on the percentage of fat and weight loss.

**Keywords:** Aerobic, weight lose, overweight.

## 1 Introduction

Fitness physical is a physical element that affects the appearance of performance. This condition is very dependent on the components of physical and motor fitness. According to (Jasmani, 2017), physical fitness can be interpreted as a physical condition that describes physical fitness or it can also be interpreted as a person's ability to do a certain job well without experiencing significant fatigue. Increasing physical fitness can be done by doing aerobic exercise. Aerobic exercise is an exercise that is done to burn fat while improving muscle tone which is led by an experienced trainer together with music that matches the rhythm / movement of the moving limbs. Power fit members participate in aerobic exercise for weight loss, body fat and increased muscle mass.

This study is based on the results of a review of 12 articles which have been reset sportsman gymnastics aerobic. A person can experience weight gain, this is due to uncontrolled diet / eating patterns, usually after doing lust activities it will increase. Someone who cannot control their diet / fulfillment of unbalanced nutritional intake can cause obesity.

Aerobic exercise is a series of movement activities that predominantly stimulate the metabolic ability, namely cardiovascular. According to (Gusvominesia et al., 2019) the benefits and advantages of aerobic exercise are: 1) the work of the heart is more efficient and it becomes trained, so that the heart does not tire quickly, 2) the blood vessels will get bigger, so that the blood will be smoother than those who untrained, 3) preventing blood clots, 4) the heart will be able to pump more blood and beat more slowly, 5) the lungs will increase in breathing capacity, 6) reduced risk of heart problems, 7) previously high blood pressure will

decreased regularly, and 8) decreased levels of harmful fats in the blood, and the occurrence of good fat levels that are beneficial in the body. Gymnastics aerobic conducted regularly and helpful programmed to work more efficiently function of organs, especially the heart and lungs. Blood circulation throughout the body, muscles become strong, there will be an increase in muscle mass, a decrease in the percentage of body fat levels.

Body weight is one of the parameters that provides an overview of body mass. Excess body mass in the body will describe being overweight which is known as obesity, which indicates a buildup of body fat that exceeds normal limits in the body. (Ramayulis, 2008) states, "The factors that cause obesity are genetic factors, damage to one part of the brain, excessive eating patterns, lack of movement or lack of exercise, emotional instability, and the environment". Fat is one of the components in the body that functions as the formation of energy for the body to do activities every day. (Lingga, 2012) stated that the function of fat is not only a constituent of body building, but also has quite a variety of functions for the continuation of life. The presence of fat in the body is reflected in the percentage of fat. Body fat percentage is a picture of how much or how much fat is in the body. The percentage of body fat can increase and can decrease the effects of activity and dietary consumption every day. For more details, the percentage of body fat can be seen in the table below:

**Table 1.** Female body fat percentage.

Age	Body Fat Proposition
<30 yo	14-21%
30-50 yo	15-23%
50-70 yo	16-26%

Based on the above quotation, the presence of body fat percentage and muscle mass will describe body weight. Excess body fat will have an impact on being overweight. To overcome the balance of body fat and body mass against body weight, it can be neutralized by doing sports exercises, one of which is through aerobic exercise. There is an effect of physical activity (aerobic exercise) in the intervention group on weight loss (Pratiwi & Basri, 2018). Aerobic exercise with low to moderate intensity, namely 50% -80% of the maximum pulse is a measure in providing training load. Exercises that last for 15 minutes to 1 hour are the limits the body performs exercise in effect on the improvement of the organism's system an increase in the physiological function of the body so that it works optimally (Indah, 2016) It means that doing aerobic exercise can lose weight. During aerobic exercise, excess fat in the body will be used as a source of energy. The more often people who have excess levels of fat in their body do aerobic exercise, the more optimal the burning of fat in the body will be. The results showed that aerobic exercise was proven to reduce body weight by 66, 78%, body fat percent by 86, 42% (Utomo, 2012). That way, aerobic exercise can reduce body fat levels.

## 2 Method

A total of 12 articles were used as data in this review article. The data used in this article are secondary data. Secondary data were obtained from articles published in recent years on the topic of the effect of aerobics on weight loss and body fat. These articles were obtained from various library sources such as Google Scholar, Springerlink, Garuda.id and so on. The analysis used in this literature review includes four steps that must be carried out sequentially

to provide acceptable answers to the research question. 1) Stages of searching and collecting material on the effects of aerobics for weight loss and body fat; 2) Stage of reduction and coding, screening and classification of material according to the topic of discussion; 3) The analysis and synthesis stage, examining and digging up detailed information about the material obtained; 4) The conclusions presentation stage is the final stage of the article review process and to state the novelty of the research. The re view process can be seen in the schematic in this section:

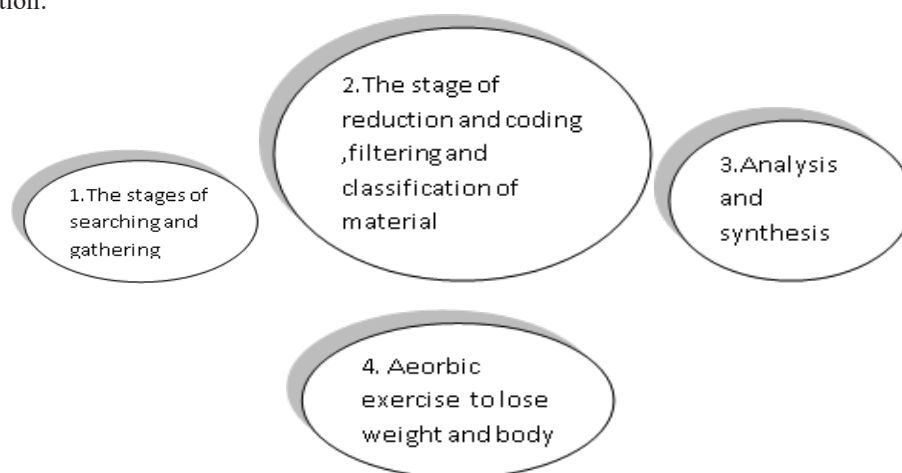


Fig. 1. Schematic Process.

### 3 Result and Discussion

#### 3.1 Effect of aerobic exercise on weight loss

Pretest and posttest data The effect of aerobic exercise on weight loss is taken from a review of data on Fit Clup members in the following table:

Table 2. Frequency distribution of pretest and posttest data effect of aerobic exercise on weight.

Interval class	Pre test		Post test	
	Frequency			
	Absolute	Relatively	Absolute	Relatively
> 80.33	1	10	1	10
71.10-80.33	1	10	1	10
61.88-71.10	4	40	4	40
52.65-61.88	4	40	4	40
<52.65	0	0	0	0
amount	10	100	10	100

Based on the table above, the pre-test data obtained with the highest weight of 86, 30 kg, the lowest weight of 56, 30 kg with an average weight of 66, 86 kg. While the post test data with the highest weight was 84, 90 kg, the lowest weight was 55, 30 kg with an average

weight of 66.12 kg. In conclusion, the effect of aerobic exercise on weight loss in Fit Clup members is moderate and less.

### 3.2 Effect of Aerobic Exercise on Decreasing Body Fat Percentage

The pretest and posttest data on the effect of aerobic exercise on decreasing the percentage of body fat in Fit Clup members are in the following table 2.

Based on the table above, the pre-test data was obtained with the highest body fat percentage of 45.50, the lowest body fat percentage of 35.60 with an average body fat percentage of 40.45. Meanwhile, the post-test data with the highest body fat percentage was 42.90, the lowest body fat percentage of 31.90 with an average body fat percentage of 37.18. In conclusion, the effect of aerobic exercise on the percentage of body fat in Fit Clup members is moderate and less.

Based on the results of the pretest and posttest data research, the results of the data analysis are presented in the table below:

**Table 3.** Frequency distribution of pretest and posttest data effect of aerobic exercise on weight.

Information	Mean			Significant level	T <sub>table</sub>	T <sub>count</sub>	Information
	Pretest	Post test	Difference				
Body Weight	66.86	66.12	0.74	5%	1,812	2,186	significant
Body fat	40.45	37.18	3.27	5%	1,812	3,285	significant

Exercise on Increasing Muscle Mass

In the implementation of the review to get the data facts, namely the need research data preliminary tests. This initial test aims to see a decrease in body weight, and a decrease in the percentage of body fat in members of aerobic exercise.

### 3.3 Aerobic Exercise Has an Effect on Weight Loss

In the post test results of aerobic exercise are weight loss, from an average score of 66, 86 kg pre-test to 66, 12 kg in the post test with a difference of 0, 74. The occurrence of weight loss caused by exercise aerobics Results of research indicates that  $t_{hitung} (2186) > t_{table} (2186)$ . This means that the research hypothesis can be accepted. Thus it can be interpreted that aerobic exercise has a significant effect on the weight of the members of the Fit Clup. For weight loss with aerobic exercise, movements that are carried out have a light impact and do not have jumps in doing movements. So that exercise has an effect on weight loss, another advantage of aerobic exercise is that it can be used for all ages, both school age and old age. (D. Supariasa, I Dewa Nyoman, 2002) states that "Weight is one of the parameters that provides an overview of body mass. According to Irianto (2007: 155) "Being overweight above 25% of the ideal body weight is called obesity. (Septiyadi, 2004) "A person weighing 20% of the ideal body weight is generally categorized as obese (general standard: height minus 110)". Body weight can increase and can decrease with aerobic exercise. Exercise is a sport activity systematically over a long period of time, progressively and individually which leads to functional and psychological characteristics of humans to achieve predetermined goals. Aerobics sebagaimana a described above that a series of motion selected intentionally by following the rhythm of music that gave birth to the rhythmic strength, continuity and a



certain duration. From the description above, it can be argued that exercising helps to lose weight for members who take exercise seriously and regularly.

### **3.4 Aerobic Exercise has an Effect on Decreasing Body Fat Percentage**

In the post test results of aerobic exercise, there is a percentage of body fat, from an average score of 40.45% in the pre test to 37.18% in the post test with a difference of 23.27%. This decrease in body fat percentage is caused by aerobic exercise. The results showed that  $t$  count (3.285) >  $t$  table (1.812). This means that the research hypothesis can be accepted. Thus it can be interpreted that aerobic exercise has a significant effect on the body fat percentage of members of the Fit Clu p . A decrease in the percentage of body fat according to (Eka Novita Indra, 2016) aerobic activity which has a big influence on body fat is all forms of aerobic activity carried out at low to moderate intensity. Aerobic activity will lead to weight loss due to a decrease in body fat percentage. The decrease in body fat percentage was seen after doing 16 exercises. Therefore, a regular and continuous training program duration and training is an important requirement for the success of an exercise program. The frequency of aerobic exercise that is done  $\geq 3$  times a week has a significant effect on decreasing the percentage of body fat. This is because fat metabolism is working properly. If the frequency of exercise is carried out three times a week, the rest period is one day and the next day you have done the exercise, it means that the stored fat in the body does not accumulate too much and will not become fat deposits in the body, because the fat will be processed immediately through burning fat in the body. during practice. Exercise causes an adaptation process in the body's organs. If the frequency of exercise is done 3-5 times a week, it means that the organs of the body will often receive stimulation or load from training so that the adaptation process will be influenced more quickly. This is because, during training, there will be an adaptation process in the body. If the frequency of exercise is increased, the organs of the body will adapt well to these changes. But the body needs time to rest so that the body can adapt to all the loads during the training process. In contrast, the frequency of aerobic exercise that is done  $\leq 2$  times a week does not have a significant effect on decreasing body fat percentage. This is because, with a long training distance and the increase in the amount of fat obtained from food intake for days, it will cause fat to accumulate a lot and for a long time, without any reduction in fat by the burning process. When training returns, the body will metabolize fat with a certain capacity and cannot burn all the fat that has been accumulated. Fat burning that occurs does not have a significant effect on decreasing the percentage of body fat if the frequency of aerobic exercise is only done 1-2 times a week. In other words, if you only do the exercise two days per week, the results are only slightly better than not doing the exercise. Thus the frequency of exercise also determines the effect of decreasing the percentage of fat. It can be concluded that aerobic exercise that is carried out in a programmed, structured manner with intensity, frequency, and duration settings will have a major effect on decreasing the percentage of body fat.

## **4 Conclusion**

Based on the data analysis and discussion that has been previously described, several conclusions can be made as follows: (1) Aerobic exercise has a significant effect on weight loss  $t$  count 2.186 >  $t$  table 1. 782. The average pretest value is 66, 86 kg and posttest 66, 12

kg. There was a decrease of 0.74 kg. (2) Aerobic exercise had a significant effect on decreasing the percentage of body fat  $t$  count 3, 285 >  $t$  table 1. 782. The average pretest score was 40.45% and posttest 37.18%, there was a decrease of 3.27%. So aerobic exercise has an influence on the percentage of weight loss and body fat.

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# The Physical Fitness Analysis of Handball Female Athletes of Central Java

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**Abstract.** This study aims to determine the physical abilities of Central Java Women's Handball Athletes who are prepared to face the XX 2021 PON event which will be held next October. The method used in this research is a survey method with data collection techniques using tests. The subjects in this study were all female athletes of Handball in Central Java who were prepared to face PON with a total of 16 female athletes. The results of a series of tests showed that the average sit-up test of 65 times was in the very good category with 14 athletes in the very good category and 2 athletes in the moderate category, an average of 40 cm of vertical jumps being in the good category with 1 athlete is in the excellent category and 15 athletes are in the good category, an average Illinois Agility Run test of 18 seconds is in the moderate category, an average Medicine Ball Push test of 3 m / s is in the moderate category, and an average an average bleep test of level 8 VO<sub>2</sub>max 40 is in the very good category.

**Keywords:** physical components, handball athletes, central java

## 1 Introduction

Handball is a game that has a fast rhythm and involves two teams with a player composition consisting of 7 people, each of which has tasks such as passing, throwing, catching, and dribbling using arbitrary hands trying to score goals against the opponent's goal (Lutan: 1998) . In Handball matches, each team is required to score as many goals against the opponent as possible during the match time so that they can outperform the opposing team. In addition, every athlete is required to be able to master various basic techniques that exist in the handball game itself. Every handball athlete is also required to have the speed of movement to support his performance in competitions and to have good physical condition. Handball sport has a match duration of 30 minutes per round. Break Time is 10 minutes in each half.

To improve the quality of an athlete in improving physical and spiritual health, one must instill a high discipline and sportsmanship, as well as develop sports achievements that can generate pride for the country. Athletes must be really active in training and maintain their physical condition before and after competing so that when competing they can get the maximum results that are produced during training. Physical condition plays an important role in handball game, because every player is required to run frequently and make continuous movements. To be able to play good handball, athletes must have good physical abilities. The elements of physical condition include endurance, speed, strength, agility, muscle power, flexibility, balance, coordination, accuracy, and reaction. (Ministry of Health of the Republic

of Indonesia in Nala: 2002). According to Tanwar, B (2103), the dominant physical conditions in cross-season are speed, strength, flexibility, power, agility, and endurance. Apart from the physical condition components, tactics and strategy are also important elements in the game of handball . Fostering physical condition is a way that must be done in an effort to achieve good physical condition, knowing the potential and developing it to the maximum is a capital that can be used as a benchmark in making a basis for carrying out physical coaching from where to start (Latuheru: 2018). The importance of physical tests on handball athletes as supporting performance for an athlete.

## 2 Method

This type of research uses a survey method with quantitative descriptive analysis. This study has 5 variables, namely; 1) abdominal muscle strength 2) leg power, 3) agility, 4) arm power, 5) aerobic endurance. The abdominal muscle strength test is done with sit ups for 1 minute. The leg power test is done with a vertical jump. The agility test was carried out with the Illinois. Arm power test is done with a medicine ball. Endurance tests were carried out using MFT (Multi Stage Fitness). The population of the study was 16 female handball athletes in Central Java. The sampling technique uses the total population, which means that all populations are used as research samples. The research instrument used a valid and reliable physical fitness test. The data analysis technique used descriptive statistics.

## 3 Result and Discussion

The following table presents the physical fitness results of Central Java Women's Handball athletes:

**Table 1.** Java women handball athletes physical fitness

NO	Sit Up	Illinois	Vertical Jump	Medicine	MFT
1	70	18.29	34	2.68	8.4
2	59	17.98	38	3.50	8.6
3	61	17.22	42	3.37	9.8
4	96	19.41	40	2.83	9.1
5	56	18.17	39	2.44	7.6
6	68	18.98	36	2.97	8.3
7	46	18.62	41	2.84	7.5
8	62	17.70	46	3.89	8.7
9	107	18.45	49	3.75	9.5
10	55	17.29	40	2.76	9.1
11	53	18.18	51	2.97	7.5

12	59	17.31	40	3.06	8.6
13	75	18.89	36	3.40	8.4
14	72	17.82	39	2.73	8.8
15	58	18.77	39	2.82	6.4
16	45	21.77	36	3.81	4.4
Amount	1042	295	646	50	131
Mean	65	18	40	3	8

Based on the results of measuring the physical components of the female handball athletes in Central Java, it shows that they have a good physique. This means that during the training program from the coach, the athletes really do it. Therefore, from the results of measuring the physical components as expected. The physical test consists of 5 components, namely the sit up test, illinois, vertical jump, medicine, and MFT (Multi Stage Fitness). With a very good sit-up test for strength and endurance of the abdominal muscles, it can support the shooting technique. the illinois test is very good at measuring the body's ability to change direction quickly when moving without losing balance, this can support feinting techniques (deceptive movements) when attacking. The vertical jump test is very good for measuring the power of the leg muscles, it can support the jump shot technique. Medicine tests can measure the strength of the arm's power and can support passing and shooting techniques. The MFT (Multi Stage Fitness) test is very good for endurance in athletes. Handball athletes must have good endurance because handball is a sport that runs continuously for 30 minutes and has to hit the ball into the opponent's goal as much as possible until the game time runs out, this requires good endurance. Thus, as a handball athlete, he must maintain his physical condition so that it remains stable and does not decline. Athletes need to do physical ability training which refers to an exercise program that is carried out in a planned, progressive and systematic manner so that their physical abilities can increase. By carrying out tests and measurements of physical abilities on athletes that can find out the results during the training they are running, and also athletes are better prepared to face the matches that will be held at the specified time.

The results of the sit-up test in the table show that the female handball athletes in Central Java with an average of 65 times for 1 minute are in the very good category, 14 athletes are in the very good category and 2 athletes are in the moderate category. The results from the Illinois test with an average of 18 seconds are in the moderate category. The results of the vertical jump test with an average of 40 cm are in the good category, it is found that 1 athlete is in the very good category and 15 athletes are in the good category. The results of the medicine ball test with an average of 3 m / s fall into the moderate category. The results of the MFT (Multi Stage Fitness) test with an average level of 8 VOMax 40 are in the excellent category.

#### 4 Conclusion

From the results of the above research that the physical abilities of the Central Java women's handball athletes have a good average physical component. During the training program from the trainer, the results will be seen on the test results, which consist of a physical component test, namely the sit-up test, the Illinois test, the vertical jump test, the

medicine test, and the MFT test. it can improve the ability to do handball technique. every athlete must have a sense of responsibility and discipline to train in order to be ready for the future and ready to support performance.

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# The Comparison of Strategies for Physiological Recovery Coach and Province Level Fencing Athlete during the Pandemic Covid-19

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**Abstract.** This study aims to compare the *physiological recovery* strategies applied by coaches and provincial fencing athletes during the Covid-19 pandemic when carrying out Regional Training Center New Normal in welcoming PON (National Sports Week) 2021. The method applied in this research is quantitative and presented descriptively. Data were collected through an online questionnaire filled in by 20 samples and a structured oral interview as a complement. Three questions that have met the validity value include *recovery* (0.547), *sleep* (0.526), and *hydration* (0.585) and a reliability value of 0.919. The data analysis technique uses the *mean*, percentage, standard deviation, homogeneity test, and difference test using One Way Anova on normally distributed data. The results showed that the application of *physiological recovery for* coaches and athletes had a value 0,781 ( $p > 0.05$ ). The conclusion shows that there is no significant difference between the application of *physiological recovery* between coach and athlete.

**Keywords:** physiological recovery, coach, athlete, fencing, covid-19.

## 1 Introduction

Currently the global pandemic has changed the life order of the world community. Diseases that have a broad impact when compared to SARS and MERS have a high transmission rate. The virus that started in December 2019 in the city of Wuhan and continues to spread throughout the universe to date has been reported from many other countries [1].

A novel infectious disease of the coronavirus family is identified in Wuhan, China in late December 2019, later called covid-19 (Chen et al, 2020). On January 30, who declared a global public health emergency. In February, outbreaks began in Iran, Italy, and other countries around the world. Then the epidemic turned into a pandemic and by the end of March half the world's population was in some form of lockdown. Based on WHO data on April 16, 2020, the total number of COVID-19 cases exceeded 2.1 million cases worldwide, without a total death toll of more than 135,000 [15].

The pandemic managed to spread to parts of the world in just a short time, one of which is Indonesia. Various losses are caused by this virus, especially in the world of sports which postpones sports competitions. The financial crisis experienced by the regions that host one of them is Papua, which is appointed as the organizer of PON 2020. A carefully designed period has to be adapted again so that it gives losses to both the coach and the athlete. The good side

is the development of a web-based training program that makes it easier for organizations / clubs to sports players [34].

Maintaining physical fitness is very important in times of a pandemic like this, especially for an athlete. In addition to increasing immunity in the body, physical fitness also keeps the athlete's physical capacity from decreasing, one of which is fencing [25]. Emphasis and dexterity with weapons are characteristic of the sport of fencing. Therefore, this sport requires players to have agility, especially in the hands [33]. The important role of the hands and feet is focused in terms of attacking to defending. There are basic movements in playing fencing, namely the mastery of basic technique movements that are trained first without neglecting other techniques. This is because the majority of the frequency is done in competing and practicing [27].

Various kinds of efforts were made in order to get a good physical quality. Through a systematic and targeted training program, it will have a positive impact on the excellent physical quality of athletes so that it can have a good impact on mental health which can support athlete's technique [5]. Apart from that the physical guidance and aggressive nature of fencing causes considerable muscle damage. In professional fencing, athletes only have a limited period of time to recover from origin after training sessions and competitions [35].

Fatigue that is not immediately followed up through the right procedures can result in damage to cells and tissues in the body, especially during its growth period. Acute injuries also haunt future athletes (early retirement). This has an impact on the decline in athlete's performance to the region or country being defended. Therefore, the province which is the forerunner of the sport in East Java will become an obstacle before reaching the golden peak of achievement [17].

Poor recovery that is done over and over again will cause physical fitness problems. Various efforts are made before the competition so that athletes can perform optimally, including evaluation of techniques, tactics, athlete's nutrition, mastery of strategy and recovery. The basic foundation that must be possessed by coaches and athletes is knowledge of *recovery*. Correct recovery supported by knowledge can certainly support athlete performance [23].

Getting the right recovery after strenuous exercise can minimize injury to reduced performance. Therefore, the role of the coach in choosing a strategy *physiological recovery* must be adjusted to the athlete's motor development. The coach is expected to be more transparent to athletes by adding strategies physiological recovery in the training program along with the types of training that the athletes will apply. The mandatory thing that must be understood and known by coaches and athletes is timing the right so that the type of recovery is right on target [17].

As is well known, body mass index is one of the important factors that can help improve performance. The higher the body mass index can inhibit athlete's performance, especially fencing which requires agility in the game. Therefore, monitoring body weight needs to be considered because the weight gain of 1kg within 24 hours shows that the recovery is going well. If there is a weight loss of 1 kg, it shows that there is overtraining and the body needs a longer recovery. Conversely, increasing body weight exceeding 1 kg shows a light training load [32].

There is a problem, namely the limitations of the research literature that shows the facts of strategies physiological recovery during the covid-19 pandemic by analyzing the comparison of the application of recovery coaches and fencing athletes in East Java Province during the Covid-19 pandemic as a basis for further discussion. Therefore, it is important to do this research to determine the strategy physiological recovery. The renewal in this study lies in the



research subject, namely the Provincial fencing team during the PNN (Regional Training Center for the scheme *New Normal*) during the pandemic Covid-19 as a material for further discussion. This research is important to do to determine the comparison of the effectiveness of the implementation of strategies physiological recovery carried out by coaches and fencing athletes of East Java Province during the pandemic Covid-19 in order to avoid decreased performance and avoid psychological disorders so that it can become a reference for clubs and the sports community so that they can maintain their strength hold the body well during the pandemic Covid-19.

## 2 Method

The method used in this research is quantitative with a descriptive approach. Target in the research of trainers and fencing athletes in East Java Province. Participation of respondents in this study amounted to 20 people consisting of 7 coaches and 13 athletes. The sample criteria are as follows:

1. Status as an active trainer and athlete of the Puslatda.
2. Following the PNN (Regional Training Center for scheme *New Normal*) at Surabaya State University

The questionnaire used in this study is a questionnaire that has passed the validity test using Microsoft Excel version 365. Consists of 30 questions with indicators including recovery, sleep, hydration with a recovery value (0.547), sleep (0.526), hydration (0.585) and a reliability value of 0.919. Questions about recovery include the use of compressed garments, thermotherapy, cryotherapy, massage, and recovery active during the Covid-19 pandemic. while questions about sleep include sleep duration, consumption of milk before bedtime, use of light sleepers, conditions after waking up. and questions about hydration including checking hydration, taking supplements, consuming electrolyte and caffeine drinks before exercise, to sleep reminder apps. Data analysis techniques used in this study include maximum, value minimum, average, standard deviation, percentage, data normality test using the Kolmogorov-Sminornov Test. The homogeneity test data for data differences uses One Way Anove. The flow of the research procedure is as follows, distributing the link to questionnaire the research sample via WhatsApp is a data collection method. Control and follow-up during data entry and structured oral interviews were the follow-up until data were collected. Data collection was carried out with a one shot case study in September 2020.

*Daily activity* during PNN (New Normal Regional Training Center) is a topic in a structured interview. The results in the structured interview show that sleep patterns and eating patterns are more regular because they have been scheduled while in the dormitory, activities carried out outside of training are carried out in the dormitory such as relaxing, playing gadgets or watching dramas, this is due to limited access to in and out during PNN (concentration Area Exercises *New Normal*).

Furthermore, the data were analyzed using a percentage. Data analysis used SPSS version 23. The determination of the criteria for the level of application regarding the application of physiological recovery is presented in the following table:

**Table 1.** Scale application assessment of physiological recovery Category interval

Intervals	Category
M-0.5 SD X M-1.5 SD	High

M-0.5 SD X <M-0.5 SD  
M-1.5 SD X <M-0.5 SD

Moderate  
Less

Source: Sriundy, 2015.

Which one:

M = mean count

Elementary school is standard deviation

X = score obtained

### 3 Result and Discussion

After conducting research through online questionnaire regarding the comparison of strategies for physiological recovery coaches and provincial level fencing athletes who are shared with Google Form, the following discussion is carried out. The results of the calculation of the characteristics of the research subjects include age, weight, height and body mass index as shown in table 2.

**Table 2.** Characteristics of research subjects

Subject characteristics	Mean and SD	
	Trainers	Athlete
Age	40 ±10.24	20 years ±1.73
Height	166.46 cm ±6.39	169.28 cm ±8.15
Weight	74.42 kg ±10.29	62.53 kg ±9.99
BMI of	25.75kg / m <sup>2</sup> ±4.14	22.46kg / m <sup>2</sup> ±2.59

Based on the profile data of the research sample shown in table two, the average age of the subjects is 20 to 40 years. The first subject had an average body weight of 74.42 kg with a height of 166.46 cm, while the second subject had an average body weight of 62.53 kg with a height of 169.28 cm. It can be seen that the first subject has an average body mass index of 25.75 kg / which is included in the overweight category, while the second subject has a body mass index of 22.54 kg / which is in the normal category.

**Table 3.** description of respondents recovery, sleep, hydration

Variable	Subjects	Min	Max	Mean &SD
Recovery	Trainers	2	6	4.7 ± 1.48
	Athlete	1	13	5.7 ± 3.57
Sleep	Trainers	3	7	4.8 ± 1.24
	Athlete	4	11	7.7 ± 2.83

Hydration	Coach	1	7	$3.8 \pm 2.03$
	Athlete	2	13	$7.5 \pm 4.6$

The data shown in table three shows that the average ratio of the application of recovery, sleep, and hydration in athletes is more dominant than that of coaches, as evidenced by the data that the average athlete who applies recovery is 5.7, while the coach has an average recovery of 4.7. The facts are reinforced by data on athletes who apply sleep and hydration with an average of 7.7 and 7.5, while athletes have an average of 4.8 and 3.8.

**Table 4.** Percentage of Recovery Application

Interval	Category	Trainer	Percent	Athlete	Percent
M-0.5 SD X <M-1.5 SD	Very High	1	14%	3	23%
M-0.5 SD X <M-0.5 SD	High	4	57%	9	69%
M -0.5 SD X M-0.5 SD	Moderate	2	29%	1	8%
<b>Total</b>		7	100%	13	100%

Based on Table four, it shows that the implementation of recovery by the majority coach is high with a percentage of 57% while the majority of athletes are high with a percentage of 69%.

**Table 5.** Percentage of Sleep Application

Interval	Category	Trainer	Percent	Athlete	Percent
M-0.5 SD X <M-1.5 SD	Very High	4	57%	4	31%
M-0.5 SD X <M-0.5 SD	High	2	29%	6	46%
M-0.5 SD X M-0.5 SD	Moderate	1	14%	3	23%
<b>Total</b>		7	100%	13	100%

Based on the data in table five, it shows that the implementation of sleep recovery in the majority of coaches is very high with a percentage of 57% while the majority of athletes are high with a percentage of 46%.

**Table 6.** Percentage of Application Hydration

Interval	Category	Trainer	Percent	Athlete	Percent
M-0.5 SD X <M-1.5 SD	Very High	1	14%	3	23%
M-0.5 SD X <M-0.5 SD	High	5	72%	8	62%
M -0.5 SD X M-0.5 SD	Moderate	1	14%	2	15%
<b>Total</b>		7	100%	13	100%

Based on the data in table six, it shows that the application of recovery hydration in the majority of coaches is high with a percentage of 72% while the majority of athletes are high with a percentage of 62%.

**Table 7.** Homogeneity and Normality

Sig	Test of Kolmogorov-Smirnov
Variables	Recovery, sleep, hydration
P	0.999
	0.724

In table seven, it is known that the Kolmogorov-Smirnov significance value is sig recovery, sleep, and hydration (0.999) where the value is more than 0.05, which means that the normality test on this data is normally distributed. Meanwhile, to determine whether there is an equation between coach and athlete variables. P is known to be 0.724. based on the results of the Sig. 0.742, which value is more than 0.05, which means the data is declared homogeneous.

**Table 8.** Difference test using One Way Anova

Sig	One Way Anova
Variable	Coach and Athlete
P	0.781

The results of the One Way Anova difference test in table eight show the implementation of strategies recovery (recovery, sleep, hydration) on provincial level fencing trainers and athletes, it is known that the sig value is 0.781. Which ( $P > 0.05$ ) indicates that there is no significant difference in the application of physiological recovery between coaches and fencing athletes during the pandemic covid-19.

After the difference is performed by oneway anova and there is no significant difference between the application of physiological recovery coach and athlete. Data triangulation is also

done for the equations of the application of physiological recovery. This indicates that the coach's instructions are already run by the athlete optimally so as to provide for the future performance of the athlete.

Based on research conducted on trainers and fencing athletes in East Java Province regarding physiological recovery with good categories then this can benefit sports physiology because it can support physical activity, minimize injury, and improve athlete performance (both physically and psychologically). Therefore, physiological quality affects achievement [16]. Often the training program provided by the coach contains several risks, especially if the athlete's physiology is not good so that it can cause physical injury. Lack of recovery time coupled with intense training results in both physical and psychological exhaustion. Athletes concentration will be disturbed from training to competition if they are stressed so that it has an impact on performance. The anxiety felt by athletes who do not have a history of injury is certainly different from athletes who have a history of injury [10].

Physiological measures can prevent athletes from drifting due to inadequate recovery, excessive stress, and potential illness. Coping with the stress experienced by athletes during the pandemic Covid-19 is one of the strategies recovery in this difficult time [11]. There are various kinds of research on the treatment and its benefits for fatigue, muscle injury, physiological recovery, and performance improvement. According to Joanna Vaile and Shona Holson in the book *Physiological Recovery*, there are several and appropriate recovery strategies, including: recovery, sleep, and hydration. Recovery consists of cryotherapy, massage, compressent garments, thermoteraphy.

The application of *cryotherapy* to the whole body (WPC) as a recovery modality for elite athletes can reduce pain in inflammatory conditions. Given the very cold air temperature from -120C to -150C in 2-3 minutes it can cause strong physiological responses in users [20]. Four research studies found a significant reduction in muscle soreness, in relation to improved muscle function. Five articles report that Cryotherapy (WBC) positively affects muscle function or performance capacity which in other ways adversely affects exercise mentally [29].

Compressent garment has been proposed to prevent performance degradation and improve recovery by speeding up nutrient delivery, improving post-workout edema, muscle soreness (DOMS), and muscle damage. The use of compressent garment can minimize the symptoms of muscle damage due to exercise (EIMD) which usually occurs as a result of unusual or eccentric exercise [4]. According to Molly Winke et al [37] in their study, the muscle swelling assessed through changes in upper arm circumference was significantly lower in treatment compressed garment (1.7 vs 2.0 cm in compressed sleeves,  $p = 0.012$ ). Interference ROM during Compressent Garments (PCD) treatment was lower and peak pain was 39% lower (27.5 mm in PCD compared to 45.2 mm in the compress arm (CS),  $p < 0.05$ ). using compressent garments further reduces the peak disturbance and recovery time from DOMS (Delayed Omzet Muscle Sorrenes).

There isa substantial treatment reduction thermo therapy in fatigue. Through thermoteraphy helps athletes to get relief from muscle pain and joints with soft tissue, metabolic rate and also blood flow with vasodilation. Due to increased blood flow, oxygen uptake increases and can heal damaged tissue. A temperature of 36 degrees Celsius in 8-10 minutes will give a feeling of calming to the muscles. Thermoteraphy can be in the form of hot cloth, hot bottle, infrared, ultraviolet light, shortwave diathermy, heating pad, pussy tub water, sauna bath [31]. Faiz Shah Sharudin (30) in his research added that the data from fifteen studies were examined, and the overall quality. Immersion duration and water temperature showed an increase in recovery with a duration of 15 minutes with a water

temperature of 15 °C. The results showed good progress in athletes when the body temperature was more than 11 percent with the time of immersion. Thermotherapy (CWI) has a good effect on athletes including increased performance, reduced muscle soreness and fatigue.

Apart from cooling, sauna, compression to active recovery, the recovery strategy that is mostly used is massage. Massage can relieve muscle tension, reduce muscle soreness, and increase flexibility and range of motion (increases blood flow to muscles, improves cleansing of substances such as blood lactate or creatine kinase). Here techniques such as effleurage, petrissage, tapotement, are usually applied with the total duration of 10-30 minutes [26]. HouyongZhong [38] in his study of 12 athletes received massage sessions for 20 minutes with the comparison group in bed for the same time. The visual analogy scale ((VAS) on the normal scale for muscle fatigue, back muscle endurance, and pulse rate as parameters for stress index (SI), HRV indexes, SDNN, RMSSD, Pnn50, IF hf, DANJKA / HF were analyzed. The results were 12 athletes (HF) were significantly higher immediately after the intervention than the LF control group. Therefore massage can facilitate recovery from muscle fatigue after training or competition for athletes.

Fahmi & Ashadi [8] also added in his research that there was a significant difference in the ratio of reduction in lactic acid levels between the use of the method recovery with sport massage and cryotherapy with a p value <0.05. Where the average value of reducing lactic acid levels with sports massage was 4.92 nMol / L while cold water was 3.91 nMol / L. There are many strategies for recovery, but sleep is the most significant strategy in avoiding overtraining. During sleep growth hormone and androgens help for muscle repair, muscle building, and bone growth. Recommended sleep of 7-9 hours is sufficient to restore physiology (metabolism and inflammation), psychology (learning ability, motivation and memory). A 30-minute nap between 1:00 p.m. and 1:30 p.m., after only 4 hours of sleep a night leads to increased alertness and mental and physical performance. The drowsiness that is reported to be reduced after a nap and improved short-term memory can help restore physiological mechanisms to avoid significant muscle inflammation as well as maintenance of the immune system [21].

Lack of sleep negatively impacts the physical and psychological functions of the human body. Because sleep disturbances affect the release of hormones, hunger arises and leads to overeating. The balance of diet and body weight will be affected if athletes experience sleep deprivation for long periods of time. The immune system will be compromised and become weak, more diseases will become infected. In addition, poor sleep quality affects motor performance and increases the risk of injury. It negatively affects the circadian rhythm directly, as well as increased fatigue, decreased reaction time, and decreased maximal oxygen uptake (VO<sub>2</sub>max). Humans who don't get enough sleep have negative moods such as depression and decreased motivation which causes psychological stress. Previous studies have shown that negative moods directly affect athlete's performance. The emotional state that is regulated by the brain is very sensitive to the quality and quantity of sleep [24].

Studies report that improved sleep quality in athletes is associated with improved performance and overall success. Apart from minimizing injuries, optimizing health and improving performance can be achieved through increased participation in training. However, the majority of athletes fail to get the recommended sleep hours, thus threatening performance and health [19].

Apart from implementing recovery and sleep patterns, it is important to keep the body well hydrated. If the body is dehydrated it can cause thirst, nausea, vomiting, discomfort during exercise and fainting. What is more fatal is the disruption of the metabolic system if it

occurs over a long period of time. Therefore the recommendation to meet fluids during physical activity can prevent dehydration. Apart from physical activity, fulfillment of hydration must be done every time, because the human body's construction is 70% fluid. If the body is well hydrated, energy transport, metabolism, and enzymes can run according to their function smoothly [22]. if the fluids in the body are not fulfilled and experience a decrease, it can result in not optimal body condition [28].

Ashadi Kunjung et al [2] in their research also reported that the average urine scale was 3.1 points, which means that only 31.2% of athletes are dehydrated. However, after exercising, the urine color index showed a scale of 4.1. And 62.5% of athletes are dehydrated. The results showed that there was a significant change in the level of hydration before and after training. It can be concluded that prolonged exercise increases the risk of dehydration. It is important for athletes to meet the needs of body fluids so that there is no malfunction in the body during sports activities.

The amount of fluid that comes out can be influenced by temperature and humidity so it is necessary to calculate replacement fluids to keep the body hydrated. Therefore, it is necessary to know the right drinking pattern in order to reduce the bad effects of dehydration. [9] in their research stated that the drinking pattern that should be applied to a hot environment with an average temperature of 35.6 ° C with aerobic activity is the ad libitum drink drinking pattern. Ad libitum drinking pattern is better than pool drinking planned drinks.

The application of physiological recovery, knowledge related to physiological recovery needs to be improved. Knowledge regarding physiological recovery affects athlete's performance because providing a less than optimal recovery program can reduce athlete's performance and can even lead to the risk of injury [6].

As additional information, there is an obstacle in this study, namely the application of a broad-scale questionnaire. Therefore, it is hoped that the limitations of this study can be used as a basis for further research to make it better and use a broad scale in the future.

## 4 Conclusion

Based on the results of the research data analysis, it can be seen that there is no significant difference in the application of the strategy physiological recovery carried out between coaches and fencing athletes in East Java Province during the Covid-19 pandemic ( $P < 0.05$ ). Based on the above conclusions, coaches and athletes have implemented physiological recovery in the high category.

**Suggestion.** Based on the results of the research data analysis, it can be seen that the application of the strategy physiological recovery carried out by trainers and fencing athletes in East Java Province.

Based on the results of the discussion of coaches and fencing athletes in East Java Province regarding strategies physiological recovery during the pandemic Covid-19, efforts are needed to maintain these achievements, including providing variations to scheduling recovery. In addition, in order to maintain physical condition during a pandemic in order to maintain athlete performance, maintaining psychological health during a pandemic is necessary in order to reduce burnout during a pandemic. In addition to developing a training model, it is necessary to increase knowledge about recovery in order to obtain better results.

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# The Comparison of Sleep's Quantity and Quality Elite Volleyball Male Athletes at Various Level of Events

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**Abstract.** The purpose of this study was to compare the quantity and quality of sleep for men athletes at the Club, Regional Training Center (Puslatda), and National Training Center (Pelatnas). The method uses descriptive quantitative. The target is six Puslatda's male volleyball athletes. The maximum age is 25 years and already participated in three conditions: Club, Puslatda, and Pelatnas. The instrument uses interview questions to determine sleep quantity and a questionnaire for sleep quality. The questionnaire has passed the validity test with a value (0.820) and reliability (0.976). The data analysis technique used mean, standard deviation, One Way Anova test on normally distributed data, and Kruskal Wallis test for not normally distributed data. The result showed the quantity and quality of sleep at the Club, Puslatda, and Pelatnas had a value ( $p > 0.05$ ). The conclusion showed no significant difference between the quantity and quality of sleep at the three levels.

**Keywords:** quantity, quality, sleep, athlete, physical recovery.

## 1 Introduction

In supporting sports performance, athletes need to be given in-depth training, namely training is carried out in a structured, scheduled, and planned manner in a training program and the needs in a good athlete's physical condition to support the athlete's achievement. Apart from being given intensive training, recovery is also needed to support maximum achievement [1]. However, if it is not supported by adequate energy and nutritional intake, optimal physical conditions will not be achieved [2].

However, recovery should not be neglected and should not be underestimated because recovery is a body condition in restoring human metabolism's function before doing activities to return to its prime and return to show good performance[1]. Because without a good recovery, it will take a long time to restore the body to its initial phase. If this happens, the athlete's body condition will not be ready when receiving new training material. It will be detrimental to the athlete if it is forced because the training will not be optimal [3].

Recovery is divided into two, namely physiological recovery and psychological recovery. Physiological recovery is the process of returning the body's condition to display optimally through the physical aspects[4]. In physiological recovery, there are several strategies used, such as compression clothing, hydrotherapy, sleep, massage, stretching, active recovery, and hydration [5].

Recovery has the goal of minimizing the risk of switching to a state of overexertion and reducing the athlete's risk of injury. One of the recovery strategies in overcoming this bad condition can be done by controlling sleep [6].

In some experts' opinion, sleep is believed to restore one's energy because sleeping can give the body time to recover and recover. It is healing of one's body systems to obtain awake the next day. What is interesting in the biological functioning system is sleep. Because no less than a third of life is spent sleeping, it all becomes normal when someone sleeps soundly, so in the morning, when awakened from sleep, the body feels refreshed and can carry out activities better than when someone lacks in rest [7].

Therefore, a person needs to be sufficient in his sleep to maintain a balanced body condition. However, of course, when practicing at a high level, he experiences the limitations and pressures of life. One of them is a lifestyle caused by physiological, psychological demands, and training or competition schedules [8]. Especially in volleyball, since volleyball is a team sport that requires much active movement. Starting from good physical and mental, movement skills complex, and good teamwork [9].

In sports, achieving the best performance fosters a sport and athlete [10]. The achievements have been made in volleyball at events national and international, namely the PON and SEA GAMES championships.

The East Java Puslatda (Regional Training Center) men's volleyball team achieved an achievement, namely the gold medal in the West Java XIX PON competition in 2016. This achievement is the fifth successive achievement since PON 2000. Then, the Pelatnas men's volleyball team (National Training Center) also won achievement by bringing a gold medal for Indonesia at the 2019 SEA GAMES competition in the Philippines.

To maintain these achievements, it needs adequate sleep for the human body, considering that sleep has a significant role in restoring its performance. The need for sleep is not only determined by the duration of sleep hours (sleep quantity) but also the depth of sleep (sleep quality) is required [11]. Sleep needs are differentiated by age, according to Samuels & Alexander [12] in the Canadian Sport for Life recommendations for sports sleep at the LTAD (Long Term Athlete Development) for women aged 18 +/- and men 19 +/- namely 8-10 hours/night plus 30 minutes of naps. Adequate sleep is needed because many impacts arise on physical health, mental, and mood, and one's immunity [13].

Therefore, a balance in regulating sleep quantity and sleep quality is essential and must be considered. Because of poor sleep quality, it will impact a person's physical and physiological functions so that it will all adversely affect health, and the activities carried out are hampered. As a result, someone who experiences sleep disturbances will experience several impacts such as disruption of the balance of the diet and disturbed body weight due to the release of body hormones so that hunger appears ultimately challenging to control. Then the body feels weak and is more susceptible to disease because of a compromised immune system. Besides, when experience sleep disturbances, it also affects psychologically. As a result, the mood becomes terrible, resulting in depression and decreased motivation, affecting athletes' performance [14].

Putra et al [15] explained that lack of sleep could result in an imbalance between hormone cycles and body metabolism, so the impact caused by irregularly maintaining this sleep pattern will be at risk of contracting heart disease, diabetes, stress, and depression. However, when a person implements a good and regular sleep pattern, it will also positively impact physical fitness; therefore, the following activities can be carried out optimally [16].

Suppose further analysis shows that these situations are interrelated and become a cycle because the physical activity carried out routinely and in a structured manner affects sleep quality. Good sleep quality can increase the ability to work physically well. Therefore,

adequate sleep is needed because it affects athletes' performance and learning [14]. Many things can be done to achieve a healthy sleep pattern. First, time discipline is essential to give attention since sleep experts believe that a regular rhythm schedule of sleep positively contributes to healthy sleep. Then, do a routine exercise, pay attention to the bedroom condition used, and try not to eat before sleep [7].

However, field observations that occur show that some athletes do sleep less controlled and then continue to exercise routine. However, sleep behavior does not affect the athlete's performance, which can be proven by obtaining good performance. This issue, of course, contradicts the theories of recovery. Because with recovery a good, one of them can be done adequately in sleep.

Based on the previous research above, the gaps in this study are the majority of athletes with the criteria for the quantity and quality of sleep for male elite volleyball athletes at the national and international levels with conditions, namely when at the Club, Regional Training Center (Puslatda) experienced a lack of daily sleep recommendations. Moreover, the National Training Center (Pelatnas) has met daily sleep recommendations. Lack of alertness is at risk of experiencing a decline in performance while training and while participating in championship competitions. Ideally, athletes should maintain a quantity of sleep and quality sleep to maintain endurance and stay in shape and give their best performance during training and competition. However, there is not enough data to show this fact.

The problem is the limited literature on the research results shows that athletes' sleep patterns both of sleep quantity and sleep quality by analyzing the comparison of good sleep patterns at the three levels, namely when at the Club, Puslatda, and Pelatnas as a material for further discussion. Therefore this study was conducted as a follow-up study and to determine the comparison of these sleep patterns. This study's novelty lies in the distinctive aspects of male volleyball athletes' research subjects at the national and international levels with conditions, namely when they are at clubs, Puslatda, and Pelatnas, by comparing the quantity and quality of sleep as a material for further discussion.

## 2 Method

The method used in this research is a quantitative method that is presented descriptively. Through a descriptive approach, the goal is to analyze the data by describing the factual data obtained without concluding it in general [17]. This study explained the comparison of the quantity and quality of sleep of Puslatda men's volleyball athletes while at the Club, Puslatda and Pelatnas.

In this study, the intended target for research was the male volleyball athletes of East Java Province following the Puslatda towards the National Sports Week (PON) in 2021, which took place in Papua in October with six research subjects. With the criteria, athletes have participated in three conditions: when at the Club, Puslatda, and Pelatnas. With a maximum age of 25 years. Research subjects have filled in informed consent, namely willingness to be research subjects and are already willing to become research subjects.

The instruments used were interview questions to determine sleep quantity and questionnaires to determine sleep quality. The questionnaire has been approved and validated by two validator lecturers following their scientific fields and is declared worthy of being used as a research instrument. The questionnaire was adopted from the ASBQ questionnaire in the journal of Sleep Science in 2018 by Matthew W Driller, Cheri D Mah, and Shona L. Halson

entitled "Development of the Athlete Behavior Questionnaire: A tool for Identifying Maladaptive Sleep" that has adjusted to various stages according to the needs. This questionnaire has been calculated and passed the validity and reliability test using IBM SPSS Statistics version 24 with a validity value of (0.820) and a reliability value of (0.976).

Data was collected through video calls which were carried out for one month from October to November 2020. Furthermore, the collected data were processed using IBM SPSS Statistics version 24 and Microsoft Excel version 2019. The data analysis techniques used are percentage, minimum, maximum, mean, standard deviation, normality test using Kolmogorof-Smirnov, Levene test for homogeneity test, difference test using one-way ANOVA on normally distributed data, and Kruskal Wallis for not normally distributed data.

The following description of the interval of values of athletes sleep quality ratings as follows [18]:

$$\text{Scale} = \frac{\text{maximum value} - \text{minimum value of}}{\text{the number of class}} = \frac{13-1}{5} = 2.4$$

Then votes variables calculated based on the average ratings for each variable, then suspended at intervals, as follows:

**Table 1.** Sleep quality assessment scale

Interval Score	Category
1 - 3.4	Very Poor
3.5 - 5.9	Less
6.0 - 8.4	Enough
8.4 - 10.9	Good
11.0 - 13.0	Very Good

### 3 Result and Discussion

The research data results have been interviewed via video call with reference questions to determine the quantity of sleep and sleep quality. The following is a description of the respondents who have been identified.

**Table 2.** Description from six respondents

	Min	Max	Mean & SD
Height (cm)	176	196	190.67 ± 7.47
Weight (kg)	66	88	81.50 ± 8.02
BMI (kg / m <sup>2</sup> )	21.3	23.4	22.4 ± 0.78
Age Club	19	24	22 ± 2.00
Age Puslatda	20	25	22.67 ± 2.16
Age Pelatnas	19	24	21.67 ± 2.16

In the description of Table 2, it can be seen that the average height value is 190.67cm. The average athlete's weight was 81.50 kg. The mean value of the body mass index (BMI) of athletes is 22.4 kg / m<sup>2</sup> which means normal. For the description of age, athletes are divided

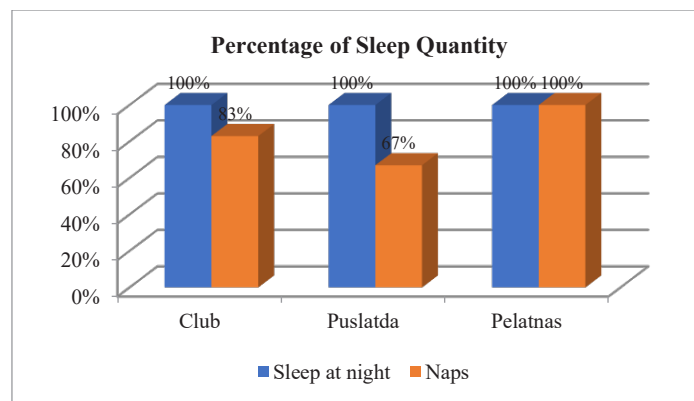
into three. When they are outside the Puslatda and Pelatnas or (Clubs), Puslatda and Pelatnas with an average age are 22 years old, Puslatda is 22.67 years old. When they are at Pelatnas, they are 21.67 years old.

**Table 3.** Description from six quantity of sleep's respondents

		Min	Max	Mean & SD
Total sleep quantity	Club	7	9	7.50±0.837
	Puslatda	6	9	7.67±1.033
	Pelatnas	7	10	8.67±1.211
Quantity sleep the night	Club	4	7	6.00±0.84
	Puslatda	6	8	6.50± 1.03
	Pelatnas	6	8	6.83±1.21
Naps	Club	0	3	1.50±1.05
	Puslatda	0	2	1.17±0.84
	Platnas	1	3	1.83±0.75

\*Calculate in Hours

The average age at the Club is 22 years old with an average total sleep quantity in one day of 7.50 hours, mean -The average night sleep is 6.00 hours, the average naps are 1.50 hours, with the information on the quantity in the recommendation that the number of hours of sleep daily is still not fulfilled and the quantity is still more when in Pelatnas and Puslatda, then on the average age in the Puslatda category, namely 22.67 years old with an average total sleep quantity in one day of 7.67 hours, an average night sleep of 6.50 hours, an average nap of 1.17 hours, with information on this quantity in the recommendation of the number of hours of sleep daily is still not meme nuhi and less than Pelatnas and more total sleep quantity than Clubs, at an average age in the Pelatnas category aged 21.67 years with an average total sleep quantity in one day 8.67 hours, an average night sleep of 6.83 hours, average nap 1.87 hours, with the information on the quantity in the recommended daily number of sleep hours has been fulfilled and the quantity is longer than the Puslatda and Club categories.



**Fig. 1.** Percentage of sleep quantity

Figure 1 shows the percentage of sleep quantity athletes doing nighttime naps and naps. The percentage results of the average quantity of sleep at night in volleyball athletes while at the Puslatda, Pelatnas, Clubs (6 athletes) are 100%. Meanwhile, the results of the percentage

of the average quantity of daytime naps in volleyball athletes while at the Puslatda, Pelatnas, Clubs were (1 athlete) 17%.

These results illustrate that the higher the athlete's training level, the greater the impetus that will make the athlete train more while maintaining the quantity and quality of sleep to appear to give the best results when competing by maintaining the quantity of sleep both at night and during the day.

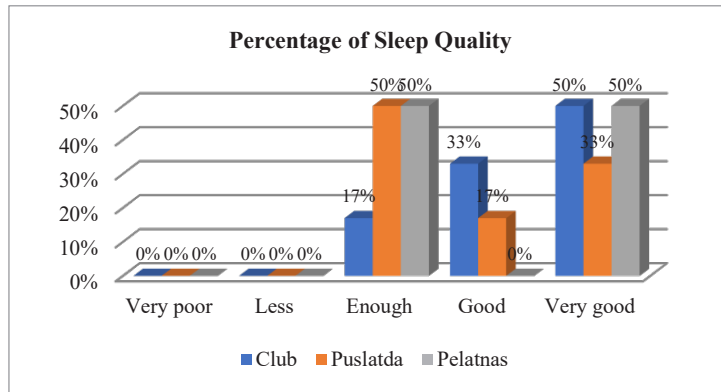


Fig. 2. Percentage of sleep quality

The percentage of athletes' sleep quality results in the volleyball sport at Puslatda, in the graphic image with a percentage label of 0%, which means no athletes whose sleep quality is Very Poor and Poor. The enough category is the highest in Puslatda and Pelatnas with 50%. The good category is mainly at the Club with 33%, and the rest is Very Good category is mostly when at Pelatnas and Clubs with 50%. The average presentation of the best sleep quality in the Club is 17% adequate, 33% is good, and the rest 50% is excellent.

The data that has been collected from the distributed sleep quality questionnaire is tabulated to be a data analysis tool. The tabulation results are processed to produce statistical descriptions of the research variables.

Table 4. Description from six quality of sleep's respondents

	Min	Max	Mean & SD	Description
Club	7	13	10.33 ± 2.160	Good
Puslatda	7	13	9.33 ± 2.422	Good
Pelatnas	8	11	9.50 ± 1.643	Good

\*Calculate in Hours

Table 4 shows that athletes' sleep quality when at the Club is known that the average sleep quality as many as 10.33 points. Puslatda has an average sleep quality of 9.33 points, Pelatnas is known to have an average sleep quality of 9.50 points, which means that overall is in a Good sleep quality condition.

To find out the difference between the quantity and quality of sleep at the Puslatda, Pelatnas, and outside the Puslatda and Pelatnas or (Clubs) using One Way Anova analysis normality test using Kolmogorov Smirnov, which can be presented in tables 2 and 4.

**Table 5.** Normality test

<b>One-Sample Kolmogorov-Smirnov Test</b>		
Variable	Asymp. Sig.	Information
Total sleep quantity	.050 <sup>c</sup>	Normal
Night sleep quantity	.002 <sup>c</sup>	Abnormal
Quantity naps	.002 <sup>c</sup>	Abnormal
Sleep quality	.080 <sup>c</sup>	Normal

Based on table 5, it is known that the Kolmogorov-Smirnov significance value Sig. of the quantity of sleep at night (0.002) and quantity of naps (0.002) where each value is less than 0.05. The normality test on these two variables is not normally distributed so that the search for differences no longer uses the Anova test but uses the Kruskal Wallis method. The non-parametric statistics described in Table 6 are different from the variable total sleep quantity (0.50) and sleep quality (0.80). Each value is more significant than 0.05, which means that the normality test uses a normally distributed Kolmogorov-Smirnov. Thus the requirements for the normality of the test model are met. The next step is to analyze the difference between total sleep quantity and sleep quality at the Puslatda, Pelatnas, and outside Puslatda and Pelatnas (or Clubs) in Table 7 using the group similarity test.

**Table 6.** Kruskal Wallis

<b>Test Statistics Test<sup>a, b</sup></b>			
Night sleep quantity	Sig.	.359	Not Significant
Quantity of naps	Sig.	.534	Not Significant

Based on the Kruskal Wallis test results, which were carried out because the variable data was not normally distributed, the Sig value was obtained. On the quantity of sleep at night (0.359) and quantity of naps (0.534), each value is greater than 0.05, which means no significant difference in the two variables.

**Table 7.** Homogeneity

<b>Test of Homogeneity of Variances</b>				
	df1	df2	Sig.	Description
Quantity sleep total	2	15	.526	Homogeneous
Sleep quality	2	15	.624	Homogeneous

The homogeneity test aims to test whether these variables have the same variance [19]. Based on the results of the Sig. The total sleep quantity is 0.526, and the sleep quality is 0.624 in Table 7, which shows that ( $p > 0.05$ ) where the problem formulation cannot be rejected which states the same variance, which means that the ANOVA assumption is fulfilled. According to Ghozali [20], this data is proven to be homogeneous. If data is not homogeneous in a group/category in sample size, it is not fatal to carry out the ANOVA test.

**Table 8.** One way ANOVA test

<b>ANOVA</b>			
	F	Sig.	Description
Quantity total of beds	2.216	.143	Not Significant
sleep Quality	.390	.683	Not Significant



In Table 8 is known Sig. at 0.143 sleep quantity and 0.683 sleep quality where ( $p > 0.05$ ) which means that from the three categories Puslatda, Pelatnas, and outside Puslatda and Pelatnas (or Clubs), there is no significant difference.

**Table 9.** Post Hoc Test

<b>Multiple Comparisons</b>				
Tukey HSD				
	Category	Category	Sig.	Discription
Total sleep quantity	Club	Puslatda	.958	Not significant
		Pelatnas	.160	Not significant
	Puslatda	Pelatnas	.249	Not significant
		Club	.958	Not significant
	Pelatnas	Puslatda	.249	Not significant
		Club	.160	Not significant
Sleep quality	Club	Puslatda	.694	Not significant
		Pelatnas	.774	Not significant
	Puslatda	Pelatnas	.990	Not significant
		Club	.694	Not significant
	Pelatnas	Puslatda	.990	Not significant
		Club	.774	Not significant

The Post Hoc Test Result in Table 9 shows the total quantity of sleep in a day; there is a category Club with Puslatda sig.  $0.958 > 0.05$ . Clubs with National Pelatnas have known sig values.  $0.160 > 0.05$ . In the category of Puslatda and Pelatnas, it is known that the sig value.  $0.249 > 0.05$ . Puslatda with the Club is known to have the Sig.  $0.958 > 0.05$ . In the category of National Training Center with Puslatda, it is known that the sig value.  $0.249 > 0.05$ . Pelatnas with the Club is known to be of Sig.  $0.160 > 0.05$ . All the values described above mean no significant difference in the quantity of sleep in that category.

The Post Hoc Test results in Table 9 show that the quality of sleep in the Club category with Puslatda is known to be the sig value.  $0.694 > 0.05$ . Clubs with National Pelatnas have known sig values.  $0.774 > 0.05$ . At the Puslatda and Pelatnas, it is known that the sig value.  $0.990 > 0.05$ . Puslatda with the Club is known to have the Sig.  $0.694 > 0.05$ . In the category of National Training Center with Puslatda, it is known that the sig value.  $0.990 > 0.05$ . Pelatnas with the Club is known to be of Sig.  $0.774 > 0.05$ . The values described above show that there is no significant difference in sleep quality in that category.

Success in sport is supported by optimal preparation and adequate recovery between training and competition [21]. Many strategies can be done in restoring the body, including sleeping [5].

Sleep is one of the strategies used as recovery to improve the condition of athletes to return to their optimal performance [22]. Sleep must be maintained because sleep is not just resting but when it is done properly and properly can provide positive benefits after running it [14]. Because it has been recognized that sleep has a significant influence on the role of performance and recovery of trained athletes [21].

It should be noted that during the sleep process the lowest phase cycle occurs for the activities metabolic body such as low blood flow to the brain, decreased heart rate, slows down of breathing, and when sleeping in the endocrine system the body increases the secretion of growth hormone through the pituitary gland which can restore physiologically [8]. Then

besides that during the sleep process, the muscles are in a state not tense, so the muscles can recover and when they wake up they are in prime condition [23].

Several specific factors in sports influence the changes in the sleep conditions of elite athletes, such as the high training load being carried out, the type of exercise, the seasonal phase, the duration of training or competition, jet lag, and the environment (such as sleeping environment and use of transmitter media), also the methodology on sleep [8].

Judging from several factors that affect athletes' sleep condition, it is indispensable to control the human body's need for adequate sleep. This need is not only determined by the sleep time duration (sleep quantity) but also the need for the depth of sleep (sleep quality) [24]. For this reason, it is necessary to have adequate sleep because it has an impact on the physical health of athletes, mental, mood, and athletes' immunity [13].

Sleep quantity is the number of hours of sleep a person needs typically to sleep [25]. According to Samuels & Alexander [12] in the Canadian Sport for Life, athlete sleep recommendations at the LTAD (Long Term Athlete Development) for women aged 18 +/- and men 19 +/-, namely 8-10 hours/night plus 30 minutes of nap.

The results of research conducted by Milewski et al [26] show that athletes who sleep less than 8 hours are more likely to experience a risk of injury than athletes who sleep more than 8 hours. Previous studies also found that there was a significant relationship between lack of sleep and increased health complaints, increased stress, and decreased mood confusion. So, the resulting lack of sleep can lead to increased health problems, increased stress, decreased mood, especially in confusion [27].

This insufficient number of hours of sleep occurs because the training schedule in each category of Puslatda, Pelatnas, and Club has a different portion. The higher the competition level, the tighter and more strenuous the training schedule must be done so that athletes' sleep routine will change. Research conducted by Roberts et al [28] shows that athletes do not reach sleep recommendations during training and competition because the competition night disturbs sleep than the previous nights. Athletes' sleep disturbance is caused by training in the morning, increased training load, and departure during the trip, jet lag, and altitude.

Likewise, taking a nap during the day is thought to be an activity to improve body health but also has a bad influence on the risk of cardio-metabolic disease and can even cause death when it is not properly regulated. There is growing evidence that trials using sleep during the day can affect both a person's psychological and emotional regulation. But also on the contrary, if sleeping during the day is carried out for a long time in the afternoon, it can interfere with sleep at night and will have a bad risk to the metabolism body's [29].

For that, the quantity of sleep must be maintained properly. Awakening in the quantity of sleep can be done by maintaining nutritional intake and sleep volume because it is easy to understand the incidence of injury in athletes [30]. However, each athlete has certain strategies to regulate the exact portion of his sleep, which is not necessarily the same as other athletes. Where every athlete has a good physical condition, but strategies to regulate sleep patterns that result in different sleep quantities, but each athlete can still ensure their respective conditions are in the best condition.

In addition to the sleep time factor (sleep quantity), sleep depth (sleep quality) must also be considered. Because good sleep quality will create a positive mood or enthusiasm for athletes either when doing rigorous training for competition or when competition, which is supported by research conducted by Andrade et al [31] when analyzing the correlation between sleep quality, mood, and the results of the games in elite athletes participating in Brazilian volleyball competitions show that athletes who sleep well, with winning situations experience low levels of tension. Furthermore, the mood is related to success in a competition.

Then when getting good quality sleep will have a good impact on increasing physical endurance so that in carrying out an activity on the body no longer experiences overtraining during training or competition so it can avoid muscle cramps or tension [32]. In other studies, it is also stated that there is a positive and significant relationship between sleep quality and concentration levels. So, good sleep quality can have a positive impact on concentration level [33].

However, when athletes have poor sleep quality it will also harm their performance. It can be caused by intrinsic and extrinsic factors. Where the intrinsic factors that occur are influenced by stress and pressure from someone such as family, coaches, and social life. Meanwhile, extrinsic factors that can affect sleep quality include environment, caffeine consumption, alcohol, level of exercise, snoring sound of sleeping partners, and room temperature of the bed [14]. These can all cause poor sleep quality. Of course, poor sleep quality will have an impact on someone who experiences it, such as disruption of diet balance and disturbed body weight due to the release of body hormones so that hunger appears, eventually, it is difficult to control. Then the body feels weak and is more susceptible to disease because of a compromised immune system. Besides, when you experience sleep disturbances it also affects the psychological, as result, the mood becomes bad so that you will feel depression and decreased motivation which will affect the performance of athletes [14].

With the study results, it was found that the quantity of sleep was not following the recommendations but still had good sleep quality so that elite athletes could wake up from sleep in a fit condition and good physical and psychological qualities. Some of the athletes' questions explained that the quality of sleep obtained was due to positive psychological thoughts to continue developing and providing the best for themselves, the team, and their families. Psychological factors such as a good mood, good environment, and a positive spirit can give the best performance for doing activities such as training or competing.

Li et al [34] supported athletes' high-performance success tends to have positive emotional characters and traits, while athletes with less successful performance levels tend to have reasonably high levels of self-control, extraversion, and aggression. So the conclusion provides evidence that psychological and emotional factors have a relationship with an athlete's success.

Besides, it is in line with the research results by Nayaga & Kusuma [35], proving that five aspects of sleep quality (sleep time, nutrition, exercise, psychological conditions, and environment) it is sufficient to influence the sleep habits of athletes. The five aspects that play an essential role in the psychological aspect have a high percentage of an essential role in influencing athletes' sleep habits to the maximum. The influence of good sleep behavior affects the improvement of sleep quality for athletes. Therefore, it can be concluded that the results of the study prove that recovery can be made with good sleep habits that can improve workability in sports, such as performance in athletes.

Despite the results obtained from such research, the athletes are in their best condition when they are training also competing. It because of habitual factors from athletes that went for a long time and continuously. Even though they do not follow the coach's recommendations according to the theory stated by Samuels and Alexander, they do not force these standards because it is proven not to have different effects. Because besides that, it has shown promising results on the sleep quality of athletes. Given the importance of adequate sleep to reduce the risk of mood-enhancing disorders, prevalent sleep deprivation, and the inability to enforce regulations [36]. The study results are in line with research that is being carried out. Even though athletes do not sleep according to the sport's standards, they could give their best performance while still paying attention to the quantity and quality of sleep

because of the quantity and quality of sleep. They are reported to be the best psychological and physiological recovery strategies available for elite athletes [21].

As additional information, there are limitations to this study, namely, the instruments used are not on a large scale. Such as sleep quality questionnaires and interview questions to determine sleep quantity do not use a measurement tool. So it is hoped that the weaknesses in this study can be used as a basis for further research that is better at using more valid instruments on a broad scale.

#### 4 Conclusion

Based on the results of the data, it can be concluded that there was no significant difference between the total quantity of sleep, the quantity of sleep at night, the number of naps outside the Puslatda and Pelatnas (Clubs), Puslatda, and Pelatnas. There is no significant difference between sleep quality outside the Puslatda and Pelatnas (Clubs), Puslatda and Pelatnas.

It is hoped that with the results like the above, the coaches will pay more attention to the importance (always maintaining the quantity and quality of sleep for the athletes) by regularly sleeping at the recommended nighttime and naps. If they cannot sleep according to international standards, athletes will continue to maintain and remind the maximum quantity and quality of sleep without depressing their mood/psychological state to harm morale/performance both while training or competing.

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# Development of Virtual Artistic Gymnastics-Based Competitions in Central Java

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**Abstract.** This study aimed to determine how a virtual-based competition development model for Artistic gymnastics competitions in Central Java. The research method uses a research design and a developer. Who involved the subjects of 29 PERSANI Pengcab throughout Central Java in this study. These experts use media experts and the wait and care technology for artistic gymnastics, PERSANI, Central Java. The research results resulted in a virtual competition system model that can be used as a means of artistic gymnastics competition in Central Java. Media experts and gymnastics claim the system's success and utility rate at 90%. The interviews with PERSANI Pengcab administrators throughout Central Java stated that all Pengcab officials stated that this system model could be applied in Central Java. This study concludes that the artistic gymnastics competition model developed can be used for artistic gymnastics competitions in Central Java during the Covid-19 pandemic.

**Keywords:** Development, virtual artistic gymnastics, competitions.

## 1 Introduction

Almost 2 years the world has faced a viral pandemic which presents a serious threat to human health. Since the outbreak was first discovered in Wuhan, China, in December 2019, the coronavirus disease 2019 (COVID-19) has spread rapidly globally. COVID-19 has been declared a pandemic by the World Health Organization (WHO) as confirmed cases are approaching 200,000 patients with what will exceed 8000 deaths in more than 160 countries [1], [2], [3]. COVID-19 has proven to be a pandemic that can bring society, the economy and education to its knees [4]. As of March 2020, several countries banned unnecessary outdoor activities during COVID-19, which is commonly called a 'lockdown'. This lockdown has the potential to have an impact on the level of associated physical activity, among others, a significant impact especially on the gymnastic situation [5], [6].

Guidance and development of elite sports are arranged in a planned, systematic, tiered and sustainable manner in order to achieve national sports achievements. In the era of the Covid-19 pandemic, the coaching system is said to have decreased, as was the implementation of the National Sports Week which was postponed, including coaching at sports clubs because of concerns about the risk of covid-19 transmission [7], [8]. The coaching carried out by the sports club has also experienced obstacles. The implementation of a routine training schedule is also limited by the maximum number, so that the training schedule is disrupted [9]. Covid-19 has had a major impact on the coaching and management system of sports coaching, the implementation of physical activity has also decreased. Training schedules that have

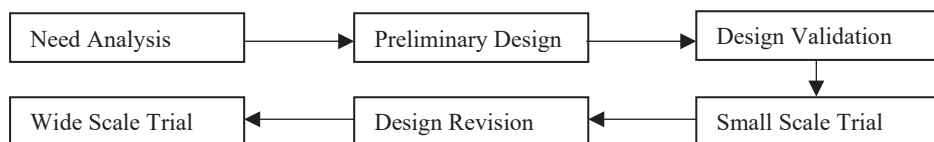
decreased in quality and quantity of training have disrupted the coaching system [10]. A reduction in the frequency of training causes the athlete's muscle strength and endurance to decrease. The significant decrease occurred due to the decreased duration of exercise [11], [12]. The mental toughness of a gymnast is basically related to various things, one of which is the problem of self-confidence, the factor of self-confidence is a very important part, considering that there are so many mainstay techniques of movement in this sport that require athletes to have courage, as an impact of movement patterns that must be used. Doing so has a high enough risk, besides that gymnastics athletes who will take part in the championship in 2020 must bury their dreams of achieving achievements due to the pandemic, the government has adopted a policy of banning crowds so that all championships in sports do not get permission and cannot be carried out like the previous year [13]. Latency determines not only how players experience online gameplay but also how to design the games to mitigate its effects and meet player expectations. Issues pertaining to the production and consumption of corporate websites and online games remain relatively unexplored. [14], [15]

In the era of the COVID-19 pandemic there was no championship held from PERSANI Central Java, so the problems to be studied were: How to develop an effective and efficient virtual competition system based on artistic gymnastics in the pandemic era?

## 2 Methods

The type of research that will be used is Research and Development (R&D) research. This study aims to develop a new product or improve existing products, in this case, to develop a virtual-based artistic gymnastics competition system.

This research stage uses the following R&D development steps:



**Fig. 1.** Research stage

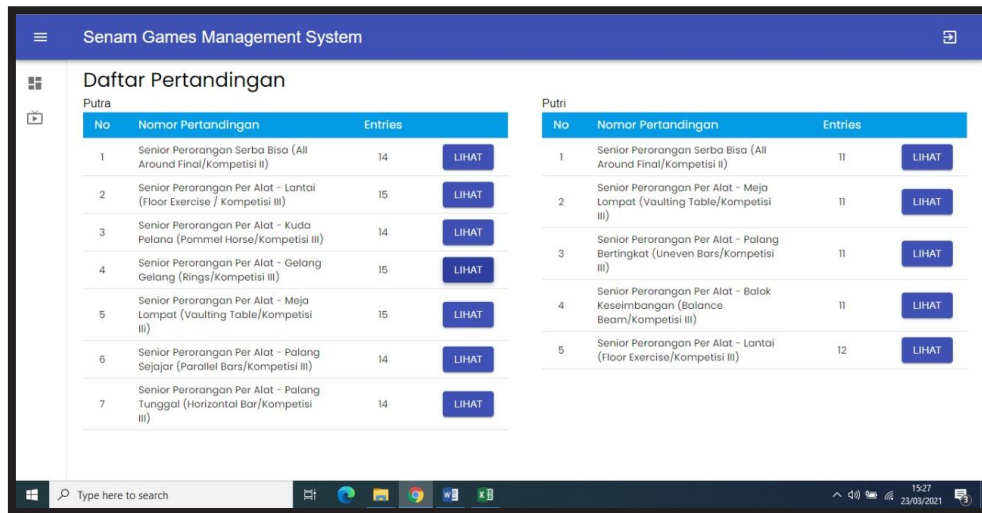
The subjects in this study were all of the 29 Pengkab / Pengkot Districts / Pengkot PERSANI throughout Central Java. The experts involved in the implementation of research and development were 2 gymnastics experts and 2 IT experts. The small scale trial will involve 1 karesidenan (Karesidenan Semarang). For a wide scale test the entire residency will be used.

The data collected came from material experts as material validators, IT experts as validators for the championship system model, and PERSANI City Government / Pengkab in Central Java as respondents to assess the virtual-based competition system. Data collection techniques to assess the feasibility of this virtual-based championship system are by using a questionnaire or questionnaire. Questionnaire or questionnaire is a technique or method of collecting data indirectly (researchers do not directly ask and answer questions with respondents). The instrument or data collection tool is in the form of a questionnaire containing a number of questions that must be answered or responded to by the respondent.



### 3 Result and Discussion

The result of this research is to produce a software design that is used for artistic gymnastics competitions in Central Java. This software is used by the jury in making an assessment. The specifications of the software is:



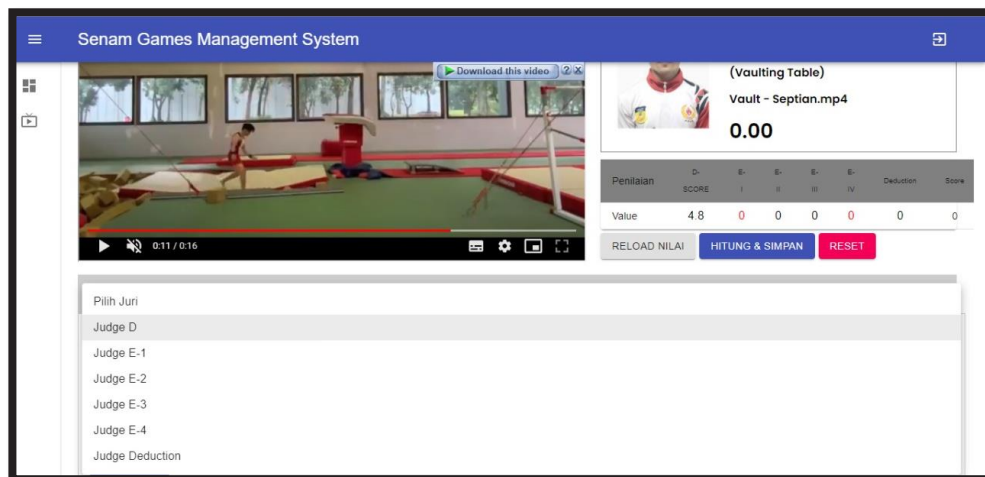
The screenshot displays the 'Senam Games Management System' interface. The main section is titled 'Daftar Pertandingan' (Competition List) and is divided into two columns: 'Putra' (Boys) and 'Putri' (Girls). Each column contains a table with columns for 'No' (Number), 'Nomor Pertandingan' (Competition Number), and 'Entries'. A 'LIHAT' (View) button is present next to each entry.

Putra		
No	Nomor Pertandingan	Entries
1	Senior Perorangan Serba Bisa (All Around Final/Kompetisi II)	14
2	Senior Perorangan Per Alat - Lantai (Floor Exercise / Kompetisi III)	15
3	Senior Perorangan Per Alat - Kuda Pelana (Pommel Horse/Kompetisi III)	14
4	Senior Perorangan Per Alat - Gelang Gelang (Rings/Kompetisi III)	15
5	Senior Perorangan Per Alat - Meja Lompat (Vaulting Table/Kompetisi III)	15
6	Senior Perorangan Per Alat - Palang Sejajar (Parallel Bars/Kompetisi III)	14
7	Senior Perorangan Per Alat - Palang Tunggal (Horizontal Bar/Kompetisi III)	14

Putri		
No	Nomor Pertandingan	Entries
1	Senior Perorangan Serba Bisa (All Around Final/Kompetisi II)	11
2	Senior Perorangan Per Alat - Meja Lompat (Vaulting Table/Kompetisi III)	11
3	Senior Perorangan Per Alat - Palang Bertingkat (Uneven Bars/Kompetisi III)	11
4	Senior Perorangan Per Alat - Balok Keseimbangan (Balance Beam/Kompetisi III)	11
5	Senior Perorangan Per Alat - Lantai (Floor Exercise/Kompetisi III)	12

Fig. 2. Gymnastics games management system



The screenshot shows the 'Senam Games Management System' interface during a judging session. The main area features a video player showing a gymnast performing a vault on a vaulting table. To the right of the video, the performance details are displayed: '(Vaulting Table) Vault - Septian.mp4' with a score of '0.00'. Below this, a judging table is visible, showing scores from five judges (D, E-1, E-2, E-3, E-4) and a deduction score. The current scores are: D: 4.8, E-1: 0, E-2: 0, E-3: 0, E-4: 0, Deduction: 0. At the bottom, there are buttons for 'RELOAD NILAI', 'HITUNG & SIMPAN', and 'RESET'. A list of judges is shown at the bottom left: 'Pilih Juri', 'Judge D', 'Judge E-1', 'Judge E-2', 'Judge E-3', 'Judge E-4', and 'Judge Deduction'.

Fig. 3. Gymnastics games management system

Based on figure 2 and 3, it is explained that the results of the development are in the form of an online judging activity application. The video file was sent in advance from the coach or respective official, then the committee recapitulated the video and entered it into the online

judging system. The judges in charge will have their own accounts that can be used to play videos as well as provide direct assessments of the system.

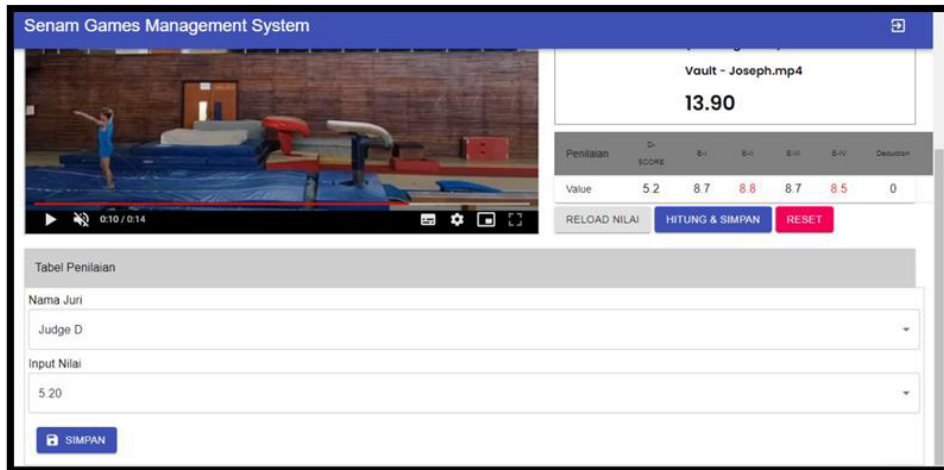


Fig. 4. D Judge system

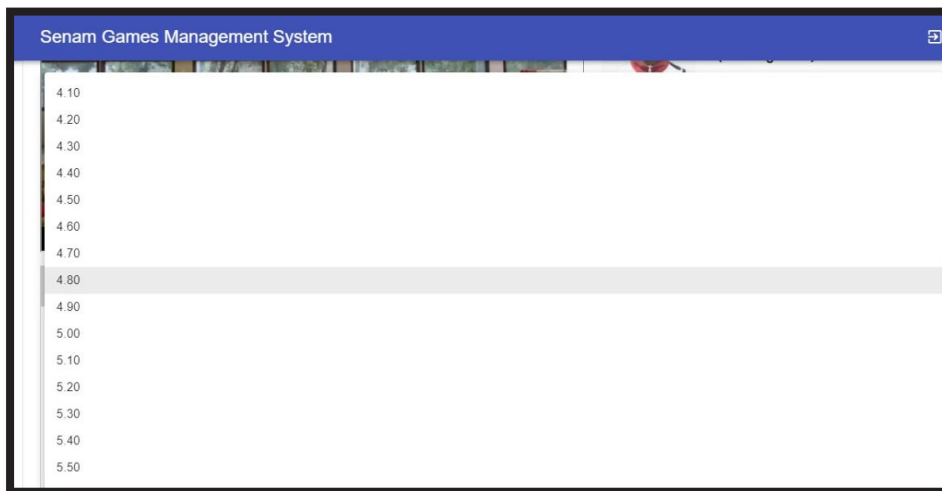


Fig. 5. Scoring D judge system

Figures 3 and 4 show the activities carried out by the judges when conducting the assessment. In the scoring system, the jury evaluates simultaneously and at one time. Judging is carried out by each panel, both jury D and E through this system. Based on validation activities carried out by experts, it can be analyzed and it can be concluded that the expert gives a score of 90% this virtual competition system can be used in Central Java. The system is very interesting, it can even be applied to the championship offline. This is reinforced by the

results of interviews conducted with coaches, administrators and judges in Central Java who stated that this system is very helpful in the judging process and the competition system in Central Java.

## 4 Conclusion

From the results of the research conducted, it is found that the developed model of the online-based competition system can be implemented and implemented for artistic gymnastics championships in Central Java. This system has many advantages that can be obtained when an online championship is held with a system management championship system.

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## Athletes' Emotional Determinants Accordingly Reflected in Their Personal Lives

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**Abstract.** This study aims at examining athletes' emotional determinant as reflected in their personal lives. 278 voluntarily elite athletes contributed to the database, they were individual-athletes and team-athletes of 28 sport branches. Data were collected from self-rated questionnaire towards athletes' emotional determinants using a 5-point Likert scale. Data analysis used the SPSS for calculating athletes' emotional determinants. The results showed that self-expression, self-control, and problem-solving for individual- and team-athletes were significantly correlated with each other. Another finding confirmed that the highest value of domination of elite athletes' emotional determinants on self-expression dealt with the lowest value of self-control. The domination of these three determinants was consequently partial positive and negative significance with  $p < 0.01$  level for 2-tailed prediction linking to Spearman's Rho coefficients. Elite athletes' emotion deals with intra-and inter-individual contexts that constitute with the multiple positive, negative, and supportive reactions. However, elite athletes' emotion conditionally influences their individual competence inventories.

**Keywords:** self-expression, self-control, problem-solving, emotion consistency.

### 1 Introduction

Throughout the most recent twenty years, sport psychology research has added to the exhibition of elite athletes through the usage and practice of accessibly psychological strategies and methods, for example, unwinding, objective setting, mental practice, perception and self-talk. Generally, the mental strategies have been all the more broadly considered by analyzing mental aptitudes got from different character characteristics and mental demeanors of elite athletes [1], since in the advanced globalization, the upgraded performance requests pressure that will be available all around, and one of us can get away from the day-by-day life stresses. Unpleasant life occasions and every day life stresses have both pernicious and aggregate consequences for human body [2].

The group of emotional capabilities is tied in with utilizing sentiments and feelings to manage your musings and conduct. It implies getting in the temperament and utilizing sentiments and feelings to encourage thinking and dynamic. The capacity to utilize feelings can assist you with distinguishing various situations and give you an alternate and upgraded point of view on issues in work and family life. It will help you see the world contrastingly

and acknowledge others' perspectives towards what others are feeling and spotlight on that which is significant when emotions are solid [1]. An away from of the elite athletes in zeroing in on close to home exertion and personal growth, building up an adoration for sports, just as attempting to improve specialized strategic viewpoints will identify with their sports to improve execution, key component in self-inspiration [3].

When elite athletes can perceive their passionate states viably, they must have the option to control those equivalent feelings. For this situation, elite athletes show their capacity of creating and being intellectually extreme, regardless of the conditions occur. Elite athletes need to keep up a balance of feelings that adjusts the two highs and lows on the off chance that they would like to create consistency in their art. This implies that there are not dwelling on the two disappointments and victories. Elite athletes' enthusiastic state additionally comes off on teammates which make their guideline of feelings much more significant as it can influence the general either team's performance or individual lives. This equivalent attitude will be persisted into the working zones. In any case, it is fundamental to keep athletes' level-headedness in the most high-pressure circumstances. By managing athletes' emotions, they can resist the urge to panic and zero in on the errand that should be cultivated [4].

Elite athletes' emotions are well-springs of information that alongside the normal data, can help them settle on very much educated choices. These additionally covers the capacity to oversee elite athletes' sentiments and emotions in pressurized and distressing circumstances to support their both performance and individual lives [1]. Elite athletes' bodily and mind emotions contain verse of every experience, mutual understanding, and relationships in their individual lives. They will comprise the feeling of who they are and stimulate the systems as energy. As the emotion consistency increased, the form of the energy within the individual will be switched, resulting in changes in the individual athletes' working experience, lives, and relationships. However, managing emotions consistency effectively convey administering the fruitless behaviors that do not seem to be beneficial to the elite athletes [5].

Some studies regarding the emotion consistency noted that self-esteem positively predicted self-determined motivation, whereas anxiety predicted it negatively and self-determined motivation positively also predicted resilience. This condition helped to better understand how different behavioral, emotional, and social aspects belonging to the athletes interrelated with the others [6]. [7] believed that athletes who practiced collective sports with the physical contact were the ones, who was better in handling their emotions. Further, understanding athletes' emotions helped predict how they reacted to different situations. The situation was about developing a map of how emotions worked, how athletes' emotions could lead to another and result in a particular emotional state. This covered understanding the warning signs of emotional states, such as restlessness, apprehension and anger. Possession of an emotional map enabled athletes to deal more effectively with the ups and downs in lifestyle [1]. Meanwhile, [8] showed that elite athletes' key factors on emotions consistency might involve their psychological strikes of unjustness, overtraining and burnout, serious public and media covers; and overseeing progressing serious weights to perform in their individual lives. On the other hand, individually specific psychological differences among elite athletes might rise to better tolerance of physiological arousal [9].

Along consideration with elite athletes' emotion consistency is accordingly depicted in athletes' individual lives. The purpose of this research analyses three embedded determinants of elite athletes' emotion in terms of self-expression, self-control, and problem-solving through the descriptive statistics analyses, which is empirically based on elite athletes' perception of using the self-rated questionnaire. The questionnaire reveals elite athletes' individual lives that correspond with the outreach of their professional careers. Pointedly, this

research aims at examining the oversight of athletes' emotion consistency as depicted in their individual lives.

## 2 Method

Respondents were elite athletes listed from 28 category of sports both individual and team sports, namely: of wushu ( $n = 19$ ), taekwondo ( $n = 16$ ), hockey ( $n = 22$ ), baseball ( $n = 18$ ), softball ( $n = 13$ ), boxing ( $n = 2$ ), roller-skate ( $n = 11$ ), shooting ( $n = 9$ ), weightlifting ( $n = 7$ ), archery ( $n = 12$ ), gliding ( $n = 8$ ), basketball ( $n = 12$ ), motor-cross ( $n = 7$ ), beach volleyball ( $n = 3$ ), karate ( $n = 9$ ), court tennis ( $n = 5$ ), full-body contact ( $n = 12$ ), badminton ( $n = 8$ ), sambo ( $n = 3$ ), diving ( $n = 8$ ), paragliding ( $n = 8$ ), handball ( $n = 28$ ), kempo ( $n = 10$ ), pencak silat ( $n = 8$ ), aeromodelling ( $n = 4$ ), judo ( $n = 11$ ), hang-gliding ( $n = 3$ ), and athletics ( $n = 2$ ). These elite athletes were officially programmed at athletes' training center program, Indonesian National Sport Committee (KONI). The respondents voluntarily involved in this research were 278 elite athletes. They were listed to the database, namely: 18.3% ( $n = 51$ ) individual-athletes and 81.7% ( $n = 227$ ) team-athletes. Athletes' age ranged from 14 to 35 years with a mean of 24.5 and standard deviation of 14.849 ( $M = 24.5$ ;  $SD = 14.849$ ) when they completely fulfilled the questionnaires.

Data were collected from those elite athletes' self-rated questionnaire towards their emotion consistency perception using a 5-point Likert scale regarding three determinants—self-expression, self-control, and problem-solving. The rubric indicated that 5—very consistent, 4—consistent, 3—moderate, 2—less moderate, and 1—uninfluenced. However, these three determinants had fulfilled the research instrument that was previously tested towards other 47 elite athletes in athletes' training center program by means of Cronbach's alpha reliability coefficients. The results ranked in between .535 to .703 with the significance level at  $p < .30$ . The Cronbach's alpha ( $\alpha$ ) for self-expression was .703, self-control was .535, and problem-solving was .562.

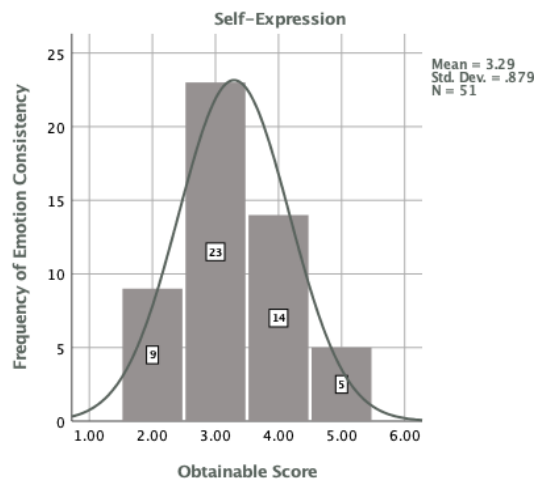
Data analysis had been undertaken from applying the IBM SPSS 25.0. In association with the statistics analyses, the descriptive and frequency statistics of athletes' inter-group perception were used to examine both individual- and team-athletes' emotion consistency. Subsequently, the correlations among three determinants—self-expression, self-control, and problem-solving were carried out using Spearman's rho with the significance level at  $p < .01$ .

## 3 Result and Discussion

This descriptive statistics and cross-sectional study relied on two hundred seventy-eight ( $n = 278$ ) elite athletes that were undertaken from the category of individual- and team-athletes (52 or 18.3% individual athletes and 227 or 81.7% team-athletes), whose age laid on 14 to 35 years ( $M = 24.5$ ;  $SD = 14.849$ ). Firstly, regarding the dominance of individual-athletes' self-expression as depicted in their individual lives, it was shown that elite athletes answered their self-expression was less moderate (9 or 17.6%), 23 or 45.1% was moderate, 14 or 27.5% was consistent, and 5 or 9.8% was very consistent (Table 1). Elite athletes' self-expression also addressed the mean was 3.29 and standard deviation was .879 ( $M = 3.29$ ;  $SD = .879$ ;  $n = 51$ ). The category of elite athletes' self-expression was moderate with 45.1% and ranked into the first category based on individual-athletes' emotion consistency (Fig. 1).

**Table 1.** Frequencies of individual-athletes' self-expression.

Likert's Scale	Frequency	Percent	Valid Percent	Cumulative Percent
2.00 ( <i>Less moderate</i> )	9	17.6	17.6	17.6
3.00 ( <i>Moderate</i> )	23	45.1	45.1	62.7
4.00 ( <i>Consistent</i> )	14	27.5	27.5	90.2
5.00 ( <i>Very consistent</i> )	5	9.8	9.8	100.0
<b>Total</b>	<b>51</b>	<b>100.0</b>	<b>100.0</b>	

**Fig. 1.** Histogram of individual-athletes' self-expression

Secondly, the dominance of individual-athletes' self-control as depicted in their individual lives showed *less moderate*. Completely, it was displayed that elite athletes answered their self-control in the following category: 13 (25.5%) was uninfluenced, 18 (35.3%) was less moderate, 14 (27.5%) was moderate, 5 (9.8%) was consistent, and 1 (2.0%) was very consistent (**Table 2**). Elite athletes' self-control also confirmed the mean was 2.27 and standard deviation was 1.021 ( $M = 2.27$ ;  $SD = 1.021$ ;  $n = 51$ ). This category ranked into the third level regarding individual-athletes' emotion consistency confirming their individual lives (**Fig. 2**).

**Table 2.** Frequencies of individual-athletes' self-control

Likert's Scale	Frequency	Percent	Valid Percent	Cumulative Percent
1.00 ( <i>Uninfluenced</i> )	13	25.5	25.5	25.5
2.00 ( <i>Less moderate</i> )	18	35.3	35.3	60.8
3.00 ( <i>Moderate</i> )	14	27.5	27.5	88.2
4.00 ( <i>Consistent</i> )	5	9.8	9.8	98.0
5.00 ( <i>Very consistent</i> )	1	2.0	2.0	100.0
<b>Total</b>	<b>51</b>	<b>100.0</b>	<b>100.0</b>	

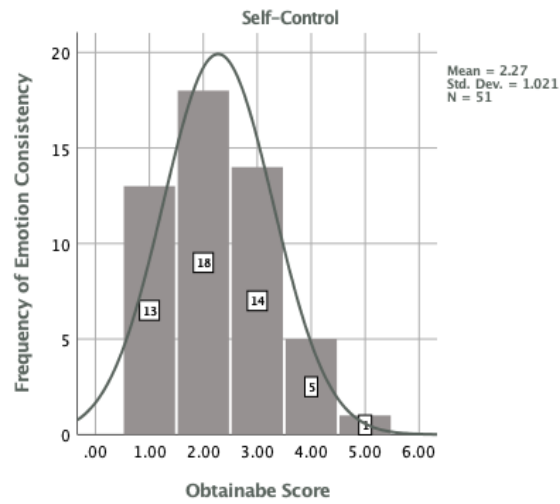


Fig. 2. Histogram of individual-athletes' self-control.

Table 3. Frequencies of individual-athletes' problem-solving.

Likert's Scale	Frequency	Percent	Valid Percent	Cumulative Percent
1.00 ( <i>Uninfluenced</i> )	3	5.9	5.9	5.9
2.00 ( <i>Less moderate</i> )	13	25.5	25.5	31.4
3.00 ( <i>Moderate</i> )	21	41.2	41.2	72.5
4.00 ( <i>Consistent</i> )	9	17.6	17.6	90.2
5.00 ( <i>Very consistent</i> )	5	9.8	9.8	100.0
<b>Total</b>	<b>51</b>	<b>100.0</b>	<b>100.0</b>	

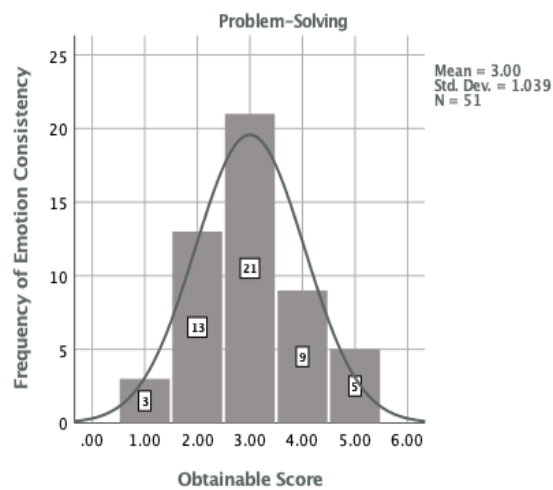


Fig. 3. Histogram of individual-athletes' problem-solving

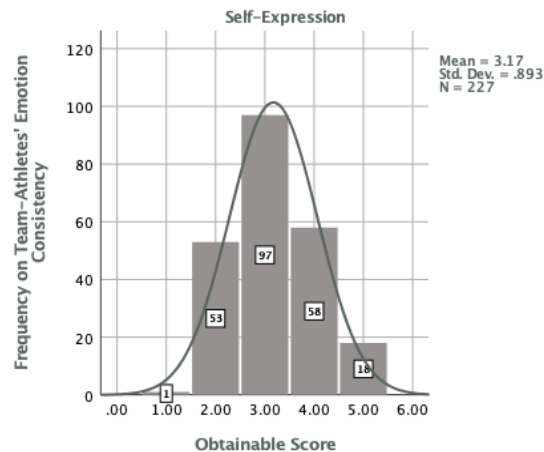


Thirdly, the dominance of individual-athletes' problem-solving as depicted in their individual lives indicated *moderate*. The overall category of elite athletes' problem-solving was accordingly recorded, as follows: 3 (5.9%) was uninfluenced, 13 (25.5%) was less moderate, 21 (41.2%) was moderate, 9 (17.6%) was consistent, and 5 (9.8%) was very consistent (**Table 3**). Elite athletes' problem-solving notably verified the mean was 3.00 and standard deviation was 1.039 ( $M = 3.00$ ;  $SD = 1.039$ ;  $n = 51$ ). This category ranked into the second level considering individual-athletes' emotion consistency among their individual lives (**Fig. 3**).

On the other hand, 227 or 81.7% team-athletes correspondingly conveyed their dominance of team-athletes' emotion consistency determination as depicted in their individual lives with less moderate and moderate category. In this determinant, the categories of elite athletes' self-expression were consequently relied on moderate category with the following results: 1 (.4%) was uninfluenced, 53 (23.3%) was less moderate, 97 (42.7%) was moderate, 58 (25.6%) was consistent, and 18 (7.9%) was very consistent (**Table 4**). Elite athletes' self-expression confidently recorded the mean was 3.17 and standard deviation was .893 ( $M = 3.17$ ;  $SD = .893$ ;  $n = 227$ ). This category ranked into the first level figuring team-athletes' emotion consistency regarding their individual lives (**Fig. 4**).

**Table 4.** Frequencies of team-athletes' self-expression.

Likert's Scale	Frequency	Percent	Valid Percent	Cumulative Percent
1.00 ( <i>Uninfluenced</i> )	1	.4	.4	.4
2.00 ( <i>Less moderate</i> )	53	23.3	23.3	23.8
3.00 ( <i>Moderate</i> )	97	42.7	42.7	65
4.00 ( <i>Consistent</i> )	58	25.6	25.6	92.1
5.00 ( <i>Very Consistent</i> )	18	7.9	7.9	100.0
<b>Total</b>	<b>227</b>	<b>100.0</b>	<b>100.0</b>	

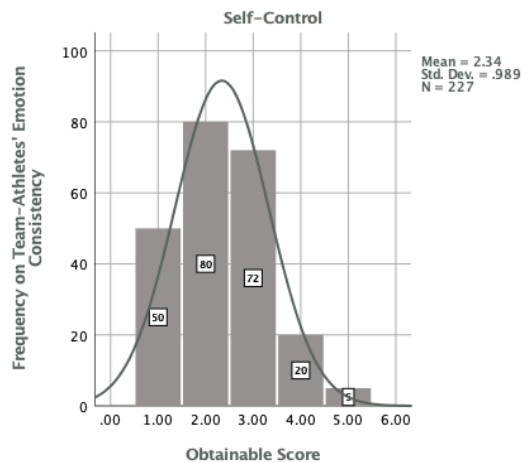


**Fig. 4.** Histogram of team-athletes' self-expression.

Another dominance of team-athletes' emotion consistency complied with elite athletes' self-control who definitely corresponded with the results of *less moderate* category with the descriptions, as follows: 50 (22.0%) was uninfluenced, 80 (35.2%) was less moderate, 72 (31.7%) was moderate, 20 (8.8%) was consistent, and 5 (2.2%) was very consistent (**Table 5**). Elite athletes' self-control empirically reported the mean was 2.34 and standard deviation was .989 ( $M = 2.34$ ;  $SD = .989$ ;  $n = 227$ ). This category ranked into the lowest level among three determinants that figured out team-athletes' emotion consistency in their individual lives (**Fig. 5**).

**Table 5.** Frequencies of team-athletes' self-control.

Likert's Scale	Frequency	Percent	Valid Percent	Cumulative Percent
1.00 ( <i>Uninfluenced</i> )	50	22.0	22.0	22.0
2.00 ( <i>Less moderate</i> )	80	35.2	35.2	57.3
3.00 ( <i>Moderate</i> )	72	31.7	31.7	89.0
4.00 ( <i>consistent</i> )	20	8.8	8.8	97.8
5.00 ( <i>Very consistent</i> )	5	2.2	2.2	100.0
<b>Total</b>	<b>227</b>	<b>100.0</b>	<b>100.0</b>	

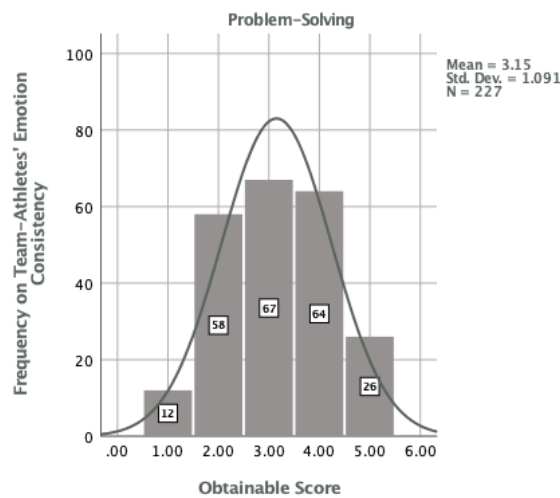


**Fig. 5.** Histogram of team-athletes' self-control

Lastly, the dominance of team-athletes' emotion consistency established elite athletes' problem-solving who variably confirmed with the results of *moderate* category and described with the following results: 12 (5.3%) was uninfluenced, 58 (25.6%) was less moderate, 67 (29.5%) was moderate, 64 (28.2%) was consistent, and 26 (11.5%) was very consistent (**Table 6**). Elite athletes' problem-solving evidently recorded the mean was 3.15 and standard deviation was 1.091 ( $M = 3.15$ ;  $SD = 1.091$ ;  $n = 227$ ). This category placed the second category among other two determinants that determined team-athletes' emotion consistency in their individual lives (**Fig. 6**).

**Table 6.** Frequencies of team-athletes' problem-solving.

Likert's Scale	Frequency	Percent	Valid Percent	Cumulative Percent
1.00 ( <i>Uninfluenced</i> )	12	5.3	5.3	5.3
2.00 ( <i>Less moderate</i> )	58	25.6	25.6	30.8
3.00 ( <i>Moderate</i> )	67	29.5	29.5	60.4
4.00 ( <i>consistent</i> )	64	28.2	28.2	88.5
5.00 ( <i>Very consistent</i> )	26	11.5	11.5	100.0
<b>Total</b>	<b>227</b>	<b>100.0</b>	<b>100.0</b>	

**Fig. 6.** Histogram of team-athletes' problem-solving.

The descriptive statistics of both individual- and team-athletes' emotion consistency established the depicted determinants of athletes' individual lives, such as self-expression, self-control, and problem-solving. In this respect, two hundred seventy-eight ( $n = 278$ ) elite athletes from the sports category engaged in the questionnaire-based research. This descriptive analysis was set forth in a 5-point-Likert scale to measure elite athletes' emotion consistency which depicted their individual lives. The results of elite athletes' descriptive statistics were shown in Table 7 determining individual-athletes' self-expression ( $M = 3.29$ ;  $SD = .878$ ), self-control ( $M = 2.27$ ;  $SD = 1.021$ ), and problem-solving ( $M = 3.00$ ;  $SD = 1.039$ ), whilst team-athletes' self-expression ( $M = 3.17$ ;  $SD = .893$ ), self-control ( $M = 2.33$ ;  $SD = .988$ ), and problem-solving ( $M = 3.14$ ;  $SD = 1.090$ ). The statistics for the individual-athletes on self-expression' skewness was .289; kurtosis was -.492, self-control's skewness was .469; kurtosis was -.492, and problem-solving's skewness was .223; kurtosis was -.492, whereas the individual-athletes on self-expression' skewness was .294; kurtosis was -.537, self-control's skewness was .385; kurtosis was -.289, and problem-solving's skewness was -.012; kurtosis was -.807. Both individual- and team-athletes' determinants of elite athletes' emotion consistency were inconsiderable for 278 elite athletes' individual lives. Of the skewness and

kurtosis shown in the determinants of elite athletes' emotion consistency, the data were normally distributed. However, either individual-athletes ( $M = 2.27$ ) or team-athletes' ( $M = 2.33$ ) emotion consistency gained the lowest mean in self-control.

**Table 7.** Descriptive statistics of individual- and team-athletes' emotional determinants.

Category of Individual- and Team-Athletes	
<b>Individual-Athletes = 18.3% (n = 51)</b>	
	Self-Expression ( $M = 3.29$ ; $SD = .878$ ; Skewness = .289; Kurtosis = -.492)
	Self-Control ( $M = 2.27$ ; $SD = 1.021$ ; Skewness = .469; Kurtosis = -.492)
	Problem-Solving ( $M = 3.00$ ; $SD = 1.039$ ; Skewness = .223; Kurtosis = -.492)
<b>Team-Athletes = 81.7% (n = 227%)</b>	
	Self-Expression ( $M = 3.17$ ; $SD = .893$ ; Skewness = .294; Kurtosis = -.537)
	Self-Control ( $M = 2.33$ ; $SD = .988$ ; Skewness = .385 Kurtosis = -.289)
	Problem-Solving ( $M = 3.14$ ; $SD = 1.090$ ; Skewness = -.012; Kurtosis = -.807)

Additionally, the analysis constituted with three determinants dominating elite athletes' emotion consistency. The significant correlations were  $r = 1.000$ ,  $n = 278$ ,  $p < 0.01$ . The highest value of domination of elite athletes' emotion consistency on self-expression dealt with the lowest value of self-control. Notwithstanding, the domination of these three determinants was consequently partial positive and negative significance with  $p < 0.01$  level for 2-tailed prediction. Table 8 showed the Spearman's Rho coefficients in the following ranks: 1.000, .191\*\*, -.203\*\*, and -.239\*\*.

**Table 8.** Spearman's Rho correlations of both individual- and team-athletes' emotional determinants.

		Self-Expression	Self-Control	Problem-Solving	
Spearman's Rho	Self-Expression	Correlation Coefficient	1.000	-.203**	.191**
		Sig. (2-tailed)	-	.001	.001
		N	278	278	278
	Self-Control	Correlation Coefficient	-.203**	1.000	-.239**
		Sig. (2-tailed)	.001	-	.000
		N	278	278	278
	Problem-Solving	Correlation Coefficient	.191	-.239**	1.000
		Sig. (2-tailed)	.001	.000	-
		N	278	278	278

\*\*Correlation is significant at the 0.01 level (2-tailed)

This research performed with the sample of 278 elite athletes, regarding the emotion consistency in athletes' daily lives involving their self-expression, self-control, and problem-solving. These determinants were equivalent with those highlighted by [10] and [11] that being uncontrollable emotion utilization to be the lowest rated matter that influenced elite athletes' individual lives daily. Conversely, [12] pointed out that higher values of emotion perception in team-athletes corresponded with the lower figures to athlete's self-emotional management. However, when connected to the emotion consistency, elite athletes' ego-oriented climate and its categories were verifiable, relating to a significant orientation towards these determinants. The influential matters addressed elite athletes' sports category as their professional background and individual lives that corresponded with their different social variables [13]. As regards relationships between elite athletes' emotion consistency and their individual lives of both individual- and team-athletes, the descriptive statistics results had found the significant contribution, although there is a tendency towards slightly lower mean elite athletes' self-control. In this regard diverse exploration concentrates with opposing outcomes are discovered, corresponding information acquired with those found in examination by [14]. Notwithstanding, they differed from the data found by [15], [16], and [17], in which the higher levels of emotional consistency might influence and implicate athletes' feelings in their individual lives, in terms of the designated determinants effectively.

On the other hand, sport psychology had evolved and advanced to the point where its application had become a key component in the peak performance of elite athletes in many fields and at many levels of competitive activity [5]. Hence, three kind of determinants used to assess elite athletes' emotion consistency in this research influenced the data, since both the individual-athletes and team-athletes enabled them to prove and maintain their emotions in the daily lives effectively. Results could explain the empirical situation where three determinants, namely: self-expression, self-control, and problem-solving might closely support to elite athletes' emotion consistency engagement. Firstly, this discussion addressed elite athletes' self-talk that was motivationally used to improve attention and assuredness, and reduce anxiety among elite athletes. As part of self-expression, self-talk relied on the positive things that were immediately followed by the negative things which could enroll a substantial matter in assisting elite athlete to stay focused on current situation and strategies, as well as to avoid the bewilderment that hampered achievements [18]. Self-expression skills was a central to the recovery process, specially regarding to the process of identifying elite athletes' current emotions when undertaking actions. Ultimately, managing self-expression skills benefited elite athletes' physical and mental recovery and held positive effects on long-term health, well-being, and performance [19].

Secondly, individual-athletes required a high level of performance that would be more effective than team-athletes to perform elite athletes' self-control and needed to convey sufficient support and feedback to obtain the better benefits [20]. Self-control characterized chronic adaptation to positive social interaction with the others. In such important and relational contexts, the affective trust strengthened the effect of appreciation on elite athletes' self-esteem over the time to discover new boundary conditions [21]. Self-control was frequently confirmed to create applicable, effortful recovery activities. That was, elite athletes might hold to wield their self-control to handle activities, especially when they were exhausted, stressed, or in negative moods [19]. The self-control assumed that all actions, such as emotion regulation, and persistence were empowered by the global metaphorical strengths that had small capacity. This became temporarily decreased soon after a major self-control acts, which alternatively could impair elite athletes' performance. Currently, the assumptions of self-control also had been reflected and examined by the field of sports and exercise

psychology [22]. In addition, self-control was associated with time spent on several daily activities. Self-control helped elite athletes stand for the tracks. It might also increase elite athletes' perceivable performance by assisting them overcome barriers, which made them more comfortable [23].

Thirdly, problem solving in both individual- and team-athletes required problem identification, intervention, and sustainable assessments. Highlighting the sequence of complex cognitive processes involved critical thinking and reasoning that influenced appropriate responses and execution within a practice domain. Critical thinking behavior in individual- and team-athletes had been established as the process of skillful matter of knowledge and experience in making discriminating judgments and evaluations [24]. Effective problem-solving process was realized in five steps, namely: believing in solving and adapting to problem, defining the problem approximately and deciding achievable targets, forming different alternatives to clear the block, predicting how positive and negative results of alternatives and how maximum efficiency was obtained with the lowest cost, and creating a plan and trying it elite athletes' real lives. It was expected that perception, comprehension, and decision making were obtainable towards the regular exercise and participation that will positively contribute to the problem-solving strategies [25].

Regarding elite athletes' supports, self-awareness firstly became the ability of understanding elite athletes' strengths and weaknesses as well as recognize their emotion consistency. In sports, self-awareness was essential for success. By recognizing and accepting their role, an elite athlete performed better in both individual- and team-athletes category. Perceiving elite athletes' emotion consistency in the midst of their day-to-day individual lives and professional competitions would be the hardest thing. Losing control of emotion could affect individual and team performance, as well as team morale and their individual lives. Emotion could be a positive trigger in elite athletes' endeavors, whilst negative emotion could be extremely hurtful to elite athletes' morale. By recognizing elite athletes' emotion consistency, they began to take decisions appropriately. Secondly, elite athletes' support relied on its empathy. In this respect, an elite athlete was not always at the top performance. It was important to understand that this would be better to show empathy to the individual- and team-athletes when they met problems and things that should be fixed. Thirdly, elite athletes complied with the social skills. Acknowledging social skills was one of the most important traits. To gain effective social skills, an elite athlete should be aware of their emotions and be able to regulate those emotions. Social skills were also important to have when elite athletes attempted to convey an idea or persuade the others. Both situations involve strong interpersonal skills and also a complete understanding of elite athletes' daily lives [4], by adhering and observing their mental rehearsal continuity as well that increased the physical performance [26].

Indeed, the results found in this research support elite athletes' determinants to convey good robustness and capacity for generalization, and, to some extent, the results also help to better understand the role of either individual- and team-athletes category towards their self-confidence, motivation, concentration, and anxiety [27]. Notwithstanding, as to the current discoveries utilizing this model, it was important to repeat that this approach was a correlational research, which meant it did not permit cause-impact connections to be extrapolated, and the results acquired could be deciphered in various manners relying upon the viewpoint of the elite athletes. So, as to be able to explain the existing relationships among the determinants. Future research was recommended to analyze in-depth-results through the longitudinal research which could identify the relationships between individual- and team-athletes more significantly. Furthermore, the influence of self-expression, self-control, and

problem-solving would be meaningful, based on the fact that the way elite athletes perceived regarding their individual lives in order to take appropriate decisions.

## 4 Conclusion

This research may be of interest to elite athletes since they are suggested to have supports for their own autonomy positively in managing the emotion consistency that involves three determinants of self-expression, self-control, and problem-solving. As for self-expression, self-control, and problem-solving may positively predict autonomous motivation and self-esteem, although self-control shows the lowest result in both individual- and team-elite athletes' emotion consistency when this determinant influence in elite athletes' individual lives. Herein, elite athletes' autonomous motivation and self-esteem accordingly encourage resilience and psychology condition. This research confirmably shows the importance of elite athletes being attentive to the emotions of various situations as they portray an appropriate emotion models in their individual lives, although among these determinants do not specifically show close correlations.

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# Effect Short-term Aquarobics Exercise on Cholesterol Levels

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**Abstract.** The purpose of this study was to determine the effect of the duration of aquarobics exercise on blood lipid profiles in 30 male students of the Sport Science (Sports, Health) Study Program, FIK UNNES, aged 21-22 years. The experimental laboratory research design using the design of The Randomized Pretest-Posttest Control Group Design, measurement of the blood lipid profile which includes of TC, TG, HDL and LDL blood levels. Measuring cholesterol levels is carried out using the automatic analyzer method (electronic resistance / impedance & volumetric metering), at the Prodia Semarang Laboratory. After pre-test the sample was divided into 3 groups where each group consisted of 10 students, group 1 (n=10) aquarobics training intensity 70-85% HRmax for 8 weeks, group 2 (n=10) resistance training with 75 % RPM for 8 weeks and control group 3 (n=10). The result showed that the Aquarobics training has better effect in HDL and Triglyceride levels.

**Keywords:** intensity, aquarobics, cholesterol

## 1 Introduction

Basic methods and techniques in the study of sports science play an important role in efforts to establish and improve individual health status. Physical conditioning exercises that are carried out regularly with the right dose can benefit health, fitness, performance and management programs for functions in the body. Aerobic exercise, including aquarobics, can be an option and it is also a modulator in the non-pharmacological management of the cardiovascular system. The negative impact caused by changes in life patterns that are all practically and instantaneous, especially in big cities is an increase in the prevalence rate of Atherosclerotic Cardiovascular Disease (PKVAS) which is caused by physiological changes in the body, especially the composition of blood and life at its level, as a cause of death in Indonesia.[1] Previous studies show a strong correlation between blood cholesterol levels and PKVAS morbidity, as well as between LDL cholesterol levels in the blood and arteriosclerosis, while on the other hand there is a significant negative correlation between HDL cholesterol and Coronary Heart Disease.[2] Previous studies have found that high levels of LDL cholesterol in the blood can be used as a predictor of the risk of developing PKVAS, while HDL cholesterol is a protective element against the risk of PKVAS. Physical exercise or regular exercise with the right dose is one of the efforts to prevent PKVAS, this is supported by research results which show that physical exercise can actually improve dyslipidemia which is the cause of PKVAS.[3,4] Several scientific and physical exercise programs for

blood cholesterol management have yielded mixed outcomes. According to certain researchers, physical exercise programs have not entirely helped in the management of dyslipidemia since certain high doses of physical activity can diminish blood vessel quality.[5,6]

There two types of exercises used in this study, namely weight training performed on land and aquarobics training performed on water. Both types of training have advantages and disadvantages, the advantage of weight training is the best training to increase muscle mass and muscle strength. Previous studies have reported that regular weight training for 8 weeks with a duration of 60 minutes, a frequency of 3-4 days can increase muscle approximately 1.4 kg. Another study using Brisk walking 60 minutes/day, intensity moderate exercise for 8 weeks can improve immunity. Weight training provided includes flexibility training, isometric strengthening exercises, isokinetic and isotonic.[7] The disadvantage of weight training is that it can cause the risk of injury, while the excess of aquarobics training is sports training that has a minimal risk of injury. [8]Aquarobics exercises have a lower risk impact on the limbs, joints and muscles due to the nature of water. Water resistance provides the advantage that it is very good for training muscles, because of this obstacle the movement becomes lighter. This resistance serves as a load to train all parts of the body's muscles. [9,10] Previous studies have reported that exercise in waist-deep water can reduce stress on the joints by 50% and chest level reduce stress on the joints by as much as 75%.[11]

Physical activity is the only side effect of dose-response exercise (Exercise intensity, frequency, and duration), so far, research protocols relating to exercise methods have been carried out utilizing dosage exercise, which necessitates a significant amount of effort from the individual who want to participate, which can be a barrier for some people. As a result, it is critical to establish a workout approach and approach that is inexpensive, safe, and enjoyable, requires little attention, effort, or time, and is successful in improving blood lipid profiles.

## 2 Methods

Thirty male Sport Science students, ages 19 to 22, who had not participated in gymnastics for at least three months before to the study. The participants were split into three groups at random: (1) aquarobics exercise, (2) weight training (n = 10) and (2) resistance training week for 8 weeks (n = 10) and the control group (n = 10). Weight training with a 75 percent RM (maximum reps) intensity, 12 repetitions (3 sets), and a frequency of every 2 days was used in this study, as was aerobic training with an intensity of 75-85 percent HRmax (maximum heart rate), a frequency of every 2 days, and a duration of 60 minutes. The 2-day frequency was chosen based on ACSM's suggestion that a decent fitness activity should be done once every two days since muscle mass will return to baseline after 2x24 hours.

### 2.1 Research procedures

Participants were told about all procedures before receiving therapy, which were approved by the Commission of Research Ethics Dr Kariadi Hospital, Diponegoro University, Semarang (No.498/EC/FK/RSDK/2019). At the morning pre-test, respondents received their informed consent and underwent a preliminary examination. Using weight scales and a Body

Scan Analyzer, eligible individuals' height and weight were measured in order to calculate their body mass index (BMI) (Inbody 230 Body Fatt Monitor).

## **2.2 Exercise training protocol**

Resistance training (n=10), aquarobics (n=10), and control groups (n=10) were assigned to participants at random. All subjects' anthropometric measurements were checked (Pre-test and post test). HDL and Triglyceride serum were obtained immediately before and after the exercise. Warm-up and cool-down time for each group is 10-15 minutes, with a weight-training regimen for the upper and lower body. All of the subjects followed the schedule to the letter, with a minimum of 95% attendance at the training sessions. The participants were not experienced with aquarobics workouts at the time, and a heart rate monitor was used every 5 minutes during moderate intensity exercise (75-85 percent HRmax): Warm-up for 15 minutes, aerobic dancing and stretching for 20 minutes, aquajogging, aquarun, and aquagames for 20 minutes, and cool-down for 15 minutes (cool down).

## **2.3 Pre-test and post-test**

Three groups were given a pre-test before the start of the meeting exercises. Body mass index, total cholesterol, triglyceride, LDL, and HDL values were all measured prior to the test. Measurements made with an enzymatic colorimetric spectrophotometer using the direct approach. After 8 weeks of treatment, a post-test exercise was performed.

## **2.4 Statistical analysis**

The data is presented in a nominal and ordinal frequency distribution, with data intervals and ratios presented by mean and standard deviation in graphs and tables. Hypothesis testing was carried out by testing the normality of the data with the Shapiro-Wilk test and the test of homogeneity with homogeneity of variance Levene statistics against data. Normal distribution of data ( $p > 0.05$ ) and variants of homogeneous data analyzed by parametric one-way ANOVA followed by Tukey HSD post hoc test (honestly significant difference). Data that was not normally distributed ( $p < 0.05$ ) or had non-homogeneous variance was analyzed using non-parametric analysis using the Kruskal-Wallis test and was followed by the Mann-Whitney difference test. All statistical analyses were performed using SPSS-PC for Windows (version 20.0, SPSS Inc., Chicago, IL, USA).

## **3 Result and Discussion**

The data that was successfully summarized through the research data collection procedure consisted of data on age, weight, height which had the same relative value (homogeneous) for each sample. Total cholesterol, triglycerides, LDL cholesterol, and HDL cholesterol levels are all blood lipid variables. Table 1 provides a general overview of the subject's characteristics.

**Table 1.** Comparison of characteristics subject

Variable	Aquarobic mean $\pm$ SD	Resistance training mean $\pm$ SD	Control group mean $\pm$ SD	p
Age (years)	21.74 $\pm$ 1.30	21.49 $\pm$ 1.41	21.79 $\pm$ 1.35	0.225
Intake energy (kcal)	3125 $\pm$ 165.81	3157 $\pm$ 119.97	3134 $\pm$ 136.11	0.112
Intake protein (g)	54.78 $\pm$ 1.67	58.49 $\pm$ 1.67	55.38 $\pm$ 1.78	0.608
Intake fat (g)	73.93 $\pm$ 3.12	69.87 $\pm$ 3.83	65.66 $\pm$ 3.34	0.265
Height (m)	1.75 + 0.05	1.72 + 0.04	1.72 + 0.04	0.151
Weight (kg)	73.66 $\pm$ 5.54	75.41 $\pm$ 3.11	73.41 $\pm$ 6.61	0.539
Body fat pre (%BF)	35.82 $\pm$ 1.00	36.64 $\pm$ 1.58	37.48 $\pm$ 1.05	0.074
Body fat post (%BF)	31.44 $\pm$ 1.26	32.61 $\pm$ 1.11	35.03 $\pm$ 1.16	0.000*
BMI (kg/m) pre	30.32 $\pm$ 0.97	30.73 $\pm$ 1.13	30.84 $\pm$ 1.30	0.195
BMI (kg/m) post	29.24 $\pm$ 1.18	31.70 $\pm$ 0.92	30.66 $\pm$ 1.69	0.000*

Information: data are expressed as mean and SD, significant difference between groups (p<0.05)

The average age of the study subjects, height, and weight before and after treatment were not statistically significant in any of the groups, but the percentage of body fat and BMI after treatment in the treatment group were significantly different (p0.05) from the control group. We used a 24-hour food recall to measure food intake in this investigation, based on the results of the Nutris computation. In this study, where food intake was measured using a 24-hour meal recall, the level of calorie, protein, and fat consumption in each group was not substantially different (p = 0.112; p = 0.608; p = 0), according to the results of the Nutrisoft software calculations.

These findings demonstrate that food intake throughout treatment was the same in all groups, indicating that food intake had no bearing on the study's findings. After the Shapiro-Wilk test revealed that the distribution of BMI data before and after in the treatment and control groups had p>0.05, one-way anova parametric analysis was performed, and the difference test was performed using the Tukey HSD parametric test. The data distribution is not normal, so the data analysis used was the Kruskal-Wallis non-parametric test, followed by the Mann Whitney test. The BMI delta test has a p0.05 in the Shapiro-Wilk test, the data distribution is not normal, so the data analysis used was the Kruskal-Wallis non-parametric test, followed by the Mann Whitney test. When compared to the control group, BMI changes considerably in the aquarobics and weight training groups (p0.05).

**Table 2.** Comparison pre and post intervention

Variable	Aquarobic mean $\pm$ SD	Resistance training mean $\pm$ SD	Control group mean $\pm$ SD	p
Total Cholesterol (mg/dl) pre	216.33 $\pm$ 40.95	238.33 $\pm$ 49.86	192.25 $\pm$ 37.42	0.144
Total Cholesterol (mg/dl) post	190.75 $\pm$ 35.43	199.83 $\pm$ 25.63	164.00 $\pm$ 17.80	0.003*
LDL-C (mg/dl) pre	137.75 $\pm$ 17.82	158.58 $\pm$ 25.90	134.00 $\pm$ 6.12	0.124
LDL-C (mg/dl) post	123.92 $\pm$ 14.38	144.92 $\pm$ 19.16	128.58 $\pm$ 5.76	0.002*
HDL-C (mg/dl) pre	57.17 $\pm$ 5.50	54.33 $\pm$ 5.29	50.50 $\pm$ 4.75	0.079
HDL-C (mg/dl) post	61.83 $\pm$ 4.85	64.17 $\pm$ 5.06	57.00 $\pm$ 4.55	0.003*
Triglyceride (mg/dl) pre	119.17 $\pm$ 35.14	131.50 $\pm$ 37.01	112.75 $\pm$ 9.42	0.160
Triglyceride (mg/dl) post	99.33 $\pm$ 29.95	105.25 $\pm$ 23.87	73.92 $\pm$ 10.11	0.004*

Information: Significant difference between groups (p0.05) is presented as mean and SD.

Total cholesterol (TC) and LDL cholesterol (LDL-C) levels were not statistically significant before and after treatment in all groups, but HDL cholesterol (HDL-C) and triglycerides (TG) levels after treatment were significantly different ( $P < 0.05$ ) in the treatment group compared to the control group. Aquarobics exercises given by heating for 5-10 minutes followed by the fundamental exercise of measuring the pulse submaximal 75-85% HRmax is 200 minus age who are training per minute, training is given 45-60 minutes and then terminated by cooling for 5-10 minute. Aquarobics exercise provided more than 30 minutes to reach the breakdown of fat, the energy generated from the metabolism of fats doubled compared to the energy produced by carbohydrates. Aquarobics exercise uses fat as fuel, especially if the load is light to moderate. If done regularly and continuously not only all physical fitness increased but bad blood lipid levels (LDL cholesterol, total cholesterol, triglycerides) decreased, whereas levels of good fats (HDL cholesterol) will increase. [12]

Decreased levels of triglycerides in this study occurred due to several factors, including, increased exercise activity, increase cardiac work done as a result of weight training and an increase in lipolysis process in energy expenditure during exercise. Triglycerides have a variety of functions in the human body is one of them as a source of energy that has a role similar to the carbohydrates. Another function is no less important than triglycerides for the human body is as an energy reserve that can be used when the body needs energy right away.[13] Excess fatty foods consumed will be stored as body fat, stored in fat tissue, called adipocytes, while the shape of the body is adipose fat tissue. Cell body releases triglycerides and fatty acids, and sent through the bloodstream to the cells that need energy.[14]

A decrease in plasma triglycerides can be triggered by acute exercise in the short term, a previous study found a decrease in plasma triglycerides occurs between 12-18 hours after exercise and last 2-3 days. The decrease in triglycerides is caused by a decrease in the concentration of triglycerides in the form of VLDL which they need as energy during exercise. Exercise maintain a long-term reduction in plasma triglycerides in sedentary, exercise should be done regularly at least every third day in order to stay awake triglyceride levels. The increase in HDL blood levels caused by aquarobics training is attributed to an increase in LPL activity, which leads to an increase in triglyceride-rich lipoprotein catabolism, speeding up the removal of surface components from HDL lipoproteins.[15]

Increased HDL levels due to aerobic exercise because fat is used as an energy source, resulting in lower triglyceride and VLDL levels, which finally led to higher HDL levels. [16] Several suggestions on the mechanism of increased HDL levels as a result of physical activity have been reported in other studies: 1) Physical activity raises the level of the enzyme LPL in muscle tissue. 2) Physical exercise can reduce Hepatic Triglyceride-Hydrolase enzyme activity in the liver and block HDL catabolism, resulting in enhanced VLDL catabolism and higher HDL levels in plasma. [17] The dose response exercise reveals that an activity volume with a calorie burn of 1200 - 2200 kcal/week is an effective workout that increased of HDL-C (2-8 mmol/L) levels.[18,19]

Based on the findings of determining the minimum duration aquarobics exercise management of blood cholesterol levels of Total Cholesterol (TC), triglycerides (TG), LDL cholesterol (LDL-C), and HDL cholesterol (HDL-C), it can be concluded that aquarobics exercise at an intensity of 75-85 percent HRmax has an effect on decreasing triglyceride levels and increasing blood HDL levels in male students.

### 3 Conclusion

Increased adiponectin and appearance characterized by lower triglyceride (TG), increased HDL Cholesterol (HDL-C, aquarobics exercise can be utilized as an effective non-pharmacological treatment.

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# Facilities Management of Samapta Sports Center in Magelang City

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**Abstract.** This research aimed to know the management and utilization of Samapta Sports Center in Magelang city. This research is qualitative. The results of this research showed that the management of the facility in Samapta Sports Center was divided into planning, organizing, actuating, and controlling. Based on the research could conclude that facility management of Samapta Sports Center that was done by the Department of Youth Sport and Tourism (Disporapar) of Magelang city was good. The organizing used the indicator of planning, organizing, actuating, and controlling. The utilization of the facility of Samapta Sports Center by the society was good. The citizen is aware of how important doing sport was. However, the application of it still low. The utilization that was done including the indicator of educational sports, recreational sports, and achievement sports.

**Keywords:** Management, sports facilities, Magelang.

## 1 Introduction

The law that was arranged about national sports system Chapter 1 Section 1 Number of 4 explained that sport is the systematic activities that motivate, build and improve body potential, spiritual and social (Law of Number of Year 2005). The goal of national sport in Law Number of 3 Year 2005 Section 4 stated that national sport has purpose to protect and increase healthy and vitality, achievements, human quality, build moral value, sportsmanship, discipline and tight the unity of the nation, support the national endurance and lift up the level, grade and the respectability of the nation [1]. Sport is physically activity that is done to get health and strong body. Sport is a physically activity that it is positive thing and can make the body and spiritual healthy and also motivate, build and increase the potential of physics. Sport cannot be separated from the tools as the facility provider to do sports. Moreover, it is needed a good management of sport facility.

The sport management facility is a process including planning, administrating, coordinating, and assessment of daily implementation from sport facility [2]. Sport facility needs expensive cost, is it outdoors or is it indoors. The construction needs much costs and also the treatment [3]. Sport facility is all about thing that is used for support the activities that cannot be brought everywhere, it is permanent for example hall, swimming pool, field: grass/synthetic football, hard: tennis, badminton, gravel: softball, volley, track and field jogging track, sand: beach volley. Sport facility has several types such as 1) single facility, it is a facility that is general used for one branch of sport, 2) multi use facility, it is a facility categorized indoors or outdoors, 3) facility in club house, it is a facility that completed by



outdoors or indoors facility that is completed by items storage box, toilet, shower restaurant, and sport store, 4) facility of big sport, it is a facility that not only provides rooms for practice sport but also for the spectator [4].

Sport facilitate is a source of sport including physical facilitate and non-physical facilitate. Physical facilitate include the facilitation and physical facilitation such as stadium, arena and field. Furthermore, nonphysical sport such as target / association of sport, coach and teacher of sport. The available of that kind of facility of sports in enough number will increase the participation of society to do the sports. Besides, in the right time will change the mind of society about sport that it is not only for recreation, keep the body health but also to reach the achievements [5][6][7].

One of facility that belongs to the government in sport aspect is arena of sport. Arena sport is a building that is used for sport activities in close room or indoors. Arena sport as the facility of sport should have good tools and infrastructure. Tools is one of the important elements that should be completed in sport. It is state that tools are all of things that is used for reach the goals. However, the infrastructure is all the things that is the main support for the process of effort, project building and many others. Tools and infrastructures are all the equipment that can support sport activity such as field sport building with the equipment that including base principal of infrastructure in, completeness of infrastructure, the quality and quantity of tools and infrastructures.

Samapta Sport Center is one of government's sport facility that is located in Magelang city. This sport center is built to reach the goal of Magelang city to make Magelang city as an epicentrum of service that is supported by good quality human source and good facility with Magelang city's region regulation Number 4 Year 2009 about planning in long of period time. Magelang city's region Year 2005-2025. Appropriate with letter of judgment of Mayor of Magelang Number 020/96/112 Year 2018 about the decision of the employing status of Samapta Sport Center in Department of Youth Sport and Tourism (Disporapar) year 2018, the management organization of Samapta Sport Center is legitimate belongs to Department of Youth Sport and Tourism (Disporapar) Magelang city.

Samapta sport center is located in Sanden, South Kramat sport center, North Magelang, Magelang city. Samapta Sport Center was renovated several times, the last renovation was finished in December 2017. Samapta Sport Center is designed with warped roof, field indoor with cement floor, full of color seat for the spectator, front fence and security post. Based on the research that has title "Sports Coaching Achievements in Magelang City" related to the sport regulation still can find several problems such as the ineffectiveness of regulation region Number 4 Year 2015 about the implementation of sport central java province in facilitate the regulation of reconstruction of achievement sport, the low of awareness about future athletes and others [8].

The awareness about how important doing sport increases. Sport is important for body since doing sport make the body keep health and avoid to disease, sport is expected to be medicine [9][10][11][12]. The scope of sport such as 1) educational sport, 2) recreational sport, 3) achievement sport [13][14][15]. The purpose of person doing sport such as sport for education, sport for recreation and sport for achievement. However, nowadays society implement about the purpose of doing sport in Samapta Sport center.

Based on the researcher's research, the researcher found that renovation gives new face to Samapta Sport Center. In interview with Ali Mahrus Alkafi, a head of empowerment and development achievement sport in Department of Youth Sport and Tourism (Disporapar), Magelang city that also as the organizer Samapta Sport Center stated that facility in Samapta Spot Center is satisfy enough and the visitor is busy enough. However, he found the lack of it

such as the seat of spectator is not high yet, damage roof, the organize of water, the limited facilitation for pray and there is no canteen there. The sanitation is not well organized yet such as glossy floor, too many dusts it because there is only little office boy.

Samapta Sport Center provides place and facility for many branches sport such as volley ball. Basketball, badminton and self-protect sport. For indoors football (futsal) sport, Samapta Sport Center not provides the tools and infrastructure/ it because the goal of Department of Youth Sport and Tourism (Disporapar) of Magelang city wants to make private indoors football (futsal) in Magelang city busy.

Many communities use Samapta Sport Center, with facilities that were provided by Samapta Sport Center support all sorts of sports that were done by society of Magelang. Besides for society's activities, Samapta Sport Center is also for event place the government or private. It could be seen from many of utilizing Samapta Sport Center's facility, the researcher was interested to do research and takes undergraduate thesis about "The Facility Management of Samapta Sport Center in Magelang City"

## 2 Method

The method that was used in this research was descriptive qualitative method. Qualitative method in a research means to understand the phenomenon about what the subject concerned such as behavior, perception, motivation, holistic action by descriptive in words and language in natural context by using natural method [16]. Qualitative method is a method research that can express the truth based on the results from the collecting data in factual manner that is done by the researcher. Qualitative method is an assessment procedure that has result a descriptive data from written source or expressing and behavior [17]. Descriptive method is a method to do research for a group of humans, object, condition, thinking system or nowadays phenomenon.

The collecting data technique using several techniques such as observation, questionnaire, interview and documentation. the subject of this research was the organizer of facility the head section for sports empowerment and development of the city of Magelang's Department of Youth Sport and Tourism (Disporapar), The head of unit executor technique of Samapta Sport Center and the society of Magelang that uses Samapta Sport Center's facility.

**Table 1.** Questionnaire grid (questionnaire)

Number	Target	Indicator	Sub indicators	Number	Amount
1.	People using Sports Center	General	a. Sports goals	1,2	2
			b. History of sports facilities	3,4	2
			c. Complete sports facilities	5,6	2
			d. Opinions regarding sports facilities	7,8	2
		Utilization for Education	a. Benefits of sports facilities	1,2	2
			b. Opinions regarding sports facilities	3	1
		Utilization for Recreation	a. Benefits of sports facilities	1,2	2
			b. Opinions regarding sports facilities	3	1
		Utilization for Achievements	a. Benefits of sports facilities	1,2	2
			b. Opinions regarding sports facilities	3	1

**Table 2.** Interview grid

Number	Target	Indicator	Sub indicators	Number	Amount
1.	DISPORAP AR	Planning	a. History of sports facilities	1,2	2
			b. Facility planning	3,4	2
			c. Constraints in management	5,6	2
			d. Source of funds	7,8	2
			e. Completeness of facilities and infrastructure	9,10	2
		Organizing	a. State of facilities and infrastructure	11,12	2
			b. Organizer tasks	13,14	2
			c. Procedure for use of facilities	15,16	2
			d. Maintenance procedures for facilities and Infrastructure	17,18	2
			e. Fund management system	19,20	2
		Controlling	a. Expenditure of funds	21,22	2
			b. Checking facilities and infrastructure	22,23	2
			c. Visitor interest	25,26	2

		Actuating	a. Visitor feedback	27	1
			b. Promotion of sports facilities	28,29 30	2 1
			c. State of sports facilities	31	1
			d. Completeness of facilities		
2.	Utilization of Samapta Sports Center facilities by the people of Magelang City	Utilization for Education	a. Purpose of exercise	1	1
			b. Reasons to exercise	2,3,4	3
			c. The importance of exercising	5 6	1 1
			d. Fascination with sports facilities	7 8	1 1
			e. Sports facilities used	9,10	2
			f. Facility conditions	11	1
			g. Reasons to use the facility	12,13 14	2 1
			h. Exercise done	15,16	1
			i. Other facilities used	17,18	2
			j. Benefits of exercise	19	1
			k. Fitness condition		
			l. Benefits of sports facilities		
		Utilization for Recreation	m. Satisfaction level		
			a. Purpose of exercise	20	1
			b. Reasons to exercise	21,22,23	3
			c. The importance of exercising	24 25	1 1
			d. Fascination with sports facilities	26 27	1 1
			e. Sports facilities used	28,29 30	2 1
			f. Facility conditions	31,32 33	2 1
			g. Reasons to use the facility	34 35,36,37	1 3
			h. Exercise done	38	1
			i. Other facilities used		
			j. Benefits of exercise		
			k. Fitness condition		
			l. Benefits of sports facilities		
			m. Satisfaction level		

Utilization for Achievements	a. Purpose of exercise	39	1
	b. Reasons to exercise	40,41,42	3
	c. The importance of exercising	43	1
	d. Fascination with sports facilities	44	1
	e. Sports facilities used	45,46	2
	f. Facility conditions	47	1
	g. Reasons to use the facility	48,49	2
	h. Exercise done	50	1
	i. Other facilities used	51,52	2
	j. Benefits of exercise	53	1
	k. Fitness condition	54	1
	l. Benefits of sports facilities	55,56	2
	m. Achievements earned	57	1
	n. Satisfaction level	58	1

A source or informant is the one who provides information. The source in this case is the one who can provide oral information about something that wants to know. The speakers in this study are actors who use facilities and managers of Samapta Sports Center in Magelang City.

The technique of checking the validity of the data used in this study is triangulation. Triangulation is a technique of checking the validity of data that utilizes something other than that data to check or as a comparison to that data [4]. Triangulation means the best way to eliminate differences that exist in the context of a study during the collection of data on events and relationships from different views. Researchers can check their findings by comparing them from a variety of sources, methods, or theories. Therefore, researchers can do it by 1) Submit various variants per question, 2) Check with various data sources, 3) Make use of various methods so that checking the data trust can be done. Data triangulation used here is a triangulation of data sources i.e., researchers dig information from three data sources.

### 3 Results and discussion

Facility management of Samapta Sport Center was divided into several indicators such as planning, organizing, actuating, and controlling. Appropriate with letter of judgment of Mayor of Magelang Number 020/96/112 Year 2018 about the decision of the employing status of Samapta Sport Center in Department of Youth Sport and Tourism (Disporapar) year 2018, the management organization of Samapta Sport Center was legitimate belongs to Department of Youth Sport and Tourism (Disporapar) Magelang city. Based on the observation results with the official of Department of Youth Sport and Tourism (Disporapar) of Magelang city as the organizer of Samapta Sport Center with using those indicators. In the implementation Department of Youth Sport and Tourism (Disporapar) of Magelang city was helped by action technique unit of sport center, The UPT has done the master plan program for planning process in organizes Samapta Sport Center.

### 3.1 Planning

The management of Samapta Sports Center facilities begins with planning indicators. To run the management of Samapta Sports Center, the manager does planning through the program. UPT (Task Force) conducted a master plan program in the sports center area in the planning process at Samapta Sports Center. In the master plan set about the planning of development in the sports center area which there has been documented in RT/ RW that there will be no development in the sports center area but only for the construction of buildings and sports infrastructure.

This master plan is prepared for the next 10 years with the aim that when there is a change of leadership will not affect the development in the sports center area itself. UPT also said that with the master plan program, Samapta Sports Center can develop into a good sports area in a vulnerable time that has been planned.

The planning of the UPT itself is more focused in terms of building infrastructure development which is not only Samapta Sports Center but there will be the construction of other sports halls in the area. For Samapta Sports Center itself, UPT continues to develop in it, from pre-retirement facilities, supporting facilities, and other needs such as bathrooms and mosques.

UPT also plans to develop facilities in Samapta Sports Center by installing fitness equipment at several points. The tool is intended to support sports activities in the Samapta Sports Center. The device is planned to be installed in March 2020.

New regulations from UPT regarding the use of Samapta Sports Center especially in the inner area for musical performances or concerts using the stage also began to be applied. UPT prohibits all forms of stage establishment in the area within Samapta Sports Center, this aims to keep the floor from being easily damaged.

### 3.2 Organizing

The second indicator of Samapta Sports Center facility management is organizing. UPT has its members manage Samapta Sports Center facilities. In the membership of UPT itself includes the division of tasks such as maintenance, security, leasing, promotion, and fund management.

The first task is maintenance, from the results of interviews conducted by officers from UPT, maintenance here includes all infrastructure facilities in Samapta Sports Center. In addition to the maintenance of officers here are also assigned to maintain cleanliness in the Samapta Sports Center. To perform maintenance, UPT has 6 personnel to perform maintenance and maintain cleanliness in the Samapta Sports Center area. The second task is security, in organizing the UPT assigns security guards in turn to maintain security. The job of the security guard itself is to maintain security in the sports center area, not just the Samapta Sports Center area. For security, it has 9 personnel are assigned in turn 24 hours. The third task is rental, in this indicator the head of UPT directly manages it in the sense that the party who wants to rent Samapta Sports Center directly meets with the head of UPT. Those who want to use Samapta Sports Center meet the Head of UPT is the office located in the sports center area, then in the process to make payments.

The next task is promotion, in conducting the promotion of UPT parties to approach through the community and clubs in Magelang City. UPT was assisted by The Disporapar of Magelang City through the official website to promote Samapta Sports Center. In the promotion, UPT also conducts CFD (car-free day) activities in the sports center area. CFD

activities are conducted every Sunday from 06.00 – 10.00 a.m., this activity is conducted to introduce and increase public interest in doing sports at Samapta Sports Center. The last task is the management of funds, in the management of funds carried out directly by the head of UPT regarding the income and expenditure of all documented, which will be made a report and given to the Disporapar Magelang city. UPT itself admits that organizing here still needs to be improved. In addition to the few personnel, coordination between personnel also needs to be considered again to achieve the common goal.

### **3.3 Actuating**

The third indicator of Samapta Sports Center facility management is the driver. The head of UPT who is in charge at Samapta Sports Center stressed that his subordinates should report what they are doing. The head of UPT is required to be able to move his subordinates to work well and effectively. In addition to his ability to manage the management of Samapta Sports Center, the head of UPT must also utilize existing personnel to fulfill the positions that are still vacant. The head of UPT relation as the mobilizer has a regular meeting agenda of all members of the sports center area, which is conducted discussion and evaluation of the performance that has been done. This aims to be able to improve what is still lacking and has not been done to be able to further develop the sports center area.

In its performance, UPT continues to coordinate with the Disporapar of Magelang City. Every performance performed must have a report that will be submitted to the Disporapar Magelang city for checking and evaluation for the future.

### **3.4 Controlling**

The fourth indicator of Samapta Sports Center facility management is supervision. The Head of UPT supervises all performance performed by its members to ensure the work carried out is by the predetermined planning. In his supervision, the first Head of UPT set the standard of implementation, whether each member has done his/her duties according to standards or not. Then make corrections if the implementation of the duties of the members is not by the standards that have been set. Supervision is the final stage of the management process of Samapta Sports Center, where supervision is carried out so that previous indicators, namely planning, organizing, and mobilizers can be carried out properly.

In its performance, the UPT is still under the supervision of the Magelang City Disporapar. The highest supervision here is held by the Disporapar of Magelang City related to the management carried out by UPT. Supervision of the Magelang City Disporapar itself determines how the process carried out by UPT can run well.

## **4 Conclusion**

1. Facility management of Samapta Sport Center that had done by Department of Youth Sport and Tourism (Disporapar) of Magelang city was well. In organizing they used several indicators such as planning, organizing, actuating and controlling.
2. The utilization of Samapta Sport Center by the society is well. The society of Magelang are aware how important doing sport was. However, in the implementation still low

enough. The utilization that has done including several indicators such as educational sport, recreational sport and achievement sport.

3. Subsequent research is expected to be able to examine the role of Samapta Sports Center for the surrounding residents.

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# Characteristics of the Home Environment Elementary School Students in the Filariasis Endemic Area, Pekalongan City

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**Abstract.** This research is to see the existence of vector stockpile of vector filariasis. Analytical descriptive research, using a total population of 244 grade 5 elementary school students. The stages of this research used in-depth interviews and direct observation at the students homes in 7 filariasis endemic sub-districts in Pekalongan City. The results of the research on the presence of the drum 24.59%, the existence of the breeding place in the house 53.89%, the existence of the breeding place outside the house within a radius of 100 m 29.46%, in the form of the existence of a resting place inside the house 43.30%, the existence of a rest area outside the house within a radius of 100 m 24.31%, the presence of wire nets 59.84%. The mosquitoes that cause filariasis can be controlled by maintaining cleanliness around the house by improving the care of all family members.

**Keywords:** Filariasis, student, environment, breeding place, reesting place.

## 1 Introduction

Lymphatic filariasis is a contagious disease caused by filarial worms which is transmitted by various types of mosquitoes including *Anopheles*, *Culex*, *Mansonia*, and *Aedes*. There are three species of worms that cause filariasis, namely *Wuchereria bancrofti*, *Brugia malayi*, *Brugia timori* [1]. More than 1.4 billion people in the world live in areas at risk of being infected with filariasis, which are spread across 73 countries including Indonesia [2].

Filarisis spread throughout Indonesia. Based on the data, there were 14,932 cases of chronic filariasis from 2002 to 2014, in 2015 there were 13,032 cases of filariasis [2] in 2016 as many as 13,009 and in 2017 as many as 12,677 cases. Of the 514 districts / cities in Indonesia, there are 236 endemic filariasis districts / cities. Of the 236 districts / cities that are endemic for filariasis, 55 districts / cities have administered the mass prevention drug (POMP) for filariasis for 5 consecutive years (5 rounds) [3]. The remaining 181 districts / cities will implement POMP until the year 2020, with a population of 76 million people at risk of being infected with lymphatic filariasis [4][5].

Central Java Province in 2018 cumulatively as many as 397 cases spread in 34 districts / cities [6]. The city of Pekalongan from 2004 to 2017 the number of clinical or positive cases containing microfilaria was 417 people, while those who were chronic (there was swelling of the body or There are 40 people with disabilities) [7]. Bondan research in 2014 in Pabean Village, out of 519 blood samples examined, 7 slides were positive for microfilaria (Mf rate 1.3%) at the age of 10-19 years, patients with microfilaremia were more found, namely 3

cases or 2.8% [8]. In 2018 it was found that 6 people were infected with microfilaria at the age of less than 12 years of SDJ results with a sample of 306 in Kertoharjo district. The prevalence rate of microfilaria in children aged  $\leq 10$  years and  $> 15$  years is proven to be 20% [9]. Based on data from the Pekalongan City Health Office, adherence to taking filariasis prevention drugs from year to year tends to decline, namely 63.01% in 2011, 60.89% in 2012, and 55.86% in 2013 [10][11].

Nurjazuli's research in Pekalongan City in 2012 on filariasis prevention behavior by using a mosquito net while sleeping, the presence of house ventilation with mosquito netting, using mosquito repellent, not hanging clothes, and environmental management [12][13]. Risk factors for vector presence in the house, environmental improvement, the existence of ditches, puddles, predators, livestock, bushes, water plants, rice fields and swamps [14][15].

The age of school children is also the object of the prevention of filariasis / POMP which is carried out jointly by the Pekalongan City Health Office [15]. Implementation of the Pre-Transmission Assessment Survey (TAS) and TAS-1 was carried out by the City of Pekalongan to complete the POMP during 5 rounds (5 times over a period of 5 years) in 2015; or declared not passing TAS-1, the POMP is re-carried out for 2 rounds (2 times within 2 years) which was carried out the last in 2018 [16].

Filariasis cases in children are known because of the low antifilaria antibody in the category of children and in general, filariasis infection in the pediatric population is rarely given attention / neglected. The risk factors for filariasis in children in Pekalongan City need further research, especially regarding the home environment around children in children. This study looked at the condition of the house, livestock drums, open space or the environment where the vector rest / reproduction was.

## 2 Method

This research is an analytic observational study with a descriptive analytic design using a survey method in the homes of elementary school students in grade 5. An indicator of the endemic environment for filariasis caused by 3 species of filarial worms and transmitted by the *Culex quinquefasciatus* mosquito. Pekalongan City is a filariasis endemic area with an Mf rate  $> 1\%$ . The prevalence of filariasis incidence in elementary school age children is 1.98% in Kota Pekalongan, environmental risk factors for the incidence of filariasis such as house conditions, cattle sheds, open spaces or resting / reproduction environments around the student's house [17].

This research is a descriptive analytic study, to prove the open space or environment where the rest / reproduction of vectors around the student's house is a risk factor for the incidence of filariasis, using a purposive sample of 244 samples of grade 5 elementary school age children. direct observation at the homes of students in 7 sub-district endemic filariasis in Pekalongan City. Kuripan Lor, Kertoharjo, Kuripan Yosorejo, Jenggog, Banyu urip, Pabean, Bandengan and Baros sub-districts [18].

The research location is in 7 villages in three sub-districts in Pekalongan City, namely Kuripan Lor, Kertoharjo, Kuripan Yosorejo, Jenggog, Banyu urip, Pabean, Bandengan and Baros villages. The sample size was determined by using the total sampling technique in the population. The total population of 244 was taken with all respondents in the cluster as many as 244 students.

### 3 Result and Discussion

The results of research regarding the characteristics of the home environment in grade 5 elementary school students in filariasis endemic areas can be seen in the following table:

**Table 1.** Characteristics of the primary school student home environment in filariasis endemic areas

Characteristic of the home environment	n	%	Mean
The existence of a livestock pen is attached to a residential building	60	24.59	24.59
<b>The existence of a breeding place in the house, in the form of:</b>			
The bathtub is drained less than 1 time a week	172	70.49	53.89
Water reservoirs that are open / not tightly closed	111	45.49	
Vase water is changed less than once a week	129	52.87	
Water in the bird's drinking area is changed less than once a week	144	46.72	
<b>The existence of a breeding place outside the house within a radius of 100 m, in the form of:</b>			
Swamps	70	28.69	29.46
The sewerage is open and stagnant	112	45.90	
Stagnant wastewater because it does not have a sewerage (gutter)	90	36.89	
Stagnant water rob	63	25.82	
Other dirty puddles: sewers, batik washing water reservoirs	56	22.95	
A deliberate pool of clean water in the form of a fish-free pond	69	28.28	
Deliberate puddle of clean water in the form of water reservoirs in water plant pots	47	19.26	
Another deliberate puddle of clean water: water supply for washing batik	84	34.43	
Unintentional puddle of clean water in the form of clean water / rain that stagnates on used goods / trash / bamboo fences	56	22.95	
<b>The existence of a resting place in the house</b>			
Used clothes hanging	127	52.05	43.30
Lush ornamental plants in the house	68	27.87	
Gordin that is rarely washed and opened and closed	122	50	
<b>The existence of a resting place outside the house within a radius of 100 m</b>			
Bush	75	30.74	24.31
Lush ornamental plant	63	25.82	
Heap of straw	40	16.39	
Presence of wire gauze throughout the ventilation and in GOOD condition	146	59.84	59.84

The existence of breeding places outside the house as much as 29.46% has an environment that tends to be a breeding place for mosquitoes. Theoretically, environmental management has a relationship with the incidence of filariasis because it is related to efforts to eliminate mosquito breeding and resting places. Management efforts that can be carried out are engineering controls, which are essentially aimed at reducing insect nests (breeding places). Control is carried out by managing the environment (environmental management), namely modifying or manipulating the environment, so that an unsuitable (unfavorable) environment is formed which can prevent or limit vector development. Environmental modification is the safest way for the environment, which does not destroy the balance of nature and does not pollute the environment, but must be done continuously [19]. Control with environmental manipulation, which is related to cleaning or maintaining existing physical facilities so that breeding places or insect rest areas do not form, for example removing or uprooting water plants that grow in ponds or swamps that can suppress the population. *Mansonia* spp and *Culex* [20]. According to Umar Fahmi Achmadi, the presence of water habitats is an important factor in the survival of adult mosquitoes to become denser. Mosquitoes lay and hatch their eggs in stagnant or semi-stagnant water, but some use temporary ponds or container habitats such as old tires. The *Culex* mosquito lays its eggs on a free surface of water, while the female *Mansonia* mosquito attaches its egg mass to the underside of floating aquatic plants or in water, or at the bottom of water. Stagnant water becomes a breeding ground for mosquitoes [21].

Based on the results of research in the environmental health journal concerning the Relationship of Home Environmental Conditions, Socio-Economic, and Community Behavior with Filariasis Incidence in Pekalongan Selatan District, Pekalongan City, it is stated that standing water around the house will become breeding places for *Cx* mosquitoes. *Quinquefasciatus*, in its life cycle, mosquitoes need very little water (50 cc), mosquitoes can use it as habitat. The mosquito flight distance in general is 1-2 km. So the presence of standing water at this distance will bring humans closer to the filariasis vector mosquito so that the risk of getting filariasis in people who live near standing water is higher than people who live far from standing water. Stagnant water affects the habitat distribution of the filariasis vector and its chain of transmission because it affects and supports the density of the *Culex quinquefasciatus* mosquito.

The existence of a resting place in the house is based on the results of research that clothes hanging in the house are mosquito resting places after sucking blood so that humans get closer to the filariasis vector mosquito so that the chance of contact with humans is even greater. Based on the results of statistical analysis carried out in this study, there was no significant relationship between the habit of hanging clothes and the incidence of filariasis). The habit of hanging clothes with the incidence of filariasis in this study is caused by temperature and lighting factors in the house that do not support mosquitoes to be used as resting places [22]. The incidence of filariasis is because the respondent has the same habit, namely hanging clothes that are already worn in the house, this is because the clothes still want to be used by the respondent and the respondent's lack of knowledge about the habit of hanging clothes in the house is a place to rest for the mosquito carrying the vector of filariasis because mosquitoes like the place - a place that is protected from sunlight and light.

The existence of resting places outside the house, such as the presence of gauze on the ventilation, as much as 59.84% of the students' homes use wire netting in good condition. In the transmission of a disease, things that cannot be ignored are the interactions between humans and their behavior and environmental components around humans that have the potential to cause disease. Gauze wire installed on all house vents can serve as a screening to

prevent mosquitoes from entering the house. So that the effort to install gauze can reduce contact between mosquitoes and residents in the house (Adrias et al, 2012). In the research location, it is known that there are still very few respondents who use gauze in the ventilation of all parts of the house in good condition. This may be because respondents who have used mosquito coils, sprays or spreads, and respondents who have used mosquito nets no longer need to use gauze for the ventilation in every room of their house.

## 4 Conclusion

The conclusion of this research is the existence of breeding places outside and inside the house, the existence of reesting places inside and outside the house and having gauze and education for students because students as agents of change can give changes to the family at home.

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# Relationship of Energy and Nutrients Adequacy with Nutritional Status on Young Football Athletes in Central Java

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**Abstract.** This study evaluates the adequacy of energy and nutrient and determines its relationship with young football athletes' nutritional status. This study is an observational analytic study using a cross-sectional design. The subjects are 21 male football athletes of the Central Java Student Sports Education and Training Center and measured their body weight and body height and determined their nutritional status (BMI-for-age and body fat percentage). Dietary pattern as energy and nutrients adequacy was obtained using a semi-quantitative Food Frequency Questionnaire. The results showed that the energy adequacy level was significantly related to BMI-for-age ( $p=0.030$ ) but not related to body fat percentage ( $p=0.733$ ). The adequacy of nutrients (carbohydrates, fats, proteins) were not related to BMI-for-age ( $p=0.086$ ;  $0.173$ ;  $0.322$ ) and body fat percentage ( $p=0.289$ ;  $0.440$ ;  $0.784$ ). It can be concluded that the energy and nutrients adequacy shows a significant relationship with the nutritional status of young football athletes of Central Java's Province.

**Keywords:** nutritional status, body fat percentage, football.

## 1 Introduction

This Athlete's performance can be measured through the individual performance achieved by the athlete. The factors that influence athlete's performance are athlete's training routine, nutritional fulfillment and athlete's physical condition. Nutritional status describes the physical condition that can determine the quality of the athlete while competing and the recovery process.[1]

Football is a team sport that requires a high level of strength and endurance because the game of football lasts quite a long time, namely 2x45 minutes in normal time. Activities in football can be aerobic and anaerobic activities according to the player's position when competing.[2] Inadequate nutritional intake and low levels of athlete's nutritional status can cause fatigue in the body's recovery process from prolonged fatigue which can reduce performance. The world football federation has stated that the nutritional status of athletes plays a role in the success of the team.[3]

The combination of the right training and adequate nutrition can make the athlete's body morphology better. Athletes with an anthropometric or somatotype structure and body composition that are in accordance with their sport tend to show better sports performance.[4]

Previous research stated that carbohydrate and protein intake was closely related to the nutritional status of Arjowinangun 1 Pacitan elementary school.[5] However, research on soccer players aged 9-12 years explains that the percentage of carbohydrate and protein adequacy is not related to the nutritional status of footballers.[6]

One of the efforts to develop young football athletes in Indonesia is through the Student Education and Training Center. Education center for student sports training in Semarang, Central Java is a center for developing early age athletes, which focuses on fostering student-age athletes for sports competitions. The athletes are quarantined in order to support the athlete's performance where the training time, physical activity and food consumption patterns of the athletes are well structured.

Adequate nutritional needs can improve the performance of athletes during training or competition by reducing fatigue, risk of disease and injury. Proper nutrition balances the incoming energy intake with the energy expenditure the body needs. This is very important to prevent deficits or excess energy. The risks that occur due to energy deficits are short stature, delayed puberty, menstrual dysfunction, loss of muscle mass and increased susceptibility to fatigue, injury or other diseases. While excess energy can lead to overweight and obesity.[7]

An athlete needs more nutritional intake than people with light physical activity levels. Nutritional needs for athletes are very important to support athlete's performance during training until the recovery process. Adolescence is a period of acceleration and growth that occurs at the age of 10-18 years.[2] Nutrition for adolescent athletes is not only to maintain physical condition and optimize performance during exercise, but is important to meet nutritional needs for growth.[7]

Research from Sacheck and team on nutrition research for adolescent athletes can be known several things that must be considered in determine the right nutrition for young athletes namely: caloric needs, macronutrient, hydration, time and supplements. While there are factors that affect the proper nutrition such as type of exercise, genes, gender, and age.[8]

## 2 Methods

This research is correlational descriptive by using sectional cross design conducted on football athletes in the Center for Student Education and Training Central Java. The subjects in this study were male football athletes with an age range of 15-17 years with total sampling techniques and obtained a total of 21 athletes.[9]

The nutritional status of the study subjects was determined using the BMI/U indicator (Body Mass Index based on Age). BMI is calculated from the weight of the weighing results of the study subjects (kg) and the measurement of height (m) squared. Weight weighing research subjects used digital scales and used microtoises with a measuring capacity of 2 meters and precision of 0.1 cm to measure height. The BMI measurement results were then associated with the age parameters of the study subjects and assessed based on Z-score (SD). Z-score scores were then categorized into 5 groups, namely very thin ( $< -3SD$ ); thin ( $> -3SD$  to  $< -2SD$ ); normal ( $> -2SD$  to  $1 SD$ ); obese ( $> 1SD$  to  $2SD$ ); and obese ( $> 2SD$ ).[10]

The body fat percentage of the study subjects was measured using Bioelectrical Impedance Analysis (BIA). The values passed by then categorized into 3 groups namely skinny, good, and acceptable body fat.

The average intake of energy and nutrients was obtained from interviews with research subjects using a semi-FFQ questionnaire (Food Frequency Questionnaire) with a span of 30



days back. The results of the interview were then converted in the form of units of calories/day for the average energy intake, and grams/day for the average intake of nutrients (carbohydrates, fats and proteins,) which is then compared to Recommended Dietary Allowance (RDA) for adolescents aged 14 – 19 years and multiplied by 100% using the formula:

$$\text{Adequacy level of intake} = \frac{\text{Average daily intake (gram/day)}}{\text{RDA}} \times 100\%$$

The level of energy adequacy and nutrients is then categorized into 3 groups, namely deficit (<80% RDA); adequate (80-110% RDA); and excess (>110% RDA).[11]

Data on age, weight, height, BMI/U, percent body fat, the average level of energy adequacy and nutrients (carbohydrates, fats, proteins) of the study subjects were analyzed descriptively and presented in table form. The relationship between energy and nutrient adequacy levels with nutritional status and percent of body fat in the study subjects was analyzed using Spearman's Correlation test with a confidence level of 95% ( $\alpha=0.05$ ).[12]

### 3 Result and Discussion

The subjects of this study were male football athletes who joined the Center for Student Education and Training and were involved in the collection of research data numbering 21 people with characteristics as presented in table 1.

Based on table 1, the average age of football athletes in this study was  $16.00 \pm 0.775$  years old with an age range of 15-17 years old and educational background at the upper secondary level. The data showed that all subjects in this study were still classified as adolescent age groups. The average weight and height of athlete  $62.48 \pm 7.68$  kg and  $168.91 \pm 4.27$  cm. The average athlete's Z-Score is  $0.34 \pm 0.71$  which means the athlete has a normal body mass index. It can also be seen in table 1 that the average energy intake of athletes is  $2027.12 \pm 597.00$  and for the average intake of athletes macronutrients (carbohydrates, proteins, and fats) is  $318.31 \pm 96.55$ ;  $83.03 \pm 36.19$ ; and  $55.68 \pm 25.27$ . Meanwhile, the average energy requirements of athletes are  $4138.33 \pm 553.77$  with the average macronutrient requirements (carbohydrates, proteins, and fats) is  $569.02 \pm 76.14$ ;  $206.92 \pm 27.69$  and  $114.95 \pm 15.38$ . Thus, the average energy adequacy level of athletes is  $57.85 \pm 15.91$  and the level of adequacy of macronutrients (carbohydrates, proteins, and fats) is  $65.49 \pm 17.28$ ;  $47.65 \pm 20.15$ ; and  $57.17 \pm 25.46$ .

**Table 1.** Characteristics of Research Subjects.

Characteristics of Subject (N=21)	Mean $\pm$ SD	Minimum	Maximum
Age (years)	16,00 $\pm$ 0,775	15,00	17,00
Body Weight (kg)	62,48 $\pm$ 7,68	49,05	76,50
Height (cm)	168,91 $\pm$ 4,27	161,00	175,60
Z-score (IMT/U)	0,34 $\pm$ 0,71	-1,40	1,69
Body Fat Percentages	15,59 $\pm$ 2,34	9,40	19,70
Daily intake of Energy and Nutrients			
Energy (kcal)	2027,12 $\pm$ 597,00	1228,50	3848,00
Carbohydrate (g)	318,31 $\pm$ 96,55	174,80	531,20

<b>Characteristics of Subject (N=21)</b>	<b>Mean ± SD</b>	<b>Minimum</b>	<b>Maximum</b>
Protein (g)	83,03 ± 36,19	52,50	214,80
Fat (g)	55,68 ± 25,27	28,50	107,50
<b>Energy and Nutrients Requirements</b>			
Energy (kcal)	4138,33 ± 553,77	2765,04	5023,35
Carbohydrate (g)	569,02 ± 76,14	380,19	690,71
Protein (g)	206,92 ± 27,69	138,25	251,17
Fat (g)	114,95 ± 15,38	76,81	139,54
<b>Sufficient Level of Energy and Nutrients</b>			
Energy (kcal)	57,85 ± 15,91	35	102
Carbohydrate (g)	65,49 ± 17,28	36	102
Protein (g)	47,65 ± 20,15	26	114
Fat (g)	57,17 ± 25,46	26	117

**Table 2.** Distribution of Nutrition Intake Category, Nutritional Status, and Percent of Athletes Body Fat.

<b>Variable</b>	<b>n</b>	<b>%</b>
<b>Adequacy Level of Energy</b>		
Deficit	20	95,24%
Adequate	1	4,76%
<b>Adequacy Level of Carbohydrates</b>		
Deficit	17	81,95%
Adequate	4	19,05%
<b>Adequacy Level of Protein</b>		
Deficit	20	95,24%
Adequate	0	
Excessive	1	4,76%
<b>Adequacy Level of Fat</b>		
Deficit	18	85,71%
Adequate	2	9,5%
Excessive	1	4,76%
<b>BMI for Age</b>		
Normal	17	80,95%
Overweight	4	19,05%
<b>Body Fat Percentage</b>		
Skinny	5	23,81%
Good	12	57,14%
Acceptable	4	19,05%

Based on table 2, most athletes (89.54%) deficit in energy and nutrient adequacy (carbohydrates, proteins, and fats). There are 4.76% of athletes who have an adequate intake of energy, and 19.05% of athletes who have adequate intake of carbohydrate, while in fat adequacy there are only 9.5% of athletes whose fat intake is adequate and 4.76% of athletes who experience excessive protein and fat intake.

**Tabel 3.** Distribution of Relationship between Energy Adequacy Level and Nutritional Intake with Nutritional Status of Athletes.

Adequacy Level	Nutritional status				Total		P Value
	Normal		Overweight		N	%	
	n	%	n	%			
<b>Energy</b>							
Defisit	16	80%	4	20%	20	100%	0,030*
Adequate	1	100%	0	0%	1	100%	
Excessive	-	-	-	-	-	-	
<b>Carbohydrates</b>							
Defisit	14	82,4%	3	17,6%	17	100%	0,086
Adequate	3	75%	1	25%	4	100%	
Excessive	-	-	-	-	-	-	
<b>Protein</b>							
Defisit	16	80%	4	20%	20	100%	0,322
Adequate	-	-	-	-	-	-	
Excessive	1	100%	0	0%	1	100%	
<b>Fat</b>							
Defisit	15	83,3%	3	16,7%	18	100%	0,173
Adequate	2	100%	0	0%	2	100%	
Excessive	0	0%	1	100%	1	100%	

Correlation test using Spearmen's Correlation, is significant at the 0.05 level  
Significance values are indicated by the notation \*

Based on the data, it can be known that the level of adequacy/fulfillment of energy and nutrition of youth football athletes in Central Java in 2019 has not been sufficient due to the lack of portion of food consumed and the high activity carried out daily by athletes. This can be seen from the average level of energy adequacy and nutrients (carbohydrates, proteins, fats) athletes only amounted to  $57.85 \pm 15.91\%$  and  $65.49 \pm 17.28\%$ ;  $47.65 \pm 20.15\%$ ; and  $57.17 \pm 25.46\%$ . Therefore, it is necessary to reconsider the athlete's diet intake and adequate energy intake for athletes must be in line with the athlete's activity because optimal physical condition during the competition will not be achieved if it is not supported by adequate energy and nutrient intake. A balanced intake of nutrients can affect an athlete's performance during a match. [13]

The results of this research correlation test analysis show that there is a significant relationship in the positive direction between energy adequacy level and nutritional status /BMI-for-Age ( $p=0.030$ ) This is in line with previous research which states that there is a relationship between energy adequacy and nutritional status.[14] The results obtained from this study from the level of energy adequacy are mostly heavy deficits, but BMI results are mostly normal, this is likely influenced by indicators of nutritional adequacy obtained from dietary recall in this study, namely FFQ that reflects nutritional adequacy that focuses on the balance of nutrient composition, so that because most of the nutrients consumed are not adequate, the analysis of FFQ is a deficit.[15]

There is a significant relationship between the level of energy adequacy and nutritional status in this study, namely the average intake of subjects is in the category of less than 2027.12 kcal/day. Energy adequacy is a direct factor that can affect nutritional status. For

subjects that have a good level of energy adequacy then the nutritional status will also be good. It is known that the RDA for energy in adults aged 16-18 years is 2650 kcal for males.

Energy is the result of the metabolism of proteins, fats, and carbohydrates. Energy is required of the body for growth, metabolism, utilization of foodstuffs, and activity. The energy that comes through food must be balanced with the needs. The imbalance of energy input with long-term needs can cause nutritional problems. Therefore, it is necessary to reconsider the consumption pattern, and also excessive physical activity should be followed by a good energy intake as well. Dishes and foods when consumed in the right amount and way will produce a healthy nutritional state, a healthy state of daily nutrition will increase intellectual development the productivity of a person and achieve optimal achievements.[14]

The results showed no correlation between energy adequacy levels and athletes' body fat percentage and based on the results of the correlation test the relationship direction in this study was positive with weak correlation strength ( $r=0.079$ ,  $p=0.733$ ). This shows that if the lower the level of energy consumption, the smaller the percentage of body fat, this is evidenced by as many as 20 respondents (95.24%) football athletes with a adequacy level of energy deficit and one responden (4,76%) with a adequacy level of energy adequate have a diverse percentage of body fat, namely 5 respondents (23.81%) in the skinny category, 12 respondents (57.14%) in the good category and 4 respondents (19.05%) in the acceptable category. The results of this study are in line with previous research in Semarang which stated that there is no relationship of energy consumption level with body fat percentage with  $p = 0.528$  ( $p > 0.05$ ).[16]

The main components of success in exercise can be influenced by adequate energy intake to support calorie expenditure and increase strength, endurance, muscle mass, and physical health. If the athlete's intake is inadequate, it will affect the performance of the athlete. The efficiency of body movement, intensity, and length of exercise also affect the amount of energy an athlete needs during exercise. Each sport has different nutritional needs, but in general, energy is a priority nutrient.[17]

Body Mass Index is not a benchmark of an athlete's nutritional status, so it does not describe body composition and does not represent a percent of body fat, and is inaccurate for predicting excess fat mass and muscle mass.[18] Body composition and weight contribute to exercise performance. Weight loss can affect an athlete's speed, endurance, and power, while body composition (fat mass and fat-free body mass) can produce strength, agility, and athlete appearance. [19]

Spearman's correlation test results showed no significant association between carbohydrate adequacy levels, fat adequacy levels, and protein adequacy levels with nutritional status ( $p=0.086$ ;  $0.173$ ;  $0.322$ ) and percent body fat ( $p=0.289$ ;  $0.440$ ;  $0.784$ ). The positive correlation between carbohydrate adequacy level, protein adequacy level, and fat adequacy level with nutritional status in this study showed that although there is no relationship but has a tendency to have a comparable relationship for subjects who have a higher nutritional status tend to have a high level of protein, fat, and carbohydrates adequacy as well. However, there is a negative correlation between carbohydrate adequacy and percent body fat ( $r= -0.243$ ) this indicates that if the lower the level of carbohydrate adequacy, the greater the percentage of body fat, These results are also comparable with previous studies that there is no significant relationship between the level of energy adequacy, protein adequacy level, fat adequacy level, and carbohydrate adequacy level with nutritional status.[20]

There is no significant relationship, possibly due to too few subjects and the level of adequacy of subjects tends to be homogeneous (most subjects have deficit levels of energy, protein, fat, and carbohydrate adequacy).

## 4 Conclusion

It can be concluded that the level of energy adequacy has a significant relationship with BMI for age, but not with the percentage of body fat. Likewise, the level of nutrient adequacy (carbohydrates, fat, protein) did not have a significant relationship with BMI for age and body fat percentage. The recommendation for further research is that more in-depth research can be carried out by adding several other variables such as monitoring physical activity, and other indicators such as waist circumference to determine the relationship with the level of energy adequacy and nutrition of athletes.

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# Biomarkers of Oxidative Stress for Human Health: Experiment of Different Swimming Exercise on Male Wistar Rats

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**Abstract.** This study aims to compare the biomarker of oxidative stress in rats after subjected to exercise in different intensity. It was an experimental study involving 15 male Wistar rats. Rats were allocated to control (C), moderate swimming training (M) and exhaustive swimming training (EX). Rats in M group were forced to swim twice a week for 15 minutes, while rats in EX were forced to swim with external load added (5% of bodyweight) until exhausted or once rats stayed submerge for 10 s. After two weeks of exercise, rats were euthanized and 4 mL of blood samples were drawn to measure MDA and SOD. The results of this study revealed a significant difference in MDA and SOD level between groups. Rats in EX were found to have highest level of MDA ( $38.10 \pm 2.29$ ) as well as lowest in SOD level ( $1.06 \pm 0.06$ ) than the peers in M. The findings indicate that moderate exercise is the most suitable exercise to prevent oxidative stress.

**Keywords:** exercise, free radical, intensity, malondialdehyde, oxidative stress, superoxide dismutase.

## 1 Introduction

Physical activity that is carried out regularly as part of a healthy lifestyle will have a positive impact on health [1]. Studies reported that physical activity can lower the risk of several degenerative diseases, such as cardiovascular disease [2][3], cancer [4], and diabetes mellitus type 2, as well as reduce osteoporosis [5]. Moreover, adequate physical activity is found to be a strong gene modulator that induce structural changes in the human brain, affecting cognitive function [6]. The benefit of regular exercise is also found to associate with psychological well-being which in turn affect quality of life [7].

While regular exercise or physical activity contributes to numerous benefits on human health system, studies observed the differences in positive effects when the volume and intensity are taken into account [7]. The favourable effects of exercise are lost following the exhaustion [8]. In other words, excessive exercise which depletes the body's adaptive system, or the ability to give positive feedback to training stimulus, can be damaging to human's health [9]. Exercise also represents a physical stress that shatters homeostasis state [10], with working skeletal muscle is the most afflicted organ during physical activity [11]. Several studies stated that exhaustive exercise especially when performed sporadic, can alter inflammatory reactions or structural damage within the muscles, likely due to the enhance production of radical oxygen species (ROS) [8]. When cell is under exhaustive condition, the utilization of oxygen increases 10-15 times and free radicals may be generated beyond the

body's natural antioxidant defense [12], which is characterized by the changes in oxidative stress biomarkers.

ROS in sufficient level actually plays important role in modulation of numerous cellular function such as signalling process, tissue homeostasis, as well as involving in biological system [13][14]. But when it is overproduced as the result of exhaustive exercise, the damage is inevitable as it can lead to oxidative stress which further causes lipid peroxidation in cells and tissues[15]. Overproduction of ROS also involves in disturbance of several biological processes, including physiological, psychological, and immunological systems[16]. Furthermore, it poses serious threat to antioxidant defence system which later can increase cells susceptibility to oxidative damage [8].

It is well established that exercise is known to induce the generation of free radical. Previous studies have demonstrated that acute aerobic and anaerobic exercise, both maximal or submaximal, can generate ROS [17]. While the exercise-induced oxidative stress has received wide attention, the relationship between exercise and its subcomponent such as intensity and the resultant production of ROS still remains unclear. And the important question about the role of various types of exercise and load or intensity is still an issue under debate. Little is known about which type of exercise or what level of intensity could give more benefit to prevent oxidative stress. Hence, the present study aims to compare the biomarker of oxidative stress in rats after subjected to exercise in different intensity.

## 2 Method

It was an experimental design using post-test only control group design. In this study, five weeks old fifteen male Wistar rats (*Rattus norvegicus*) weighing 150-200 grams were used. All rats were placed in standard cages and maintained to adapt under environmentally controlled conditions during the study ( $25\pm 1^{\circ}\text{C}$  temperature;  $50\pm 1\%$  relative humidity; and 12:12 hours light-dark cycle) and were provided standard rat chow and tap water ad libitum during experimental period. Afterward, they were divided into three weight-matched groups ( $n=5/\text{cage}$ ): (1) control group (C); (2) moderate intensity swimming training (M), and (4) exhaustive swimming training (EX).

All rats were adapted to the water for 1 week during the acclimatization period. The adaptation was done by putting the animals in shallow water for 1 minutes every day to prevent stress. After a week of acclimatization, the rats were assigned to respective swimming training. The swimming session was done individually in a glasses tank filled up with water that was set on normal temperature and sufficient enough for rat to swim simultaneously. Moderate swimming training was performed every morning at 9 am, two times a week, 15 minutes/day, for two weeks. While exhaustive swimming training was done using the same protocol as moderate exercise but until rats got exhausted. Exhaustion was defined once rat remained submerged in the water for 10 seconds. An external load weighed 5% of rat's bodyweight was added to EX group to augment the exercise intensity.

After each swimming session, rats were hair-dried to prevent hypothermia stress. 24-h after the end of last swimming session, all rats were euthanized. 5 mL of intracardiac bloods samples were drawn to measure malondialdehyde (MDA) level and superoxide dismutase (SOD). MDA was measured using thiobarbituric acid reactive substances method (TBARS) and the result was stated as  $\mu\text{M}$ , while SOD measurement was performed by xanthine oxidase method and the result was stated as U/mL.



Data were analysed using standard statistical software package SPSS and presented as mean values and standard deviation (SD). Kolmogorov-Smirnov was used to evaluate the data distribution. The normally distributed data were analysed using Pearson correlation to assess the relationship between MDA and SOD level. Further analysis was carried out by one-way Anova to compare MDA and SOD level between groups, and post-hoc analysis was carried out using LSD test to find out which pair showed significant different. P-value less than 0.05 was considered statistically significant.

### 3 Result

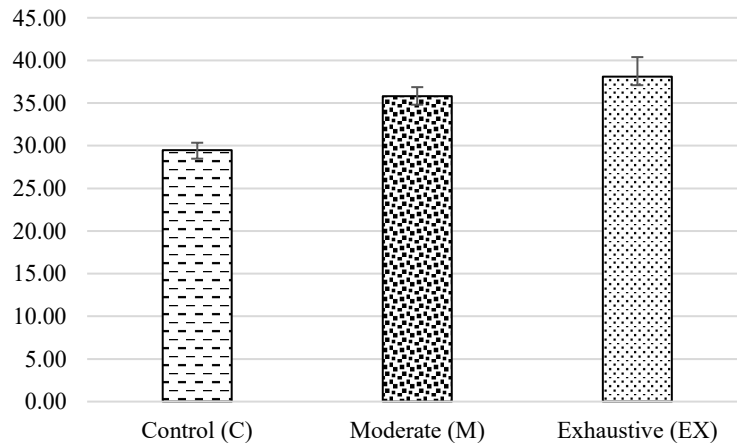
This present study investigated the effect of different intensity of swimming training on oxidative stress biomarker in rats. Rats in all groups were healthy and did not show any significant changes on physical figure and behaviour after a week of acclimatization phase. All rats completed the whole protocol from first week until the end of experimental period.

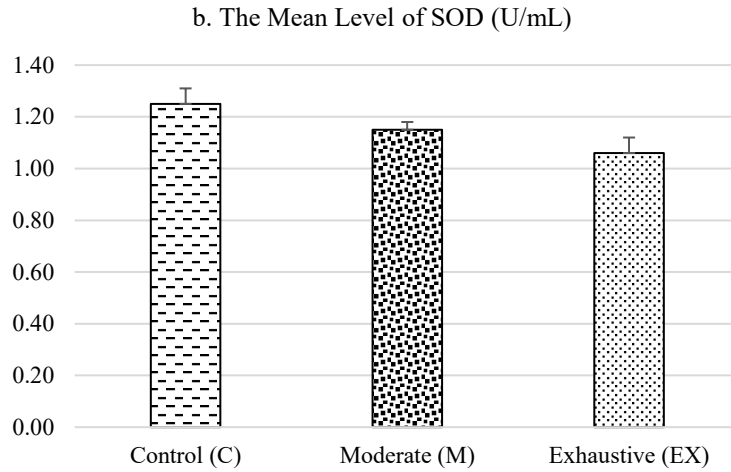
**Table 1.** Normality test of oxidative stress biomarker

Biomarker	Mean	SD ( $\pm$ )	p-value
Malondialdehyde ( $\mu\text{M}$ )	34.46	4.03	0.846
Superoxide dismutase (U/mL)	1.16	0.09	0.631

Table 1 shows an overview of normality test on oxidative stress biomarker. The result of Kolmogorov-Smirnov test shows that malondialdehyde (MDA) and superoxide dismutase (SOD) are normally distributed with p-value 0.846 and 0.631, respectively. The overall mean level of MDA is  $34.46 \pm 4.03 \mu\text{M}$ , while SOD is  $1.16 \pm 0.09 \text{ U/mL}$  (Table 1).

a. The Mean Level of MDA ( $\mu\text{M}$ )





**Fig 1.** The Mean Level of MDA (a) and SOD (b) in Each Group

The highest level of MDA is  $38.10 \pm 2.29 \mu\text{M}$  and it is found in EX group which is assigned to exhaustive exercise. The contrast finding is found in SOD level, where EX group happens to have lowest endogenous antioxidant (SOD) with  $1.06 \pm 0.06 \text{ U/mL}$  compared to moderate (M) and control group (C) (Fig. 1).

**Table 2.** The correlation between Malondialdehyde (MDA) and Superoxide Dismutase (SOD) level

Variable	Group	Mean	SD ( $\pm$ )	r	p-value
Malondialdehyde ( $\mu\text{M}$ )	Control (C)	29.48	0.87	-0.726	0.021
	Moderate (M)	35.81	1.06		
	Exhaustive (EX)	38.10	2.29		
Superoxide dismutase (U/mL)	Control (C)	1.25	0.06		
	Moderate (M)	1.15	0.03		
	Exhaustive (EX)	1.06	0.06		

Pearson correlation found a negative correlation between MDA and SOD level with  $r = -0.726$ . It could be seen that swimming training that were assigned to rats altered the redox balance in favour of oxidative stress, where the increase of MDA level would be followed by the decrease amount of SOD.

**Table 3.** The comparison of Malondialdehyde (MDA) and Superoxide Dismutase (SOD) level between groups

Variable	Group	p-value
Malondialdehyde ( $\mu\text{M}$ )	Control (C) vs Moderate (M)	0.000
	Control (C) vs Exhaustive (EX)	0.000
	Moderate (M) vs Control (C)	0.000
	Moderate (M) vs Exhaustive (EX)	0.036
	Exhaustive (EX) vs Control (C)	0.000
	Exhaustive (EX) vs Moderate (M)	0.036
Superoxide dismutase (U/mL)	Control (C) vs Moderate (M)	0.012
	Control (C) vs Exhaustive (EX)	0.000
	Moderate (M) vs Control (C)	0.012

	Exhaustive (EX)	0.017
Exhaustive (EX)	Control (C)	0.000
	Moderate (M)	0.017

According to the result of one-way Anova, MDA level in control group (C) shows significant different with those in moderate (M) and exhaustive swimming training group (EX), with  $p = 0.000$  for both groups. MDA level in moderate group also differs significantly with the peers in exhaustive exercise ( $p = 0.036$ ). The present study also found significant differences in the level of SOD between control group and moderate ( $p = 0.012$ ) and exhaustive ( $p = 0.000$ ) groups. Furthermore, rats in moderate group shows significant different with those assigned to exhaustive exercise ( $p = 0.017$ ).

#### 4 Discussion

In recent years of clinical research, MDA and SOD have often been used as popular matching indicators of oxidative stress. MDA is one of the aldehyde compounds occurring as a result of lipid peroxidation [18]. MDA reflected the degree of damage in cells caused by overproduction of free radicals, whereas SOD is associated with free radical scavenging ability [19]. MDA also reflected the severity of lipid peroxidation, thus it often used as biomarker of oxidative stress [20].

In this study, the swimming training that were given to rats for certain duration and intensity produced a significant increase in oxidative stress biomarkers, principally shown through the elevation of MDA plasma and the decrease in SOD level ( $p < 0.05$ ). MDA level was significantly found to be highest in exhaustive group (EX) than in control group (C) and moderate exercise group (M). The result was similar to other studies conducted in both animal and human studies, where exhaustive or intense exercise has been found to induce the elevation either in protein or lipid oxidation [21]. Yasa & Jawi [22] found a sharp increase in MDA level after rats were forced to do treadmill exercise. From the previous studies we can see that exhaustive exercise enhanced lipid peroxidation that led to oxidative stress, resulting in dramatic increase in MDA level due to the rise of oxygen uptake during exercise [23]. The exhaustive exercise would cause blood flow to be redistributed, followed by ischaemia mechanism that in turn led to a serious reperfusion injury, as it has been shown by other previous studies [18]. Exhaustive exercise is also known to generate high level of plasma lactate, as an indicator of exercise intensity, which could also be contributed to free radicals production [23].

Although there are some debates regarding the source of free radical during exercise, mitochondria have been long considered as the major source of ROS [24]. In the mitochondria, the oxygen consumed partially loses one electron, giving rise to the superoxide radical ( $O_2^{\bullet-}$ ), which is generated in different rates according to the examined tissue [25]. But as the intensity of exercise increased, the production of ROS mainly come from hypoxia condition [26]. During hypoxia, adenosine triphosphate (ATP) will decrease due to ATP-dependent calcium ionic pump impairment and activation of Ca-dependent proteases. This activity result in the cleavage of xanthine dehydrogenase to xanthine oxidase (XO). This enzyme catalyse a reaction where hypoxanthine were converted to xanthine then to uric acid and free radical ( $O_2^{\bullet-}$ ) [18]. It explained why ROS production elevated sharply during exhaustive exercise.

Regarding SOD level, we found that exhaustive group had the lowest SOD compared to the rest of the groups. The decrease in SOD levels that occurred in EX is caused by an imbalance between the amounts of antioxidants in the body and the number of free radicals formed due to exhaustive swimming training. This process causes oxidative stress, which is indicated by a decrease in SOD levels. The formation of malondialdehyde (MDA) will be followed by oxidative damage on the cell membrane, which in turn will lead to more progressive damage leading to decreased activity of intracellular enzymes such as Superoxide Dismutase (SOD), Glutathione Peroxide (GPx), and Catalase (CAT) [18].

Decrease of enzyme activity could also be a consequence of elevated endogenous free radicals and MDA formation, as indicated by several studies. Previous study showed that, in response to oxidative stress, SOD enzyme might be consumed to prevent oxidative damage since it was shown that the overproduction of ROS exhausts the SOD capacity [27]. Apart from reducing enzyme activity, the high number of free radicals cause disturbance in the synthesis of antioxidant enzymes such as SOD and GPx. Disruption in enzyme synthesis will cause a decrease in the levels of SOD produced, so that the amount of SOD in the body cannot counterbalance the damage caused by free radicals that formed as a result of exhaustive exercise [28].

The oxidative stress happened to rats in moderate (M) and exhaustive exercise (EX) indicated that swimming training could reduce SOD levels significantly. In addition, the sharp decrease in SOD levels in EX indicates that excessive exercise or physical activity does not provide a protective effect against free radicals. These results are in accordance with research conducted by Li et al [19], where giving excessive physical exercise can reduce the levels of SOD in Wistar rats lower than the control or baseline group.

## 5 Conclusion

Our findings indicate that exhaustive exercise gives significantly result in escalating malondialdehyde level and reducing the endogenous antioxidant levels, compared with control and moderate intensity exercise. Raised level of MDA and declined SOD are the potential risk factors for many diseases, so it is advised for people to do exercise in the right intensity and duration to maximize the health benefits. Further research is needed elucidate the long-term effects and potential mechanisms of high-intensity exercise and redox-mediated health adaptations.

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# Qualitative Study of Social Support for Occupational Safety and Health in the Informal Sector of Limestone Processing in Gunungkidul, Indonesia

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**Abstract.** Law enforcement, commitment, leadership and monitoring of behavior are factors in the implementation of Occupational Safety and Health (OSH). Social environmental factor of workers is a potential that needs to be identified for improving the implementation of OSH. The qualitative research with respondents were executors of OSH programs, community leaders and workers. Data were collected through in-depth interviews. Data analysis was carried out using factors that influence occupational health behavior with the Lawrence theory approach. The results that the predisposing factor for knowledge workers are limited. Availability of personal protective equipment is an enabling factor. Strengthening factors, namely the coaching support from Puskesmas, the activeness of health cadres. Limited understanding of implementation, absence of work monitoring and continuous appeals and social support are obstacles to the implementation of OSH. Social support who have the potential to optimize the implementation of providing information, motivation and monitoring the implementation of OSH.

**Keywords:** Occupational safety and health, limestone processing, Gunungkidul.

## 1 Introduction

Occupational safety and health (OSH) in every workplace is very important to increase work productivity and product quality. The implementation of rules and inspection on a hazard is a success factor in fulfilling the safety and health of workers (1). The results of Bluff's research state that providing information, training, instruction and supervision is effective in improving the implementation of work in a healthy and safe manner for small and medium industries (2). Aburumman added that success in work safety is a commitment to safety, leadership and behavior monitoring (3). This factor has been implemented in formal sector jobs, but for the informal sector it cannot be implemented.

Informal sector workplaces have fundamental differences such as organization, management and nature of work (4). Informal sector workplaces do not have certain requirements to be able to carry out work in that work area. Awareness, willingness and technical ability are factors that underlie informal sector work so that the heterogeneity of age, sex, education level, work ability and motivation varies widely. The successful

implementation of OSH requires the role of people who are able to act as information givers, trainers, motivators, monitoring and active supervision. According to the ecological theory of Urie Bronfenbrenner that there are subsystems that can affect a person's development, the subsystem of the micro-systems says that environmental factors such as colleagues and family can influence a person (5). Referring to this theory, the microsystem of workers, namely family, community leaders, neighbors, colleagues can play a role in efforts to improve OSH for workers as social support. Some research results show that social support has a role to increase motivation and positive attention, experience information and friendship (6), another role for peers is to provide information on limited human resources, comfortable interaction and supervision (7) and proximity to workers can provide more effective information experience (8).

In Indonesia, the number of informal sector workers is 56.50% (9), while in Daerah Istimewa Yogyakarta (DIY) the number of informal sector workers is 51.59% more than formal sector jobs (10). Gunungkidul Regency is one of the Provinces in DIY with conditions of clusters of karst mountainous areas, so the community uses it as a potential source of income by processing limestone, so the main risk of danger to workers is exposure to limestone dust. Although there is no data on the results of workers' health examinations, if seen from the number of diseases associated with the respiratory tract, acute nasopharyngitis is in first place (8.49%), acute upper respiratory infection is number 3 (4.44%) (11). The government through the Ministry of Health of the Republic of Indonesia has mandated the establishment of an Occupational Health Effort (Pos UKK) as a place for the implementation of occupational health for the community whose guidance is carried out by the Community Health Center (Puskesmas), although the implementation of occupational health by Pos UKK has not been optimally implemented (12).

Based on the description above, to the knowledge of the researcher, there is no research on the needs of workers in the role of social support to increase the implementation of OSH to the knowledge of the researcher, so main of this study is how the workers' needs for social support for limestone processing workers in improving the implementation of OSH in Gunungkidul Regency, DIY Province.

## **2 Methods**

The research was conducted in Gunungkidul Regency, DIY, Indonesia, which has the character of a limestone mountain area, so that the community uses this potential as a livelihood as a limestone processor. Limestone processing workplaces are carried out in groups of 5 to 20 workers. The workplace is owned by a business owner or joint property that is done by neighbors or family of the business owner. The workplace is one or not far from the local residents' settlements. In Indonesia, the implementation / coaching of occupational health in the informal sector is the responsibility of Puskesmas in each sub-district with the establishment of Pos UKK for similar work groups. The function of the Puskesmas is to provide guidance to the Pos UKK.

### **2.1 Data analysis**

Respondent interview data were recorded during the interview process and then compiled into an interview transcript. The step of implementing data analysis begins with the researcher



rereading the interview transcript, moving it into a table / matrix to map the results of the interview and making it easier to see the relationship between the analysis categories, the matrix containing the respondents' answers which are grouped into supporting and inhibiting factors for implementing OSH then identified according to predisposing factors, driving and enabling questions and questions according to the objectives and research concepts of several informants.

## **2.2 Reliability**

Ensuring reliable data to be analyzed by data collection using triangulation of respondents from various variations in source positions. Research informants were 1) limestone processing workers, 2) health cadres, 3) hamlet heads and 4) executors of occupational health programs at Puskesmas. Respondent interview data were recorded during the interview process and then compiled into an interview.

## **2.3 Ethical clearance**

This study has obtained ethical feasibility from the health research ethics committee of the Fakultas kedokteran, Universitas Sebelas Maret No. 176 / UN27.06.6.1 / KEPK / EC / 2020.

## **3 Result**

The work process of limestone processing begins with sorting the rocks that will be put into a grinding machine, followed by grinding limestone into lime powder, milled lime powder is packed into sacks with volumes according to the order ranging from 5 kg to 50 kg. The process has the main potential hazards of exposure to lime dust, ergonomics of work, falling / getting caught in limestone, being hit by a limestone crusher and noise from grinding machines. The work place of limestone processing by the community is known as a factory. Each factory has a minimum of 5 people who carry out joint work activities. Working hours start from 7 AM to 8 AM until 12 PM, then 12 PM to 1 PM is a break time. Work is resumed from 1 PM to 4 PM with a maximum limit of 6 PM or just before the evening prayer time. During the break, the workers return to their respective homes.

Workers are people who live around the factory, the ages of the workers are mostly adults and at the time of observation, there were child workers who helped because they were not in school and learning from home during the Covid-19 pandemic conditions. The workers only know that the risk factors for the hazards that exist are only lime dust, while the others are not a risk. The attitude of the worker agrees to carry out occupational health according to the understanding he knows, occupational health behavior is still not fully implementing occupational health.

The health office provides a policy so that Puskesmas form Pos UKK for people who have similar jobs, Puskesmas provide guidance to the implementation of Pos UKK through occupational health programs. Pos UKK has a health cadres whose job is to carry out monitoring of workers' health and health education to workers. The existing community organizations are meetings of the Rukun Tangga (RT), Hamlet and also meetings such as Posyandu. The management of Pos UKK is carried out by health cadres who are the driving

force for Posyandu / Posbindu activities. During the Covid-19 pandemic the meetings were not actively run.

**Table 1.** The process of analyzing qualitative data from the topic to coding the results of the respondents in-depth interviews

Topic	Meaning Unit	Condensed MU	Code
What occupational health programs are run by the Puskesmas	<ul style="list-style-type: none"> <li>- The health office asks each puskesmas to form a Pos UKK and asks for reports of accidents / illnesses, the Puskesmas provides guidance for a pos UKK, OSH health education, money once a year, coaching once a month, when the puskesmas performs medication (Puskesmas)</li> <li>- The agency recommends the existence of a pos UKK activity at the Puskesmas, but it has not been established because of the lack of community response. (Puskesmas)</li> <li>- Implementation of health checks, health promotion of Personal Parotective Equipment (PPE) use. (health cadres)</li> <li>- Carry out assistance in health examinations.</li> <li>- Advise when working to use a mask to protect yourself.</li> <li>- Conducting tension health checks, giving masks, health education while working using personal protection.</li> </ul>	<ul style="list-style-type: none"> <li>- Socialization of occupational health programs</li> <li>- Establishment of the Pos UKK</li> <li>- Provide assistance to health cadres</li> </ul>	Policy support from the health office, puskesmas
What is the role of the health center health worker	<ul style="list-style-type: none"> <li>- Side counseling in posbindu activities.</li> <li>- Disseminate health programs for workers to wear masks, gather dukuhs and cadres to improve factory performance to use masks.</li> <li>- Assistance of Pos UKK cadres and supervision of occupational health activities</li> </ul>	<ul style="list-style-type: none"> <li>- Providing health education</li> <li>- Carry out coaching for cadres</li> </ul>	There is support from puskesmas health workers
What is the role of health cadres	<ul style="list-style-type: none"> <li>- Move workers.</li> <li>- Referring if there is an accident, conducting medical examinations, providing health education, mobilizing workers.</li> <li>- Tension health checks, health information</li> </ul>	<ul style="list-style-type: none"> <li>- Coordinating workers and the community</li> <li>- Limited health checks</li> <li>- Referring to work accidents</li> </ul>	There is support for the role of health cadres
What is the role of the work owner	<ul style="list-style-type: none"> <li>- Helping the work process, providing PPE masks, suggesting using masks.</li> <li>- Helping work during high orders by inserting limestone into the grinding machine</li> </ul>	<ul style="list-style-type: none"> <li>- Provide PPE for workers</li> <li>- Providing health education</li> </ul>	There is support from the work owner
What is the role of community leaders	<ul style="list-style-type: none"> <li>- Provide support for the implementation of activities for health cadres and workers, provide socialization support</li> </ul>	<ul style="list-style-type: none"> <li>- Supports the implementation of activities</li> </ul>	There is support from community leaders

	from the puskesmas. - Facilitating meetings for health outreach such as PKK, posyandu, etc	- Facilitate meetings	
Do workers understand occupational health	- There is only a small risk of the grinder being exposed to dust. - Beaten, falling stones due to working with stones, wearing a mask so as not to be exposed to lime dust. - Don't think it's important to be careful yourself. - Understand, interfere with breathing, irritate the eyes, become irritated, but sometimes don't use them	- Knowing the occupational risks in the form of dust exposure - Not yet fully understanding the job risks	Lack of understanding of workers about occupational risks and the efforts to prevent them
Are there any rules that apply to workers	- Nothing, only working time from 8 to 16.00 break time from 12.00 - 13.00 (Workers), during breaks the workers return home. - Working time if you leave a little late, no problem. - It's up to the worker how you want to wear a mask or not, the work owner does not require it. - Yes, it is advisable to wear a mask	unwritten rules regarding working hours	There is support for working time regulations, but nothing is specific about occupational health
Do workers wear PPE	- Sometimes I wear. - Workers wear masks. - Wear a mask if the machine beeps	Some are wearing masks	Lack of awareness of using PPE
Who provides PPE procurement	- Work owner. - Buy it yourself. - Masks have been provided by the work owner	Owners of companies and independent workers	Support from the work owner for the provision of PPE

In-depth interviews with several resource persons including 6 workers, community leaders consisting of the head of the village community and 4 health cadres, 3 people managing the occupational health program at the Puskesmas. The results of the study found various supporting and inhibiting factors in the implementation of OSH in limestone processors in Gunungkidul. Supporting factors include 1. Program support and mentoring from Puskesmas, 2. Active motivation from health cadres, 3. Availability of PPE facilities from business owners, 4. Support for meeting facilities from community leaders / hamlets, 5. Support from the community's social environment. Factors that make it an obstacle include 1. Knowledge and understanding of risk factors for hazards that are still low, 2. Lack of self-motivation to carry out occupational health, 3. Lack of monitoring from business owners and other social support.

### 3.1 Inhibiting factors for the implementation of OSH

The knowledge and understanding of limestone processing workers on the risk factors of hazards is a fundamental factor that is an inhibiting factor in the implementation of OSH. The workers consider that the occupational health risk factor is only lime dust and even the fall of the rock is not a big problem. "... yes, the risk is working like this to chalk dust, if a hit or falling of a rock is normal and not a serious problem .." (worker). Workers' lack of motivation in using PPE such as masks, headgear, gloves because they think that using PPE is

uncomfortable and disturbs in work activities, thereby reducing the number of work results. "... if the machine is running, use a mask, but sometimes I forget because after drinking, smoking so I have a mask, but I put it ..." (worker).

Lack of motivation in implementing OSH from business owners and other social circles so that workers do not implement efforts to prevent existing work risk factors. "... the work owner has provided masks for workers and to use them, but it's up to the workers to wear them or not ..." (worker), "... the work owners don't wear them, so workers don't wear masks at work either ... (Health cadres). "... if the owner of the work doesn't require it, it's up to you to use it or not ..." (worker).

### **3.2 Supporting factors for the implementation of OSH**

Government programs for the implementation of occupational health in the informal sector are implemented through the Puskesmas program. Puskesmas that actively carry out coaching become a supporting factor for workers in implementing OSH. "... there is a provision of medical examination tools from the Puskesmas such as scales, tensimeters and assistance during medical examinations to workers ..." (health cadres). "... yes, it was previously told to wear masks, shoes, gloves from the Puskesmas and have their health checked there (hamlet hall) ..." (worker).

Community leaders provide support by providing facilities for the hamlet hall as the location for the Pos UKK or village and RT level meetings for the implementation of activities and socialization of efforts to improve OSH. "... the head of the hamlet fully supports the activities of the cadre women to carry out activities at the hamlet hall or other meetings for health outreach ...". (hamlet).

Health cadres of the Pos UKK are active in providing occupational health services in accordance with the directions given by the Puskesmas health workers, namely tension checks, weighing and referring workers if there are health problems or work accidents to the Puskesmas which is responsible for their area. "... yes, before Covid, there was a meeting for weighing and measuring tension, sometimes I had to go around to workers to do that and report to the Puskesmas, I was taught to also refer sick workers to the Puskesmas". (health cadres).

Availability of masks as personal protective equipment. Business owners providing and giving masks to workers are a facilitation provided so that workers can use them as personal protective equipment from the risk of the dangers of lime dust. "... yes (masks) have been provided, if they can't be used, they can take them again, they have been provided ..." (worker)

The social conditions of the community that support the implementation of work in the community because the location of the work is integrated with the residential area. There are rules but not written that already exist in the community, such as working time which starts in the morning around 07.00 to 08.00 WIB until 12.00 WIB before midday prayer time and lunch time. Work is resumed from 13.00 to 16.00 WIB, this time is flexible according to factory production conditions. The working time limit for production machines must be turned off just before the maghrib call to prayer until the morning, besides that if a resident is having an event such as a wedding or someone dies, some of the areas closest to the location will not carry out the production process. "... yes, the working time is as agreed upon, starting between 07.00 or 08.00 to 12.00 then they go home and then resume at 13.00 until it finishes at approximately 16.00, which means that in the afternoon and evening, you cannot turn on the milling machine, or if you are currently someone died ... "(hamlet)

The implementation of OSH in limestone processors has the support of resources from the government, work owners and the community. Government support that has been provided, such as assistance to health cadres training, and the formation of a Pos UKK organization as the spearhead in the implementation of occupational health. support from business owners including the provision of personal protective equipment such as masks, providing food and drink at workplaces. Support from the community with shared ethics in the production process paying attention to work and rest time according to unwritten ethics in the community and mutually agreed upon, facilitation from the hamlet to carry out OSH-related activities in hamlet events as well as the active health cadres of the Pos UKK to serve workers.

#### 4 Discussion

In general, the factors of behavior change in health include intrapersonal factors, interpersonal theory and community. Intrapersonal factors such as cognitive domains, past experiences and motivations. Interpersonal combines social structure factors and individual characteristics. According to the theory developed by Lawrence Green and Kreuter that the problem analysis begins with a social, administrative and policy assessment, namely the Precede step. Precede includes analysis of Predisposing, Reinforcing, Enabling factors (13).

Safety behavior and attitudes are influenced by a person's knowledge of safety. This is in accordance with the results of the research by Marquardt Hoebel (2020) that there is a significant change in the elements of safety culture after participating in training (14), so that limestone processing workers' knowledge about occupational health and safety is one of the inhibiting factors in the implementation of occupational health for limestone processors in Gunungkidul. Education is a factor related to the level of public knowledge, education is very important in the implementation of occupational health even though it is not the main one, it is necessary to look at cultural structures that can describe the attitudes of society and individuals towards new social norms to focus attention on health behavior (15), so that in stone processing lime which is a rural community needs to involve social structures that can support the implementation of occupational health. The structure of the community in the limestone processing area that the workplace is in a residential area and the workers are mostly local people. The community is led by a head of a village called dukuh. The structure of the community that promotes occupational safety and health is a Pos UKK organization which is managed by trained health cadres. The function of health cadres as information providers about occupational health is the result of research by Caffaro et al (2018) that training can make a major contribution to the achievement of effective OSH information, but this review shows that more evidence is needed to guide the development of effective training activities (16).

The finding of inhibiting factors in the implementation of work safety and health of limestone processing is the lack of information, monitoring and motivation in the implementation of occupational safety and health from the work owner and other social support in the workplace and in the community. according to Aburumman (2019) the most successful interventions are related to the importance of safety, leadership style and behavior monitoring (3). Lack of supervisor support increases the likelihood of physical injury in the workplace. The risk of physical injury is 3.5 times higher among workers who are vulnerable and lack supervisory support (17). Limestone processing work is an informal sector job so that there is no formal relationship between workers and employers but based on kinship so that

there are no written rules that bind formally to be obeyed together, especially regulations related to occupational safety and health. This condition is not in line with the opinion of the research results of Andersen et al (2019) that increasing the implementation of occupational safety and health is the enforcement of legal regulations and the implementation of inspections on a hazard and the fulfillment of workers' safety and health (1).

From the identification of inhibiting and supporting factors for the implementation of work health in limestone processing, there is a social condition that can be optimized in the role of improving occupational health with the function of providing information, motivation and monitoring of the implementation of occupational health at work. Potential workers who come from the community where they live, take time off to return home so that the intensity that is often encountered for workers is family and co-workers. so that the social potential of the community can be used as a social support group. Social support that can play a role such as family and co-workers. Family support acts as a provider of emotional support and instrumentation support that can increase positive values in work outcomes (18). The results of research by Bush et al (2014) on the evaluation of a pilot program for forest immigrant workers health counseling in southern Latin states that working group health educators can increase work capacity, improve leadership and community access to information and health and safety resources. Peer support can improve positive motivation and attention, experiential information and friendship (6). Regarding social support, it is also in line with the theory of Urie Bronfenbrenner that in the individual experience, it is the driving force of behavior, in this case, the practice of occupational health, where the micro-system sub-system is the closest personal environment to workers, namely family, co-workers, and neighboring communities. So that the support of family and coworkers can influence worker behavior. The relationship between microsystems can influence each other into a larger sub-system, namely the mesosystem. In a more complex sub-system, namely the ecosystem, even though it does not interact directly with workers, it can affect workers' behavior, for example, the involvement of information obtained by family, coworkers and other social communities can affect the behavior of workers (5). The role of social support can increase motivation which will increase the level of participation in the implementation of OSH (19). Based on the above discussion, so that the implementation of OSH in informal sector work can be improved, further research can be carried out to optimize the role of social support, namely family support and peer support.

#### **4.1 Research limitations**

Triangulation is done by triangulating sources of informants, triangulation of data sources such as documentation of the results of recording cannot be done because the organization is informal so that the data cannot be shown from the data source. The results of interviews from various information sources based on roles and levels in the community can be a reliable data source according to the existing conditions of limestone processing workers.

## **5 Conclusion**

Supporting factors for the implementation of OSH are the assistance policy from the Puskesmas, the provision of PPE facilities in the form of masks by the work owner, the active role of health cadres of the Pos UKK and the support of local community leaders. The

inhibiting factors for the implementation of OSH are limited knowledge, lack of motivation from both workers and the working community, lack of monitoring from business owners. Further research suggested is to develop the role of family and peer support to increase knowledge, attitudes and practices of OSH in limestone processors.

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# Effectiveness of Aerobic Exercises in Obesity Cases Pertamina MOR IV Semarang Employees

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**Abstract.** The purpose of this study was to determine the effectiveness of aerobic exercise in losing weight and maintaining the health of Pertamina MOR IV Semarang employees. The method used in this research is descriptive quantitative. The total number of respondents who participated was 44 people provided that all respondents were internal employees of Pertamina MOR IV Semarang and were willing to be part of this research, indicated by completing the willingness sheet to be a participant. The instrument used was a physical condition test using the Tecumseh test report, aerobic exercise, and jogging. The results of this study found that 11 people (25%) were effectively able to lose weight and maintain health. 19 people (43.2%) were able to lose weight regularly, and 14 people (31.8%) were able to maintain their normal condition. Overall, this study proves that a good lifestyle and diet will maintain everyone's health.

**Keywords:** Aerobic exercise, Obesity, Health, Physical Fitness.

## 1 Introduction

Health is very important because without good health, it will be difficult for every human being to carry out his daily activities. According to Griwijoyo et al. health is the foundation or basis for physical conditions that are indispensable for the success of carrying out work [1]. In addition to a lifestyle or lifestyle, the lack of understanding and awareness of Pertamina MOR IV Semarang employees to exercise also affects their health improvement. Even though the Pertamina MOR IV Semarang office has facilitated a fitness room, volleyball court, and basketball, which should have been maximized for sports. One of the health problems that may be experienced by employees is obesity. According to James W. P et al. obesity is an excessive or abnormal accumulation of fat that can interfere with health [2]. The main cause of obesity is an imbalance between energy intake and energy expenditure. Some of the risk factors that cause obesity are genetic factors, psychological factors, inappropriate lifestyle, wrong eating habits, stress, and other trigger factors [3]. According to Fadli and Sutisna, several impacts that occur in the long term due to obesity include the following: (1) Insulin resistance syndrome generally decreases the amount of insulin in the blood. As a result, it triggers Type 2 Diabetes Mellitus. (2) High Blood Pressure, obesity is one of the main causes affecting blood pressure. (3) Coronary Heart Disease, a disease that occurs due to narrowing of the coronary arteries. The risk of developing coronary heart disease increases with changes in the occurrence of excessive weight gain. (4) Respiratory disorders such as asthma, shortness of breath, slitting during sleep, and sleep apnea. This is due to the accumulation of excess fat

under the diagram within the chest wall which stresses the lungs. (5) Joint disorders, which are often felt are low back pain and pain due to arthritis [4].

Based on the results of the survey and the facts in the field during observations found by the research team, the MOR IV area of the operational area of Central Java (Central Java) found more than 40% of employees are obese, which affects their physical fitness level. A person needs to strive to be healthy by having a lifestyle that supports health, such as by adopting a healthy eating style, paying attention to stress management problems, and having regular physical activity [5]. Therefore it is necessary to have a formula or program to solve this problem. Exercising regularly is a way to improve human health and fitness, especially aerobic exercise. Aerobic sports are sports activities with low to moderate that is carried out continuously, such as gymnastics, running, and cycling [6]. Energy metabolism in aerobic exercise runs through the burning of stored fat, carbohydrates, and a small portion (less than 5%) of the breakdown of protein stores in the body to produce ATP. Apart from going through a regular exercise process, improving fitness or health must also be accompanied by adopting a healthy and nutritious diet, getting adequate and regular rest, and reducing excess stress because, in the end, it will affect your lifestyle and health. Many epidemiological studies have confirmed that physical activity can reduce the risk of various morbidity related to age or aging as well as the risk of mortality from any cause [7].

According to several previous studies, stated that moderate-intensity aerobic exercise can significantly reduce body fat and body weight [8]. Another opinion from Budiasih, she states that several factors that affect a person's physical fitness are knowing the lifestyle and diet [9]. From the above references, it can be seen that aerobic exercise has the opportunity to lose weight and burn fat significantly. Therefore, researchers are interested in researching aerobic exercise as a medium or treatment to lose weight for Pertamina MOR IV Semarang employees. The purpose of this study was to determine the effectiveness of aerobic exercise in losing weight and maintaining the health of Pertamina MOR IV Semarang employees.

## 2 Methods

The method used in this research is quantitative descriptive with instruments in the form of direct observation related to the progress of Pertamina employees in carrying out the weight loss program. The data collection technique used one group pre-test and post-test [10]. The results of the pre-test and post-test are used as comparative data and an indicator of the success of a study. The total number of participants used is 44 people provided that all participants are internal employees of Pertamina MOR IV Semarang and are willing to be participants in this research indicated by completing a willingness sheet to become a participant. The instrument used was a physical condition test using the Tecumseh test report, aerobic exercise, and jogging. The procedure for implementing the test in this study begins with socializing and understanding to employees regarding a healthy diet and proper diet, then mentoring aerobic exercise training to employees during the program.

The measurement process itself was carried out by the research team from UNNES, starting from measuring nutritional status to employee anthropometry. Assistance to respondents was carried out for 4 months with a predetermined training time (flexible) following the employee's busy level. Normally it is done in the afternoon, except for treatment or sports that are done on Saturdays and Sundays, usually in the morning.

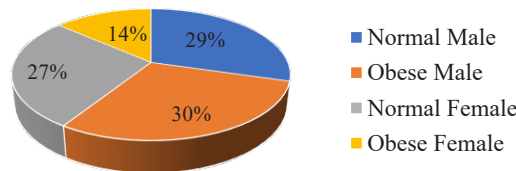
### 3 Result and Discussion

The first stage of this research is to measure each employee of Pertamina MOR IV Semarang to classify normal employees with obese employees. In general, from a total of 44 employees, the following results were obtained:

**Table 1.** Employee Health Status

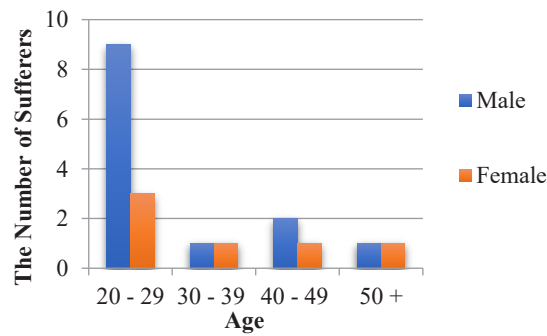
Status	Employee Data		Total
	Male	Female	
Normal	13	12	25
Obesitas	13	6	19
<b>Total Respondents</b>			<b>44</b>

Table 1 above is the initial data that serves as a guideline or basis for conducting this research because the total respondents and the number of obese respondents, in general, are listed in it. The participant comparison ratio can be seen in Figure 1 below:



**Fig. 1.** Percentage of Pertamina MOR employee health status IV

The data in Figure 1 above states that a total of 44% (13 men and 6 women) of employees are obese or overweight, while the rest, namely 56%, are normal.



**Fig. 2.** Data on obesity respondents for Pertamina MOR IV Semarang employees

Based on the data in Figure 2, it can be seen that the average young employee between 20-29 years is obese. Based on the data above, the writer intends to provide treatment in the form of aerobic exercise as a method to lose weight for Pertamina MOR IV Semarang employees. Here are the treatments or training patterns:

**Table 2.** Pertamina Employee Training Program

No	Treatment Aerobics	Intensity/ Week	Day	Duration/ Minute
1	Tecumseh	2	Tuesday Wednesday	20 - 40
2	Jogging	1	Saturday	60
3	Gymnastics	1	Sunday	60

The intensity and time of training in table 2 above are made based on the level of busyness and schedule of Pertamina employees during the study. Therefore, it can change at any time according to the conditions and physical conditions of the employees. For this type of exercise, it can also be changed or combined.

Based on data from the Indonesian Minister of Health Regulation No. 8 of 2019 [11], states that the standard of energy or calorie needs of the human body for men is + - 2500 and for women + -2000, provided that they adjust their weight and height. Several studies suggest that women are more prone to obesity, such as the data on the prevalence of obesity according to the (Riskedas, 2013) increasing when compared to Riskedas 2010. The male obesity rate in 2010 was around 15% and now it is 20%. In women, the percentage is from 26% to 35% [12]. However, it does not rule out that men can also be obese with higher intensity, such as the case that researchers currently experience, it all depends on internal and external factors in each respondent starting from age, genes or heredity, level of physical activity, diet, lack of excessive rest and stress. Based on the researcher's analysis, the cause of the high level of obesity, especially in men at Pertamina MOR IV Semarang, is due to the high level of calories that enter the body, which is inversely proportional to the low level of physical activity undertaken so that the calories that enter the body are stored which will eventually become the main cause of obesity or overweight, especially when seen from Figure 2, it is clear that most obese people are aged 20-29 years, which if we look at the increasingly sophisticated era, young people are too late in technology and make them forget about sports.

According to the data in Figure 1 which contains the percentage of a total of 44 respondents including several influencing factors such as the value of the Body Mass Index (BMI), age, gender, health level (obesity), it is stated that the total respondents are obese as much as 44% of For the total sample, a formula is needed to solve these problems so that the level of health and performance of workers in related institutions can be increased. The treatment is carried out routinely in a week with the provisions of the Tecumseh, Jogging, and Gymnastics Tests, for the provision that the methodical test is carried out every morning before work by asking the agency for a little time to be given a little leeway. As time goes by, the test can be adjusted according to the needs and physical conditions of the respondent so as not to force it. However, in its implementation, it must also be balanced with a healthy diet, by paying attention to the levels of carbohydrates, fats, and proteins that enter the bodies of employees. Rosidji et al. stated that to lose weight a person needs to burn more calories than what enters the body [13]. The following are some data on the number of calories burned during aerobic exercise according Yuliasuti and Anggoro including (1) Static cycling: 520 calories per hour, (2) Stair-step machine (stair treadmill): 450 calories per hour, ( 3) Freestyle swimming: 450 calories per hour, (4) Jogging: 450 calories per hour [14].

For the Tecumseh data itself, it has the following results from a total of 19 respondents who are obese, 11 respondents experienced an increase with their respective levels where the

highest increase at 71.43% was obtained by Respondent 1, and the lowest increase was 2.04% obtained by Respondents 4. While the other 8 respondents got results below the average starting from 0% by Respondents 14 and Respondents 16 (no increase) to the farthest below the average at a percentage of -27.27%, namely Respondents 13. The purpose of this test is to measure a person's body's ability to adjust to the workload and recover from the work's origin or it can be called the body's aerobic ability [15]. The height of the bench, the rhythm of the ups and downs of the bench, the length of time going up and down the bench, and when to measure the pulse of recovery differentiate one test from another [16]. The measurement results are influenced by several factors including age, body condition, gender, and the readiness and seriousness of the respondent in carrying out the treatment. That means the aerobic treatment as mentioned above is proven to be able to lose weight with a structured and periodic implementation program according to the method developed by the researcher and balanced with a good lifestyle.

#### 4 Conclusion

The results of this study found that 11 people (25%) were effectively able to lose weight and maintain health. 19 people (43.2%) were able to lose weight regularly, and 14 people (31.8%) were able to maintain their normal condition. Overall, this study proves that aerobic exercise such as jogging, gymnastics, and Tecumseh tests can significantly reduce body weight coupled with a good lifestyle and diet to maintain everyone's health. The existence of continuous supervision and monitoring is expected to be able to maintain and maintain physical condition supported by routine aerobic exercises that are programmed.

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# The Effectiveness of Vitamin C as an Antioxidant Against the Pulse of Recovery After Physical Activity in the New Normal

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**Abstract.** Physical activities in new normal led to changes in body temperature as well as the amount of oxygen consumption, pulse and changes in chemical compounds in the body. Vitamin C can prevent tissue damage by reducing the production of oxidants which have a protective effect against muscle injury. This study aims to determine the effect of vitamin C as an antioxidant on pulse recovery after physical activity on hockey athletes of PON South Sulawesi in the new normal. This type of research is an experimental with a randomized group design pretest and posttest design. The Subjects of this study were 30 South Sulawesi PON hockey athletes and the data was analyzed with T test. The result of this research showed that the group which was given Vitamin C is greater than the group that was only given unsweetened syrup with comparison 48,60 and 39,60. Thus, can be concluded that the provision of vitamin C has better effects on pulse recovery compared to the group that was only given unsweetened syrup.

**Keywords:** Recovery, Physical activity, Pulse, New normal.

## 1 Introduction

During the Covid 19 pandemic, it is not new anymore that the implementation of any program is carried out independently, including physical activity (exercise). Since the WHO declared global Covid-19 emergency in January 30, 2020 [1]. Public physical activity during the COVID-19 pandemic in several countries has decreased, so that many people have gained weight and degraded of mental health [2,3] In total, the average time spent on physical activity has decreased dramatically, from 540 minutes/ week (before the pandemic) to 105 minutes/ week (during the pandemic), resulting 435 minutes in total average [4] In the new normal, we need to prepare and develop ourselves to carry out a healthy lifestyle in order that our immune system is maintained, one way is by doing an exercise [5]. Several studies have shown that physical exercise increases the level of cytokine production mediated through the TLR (toll-like receptor) signaling pathway during microbial infection could increase host resistance to invasive pathogens [6,7]. Exercise is one of the physical activities with a specific purpose, including it could increase the efficiency of the body's work or what is commonly referred as (increasing physical fitness). Exercise is also a movement of the body for a certain period of time[8]. Exercise affects energy balance and leptin response, type I IFN responsiveness, muscle PDC activation, further increasing serum anti-influenza virus-specific IgG2c antibody percentage and

CD8 + T cells in BAL; all possible mechanisms are important in host protection and infection [6,9].

Hockey is an exercise or a sport which is always competed in the highest multi-events in the world of the Olympics, Asian Games, SEA Games, and other championships including the National Sports Week or originally called Pekan Olahraga Nasional (PON). Therefore, hockey is a sport that requires a lot of energy, so that athletes are required to have a good level of physical condition to achieve optimal performance. A good hockey player needs to develop physical fitness, especially in this new normal. Physical activity requires 9 support systems that needed energy so that movements are performed by muscles [10], physical activity that is carried out regularly, with a certain period of time will improve one's physiological condition. Where the perpetrator of every physical activity in sports training results in changes in the anatomical, biochemical, psychological, and physiological conditions. Thus, exercise can train the body to improve the functional abilities of the physic [11]. An additional benefit of exercise is an increase in the antioxidant defense system and a reduction in oxidative stress [12,13]. However, if our bodies do physical activity with high intensity, the body will become weak and the ability to move within normal limits is reduced, in addition, besides the cooperation and cohesiveness of hockey athletes, they must also have excellent physical condition, especially endurance so that athletes do not get tired easily. Exercise will cause a response in the form of an increase in pulse rate, so that an increase in blood lactic acid levels and pulse are often used as indicators of intensity in exercising [7,14,15].

The frequency of heart rate and stroke content will increase 95% as long as a person does maximum exercise. Thus, the body is said to be experiencing fatigue [8] further involvement of intense (continuous) training without adequate recovery will lead to accumulated fatigue. Some heart rate monitors can be used to predict maximal oxygen absorption (VO<sub>2</sub>Max), so as to identify changes in fitness during exercise and early signs of overtraining [16]. Poor physical condition can be improved by increasing endurance and fast recovery [17,18] therefore athletes must have good physical condition in order to recover quickly [19] endurance has an influence on the body's ability to perform recovery. Maximum physical activity can trigger an imbalance between the production of free radicals and the body's antioxidant defense system known as oxidative stress [13,20].

During maximum physical activity, oxygen consumption throughout the body increases even up to 20 times, whereas oxygen consumption in muscle fibers is estimated to increase 100-fold [21] this increase in oxygen results in increased production of free radicals which can cause cell damage [15] defense of endogenous antioxidants and exogenous antioxidants to ward off free radicals. Antioxidants are substances that can delay, prevent or eliminate free radicals [22]. Coconut sugar has benefits, namely as an anti-bacterial, anti-inflammatory and antioxidant, where the antioxidant content in coconut sugar, one of which is Vitamin C [23]. The concentration of Vitamin C in the body that experiences oxidative stress is lower than the level of vitamin C in the normal body [24].

Physical activity given to the hockey athletes of PON South Sulawesi in this new normal, resulted in changes in body temperature and the amount of oxygen consumption, pulse and changes in chemical compounds in the body. Vitamin C as an antioxidant can reduce the production of oxidants so that it can reduce levels of free radicals in the body, prevent tissue damage, protective effect against muscle injury. With this, this study aims to determine the effect of giving vitamin C as an antioxidant on pulse recovery after physical activity on hockey athletes of PON South Sulawesi in the new normal.



## 2 Method

This research used an experimental research design by using randomized group pre-test and post-test design. This method is used to determine the effect of one or more variables on other variables. According to Arikunto, Experimental research is research that is intended to determine whether there is a result of something that is imposed on the subject inquired. The subjects in this study were South Sulawesi's hockey male athletes of PON, have a weight between 50-70 kg, have an age between 18-26 years, have a normal body mass index (BMI) and blood pressure, are not undergoing medical or postoperative treatment 6 months before the study, are not seriously injured, does not consume energy drinks, does not do any physical activity before the test, did not have a history of cardiovascular disease. The total of samples was 30 divided randomly into 2 groups. The first group was the control group (A1) and the second group was the treatment group (A2), each group consisting of 15 people. Retrieval of research data in the form of a pulse was held at the UNM Hockey Field. The researcher used a stopwatch to count pulse. Pulse measurement would be done 2 times, the first before treatment (pretest), then 15 minutes after consuming vitamin C (posttest). In this study, the measurement of physical activity was carried out (push-ups, sit-ups, and harvard step tests) where the sample would perform the physical activity in 60 seconds (1 minute). Kolmogorov Smirnov was used to test the normality of the data. The test criteria, if the statistical significance of the calculated value is greater than  $\alpha = 0.05$  (5%), the data distribution is normal. To calculate the data homogeneity test, the Levene Test formula was used. The test criteria, if the statistical significance of the calculated value is greater than  $\alpha = 0.05$  (5%), the data variance is homogeneous. The data analysis technique used is the T-test using the SPSS 25 program.

## 3 Results and Discussion

### 3.1 The characteristics of research subjects

**Table 1.** Descriptive statistics of sample (average : age, height, weight, IMT)

	N	Minimum	Maximum	Mean
Age	30	18	26	19.67
Weight	30	52	70	59.33
Height	30	144	170	161.90
Body Mass index	30	17	24	18.89
Valid N (listwise)	30			

The characteristics of research subjects include: age, weight, height, and body mass index, in treatment 1 and 2. Characteristics of research subjects before receiving treatment could be seen in Table 1 above. Table 1 showed that the mean age of the subjects was 19.67 years, with an average weight and height of 59.33 kg and 161.90 cm. The Body Mass Index (BMI) of the subjects averaged 18.89 kg/ m<sup>2</sup>.

**Table 2.** Descriptive statistics of pulse.

Variabel	Mean	Median	Std. Deviation	Minimum	Maximum
Pretest Vitamin C	118.87	119.00	2.588	114	123
Posttest Vitamin C	70.33	71.00	5.460	62	80
Pretest Unsweetened Syrup	112.67	113.00	2.410	109	117
Posttest Unsweetened Syrup	73.07	73.00	3.195	117	78

Meanwhile, the pulse during resting or the pulse before doing physical activity was carried out in this study (push-ups, sit-ups, and harvard step test). Treatment 1 was given Vitamin C and treatment 2 was given with unsweetened syrup. Each of them has a mean of 118.00 times / minute and 112.67 times / minute. It could be seen in Table 2.

### 3.2 Pulse recovery

**Table 3.** Test of normality, *kolmogorov-smirnov*

Variabel	Statistic	df	Sig
Pretest Vitamin C	.187	15	.165
Posttest Vitamin C	.132	15	.200
Pretest Unsweetened Syrup	.110	15	.200
Posttest Unsweetened Syrup	.141	15	.200

To fulfill the statistical test that would be used, the normality test of the data from the measurement of the speed of pulse recovery after treatment is carried out first. The normality test used the Kolmogorov-Smirnov test, which showed that in treatment 1, by giving vitamin C as much as 250 cc from 500 grams of dissolved vitamin C, before doing physical activity (push ups, sit ups, and harvard step tests) the value  $p > 0.05$ , while in treatment 2, by giving 250 cc of unsweetened syrup,  $p$  value  $> 0.05$ . The data could be seen in Table 3. Furthermore, based on the homogeneity test table below, it can be seen in Table 4 using Levene Statistic analysis, obtained a sig value of  $P > 0.05$ . So it can be concluded that the data has a homogeneous variance.

**Table 4.** Homogeneity test, *Levana Statistic*.

Variabel	Levena Statistic	Df1	Df2	Sig
Pulse Rate Pretest	.067	1	28	.797
Pulse Posttest	4.036	1	28	.054

Thus, the pulse recovery data after doing physical activity (push-ups, sit-ups, and harvard step tests) had a homogeneous and normal distribution. Based on this normality test, the statistical test used to compare the effect of vitamin C and unsweetened syrup on pulse recovery after physical activity (push-ups, sit-ups, and harvard step tests) was a parametric test, paired t test. To compare the effect of giving Vitamin C and unsweetened syrup on pulse recovery after

physical activity (push-ups, sit-ups, and harvard step tests), a parametric statistical test was applied which was the paired T-test, the results were showed in the table. 5 and Table 6.

### 3.5 T-Test (Paired Sampel T-Test)

**Table 5.** The effect of giving Vitamin C and unsweetened syrup on recovery of the pulse.

	Std. Deviation	t	df	Sig. (2-tailed)
Pair 1- Pretest-posttest Vitamin C	6.022	31.213	14	.000
Pair 1- Pretest-posttest Unsweetened Syrup	4.323	35.480	14	.000

Based on the paired sample T-test table in Table 5. Pair 1 was given vitamin C and Paired 2 was given unsweetened syrup using the paired sample t-test above, it could be seen in the table above, the sig value is above 0,000. So it can be concluded that there was an effect of giving Vitamin C as an antioxidant on pulse recovery, as well as giving unsweetened syrup.

**Table 6.** Differences in the effect of vitamin C and unsweetened syrup.

Variabel	N	Mean
Difference in Vitamin C	15	48.60
Differences in Unsweetened syrup	15	39.60

Based on the results of the analysis using paired t-test, using the mean difference technique in each group. The results obtained were that if the average group given vitamin C as an antioxidant was greater the result was 48.60 than the group given unsweetened syrup was 39.60, the data can be seen in Table 6 above. The difference in pulse recovery in the two treatment subjects was statistically significant, with a value of  $p = 0.000$  ( $p < 0.05$ ). The subjects of this study were 30 hockey athletes of PON, the subjects were selected and determined after fulfilling the research criteria set by the researcher. The mean age of the subjects was 19.67 years. The average weight of the subjects was 59.33 kg, while the mean height of the subjects was 161.90 cm. The mean body mass index (BMI) of the subjects was  $18.89 \text{ kg / m}^2$  which gave a description of a person's nutritional status. The average resting pulse rate in both treatments was treatment 1, has given Vitamin C and treatment 2 hs given unsweetened syrup, each of which had a mean of 118.00 times/minute and 112.67 times/minute. To determine the distribution of research subjects before treatment, a normality test was carried out using the Kolomogorov-Smirnov. The variables tested included resting pulse rates for treatment 1 and 2. The statistical test results for normality showed a normal distribution ( $p > 0.05$ ) for all variables.

In this study the subject was given 2 different treatments. The first treatment was given 250 cc of Vitamin C and the two different treatment subjects was given 250 cc of unsweetened syrup. Before being given vitamin C and unsweetened syrup, the resting pulse rate was measured first. Thirty minutes later, the subjects of the research carried out physical activities (push-ups, sit-ups, and Harvard step tests) while still paying attention to health protocols, the physical activity was modified for 3 minutes, which was divided into 3 stages with each stage being 1 minute. After training, the measurement of the pulse recovery to the resting pulse is measured. Based on data analysis on the average rate of pulse recovery in the two types of treatment, it was found that treatment 1, which was given vitamin C as much as 250 cc, 30 minutes before doing physical activity (push-ups, sit ups, and harvard step tests) had a pulse recovery pulse better than treatment 2, which was given 250 cc of unsweetened syrup.

Exercise causes excessive sweating, the content in it is a variety of electrolytes and other substances, which vary from individual to person and for each individual will also differ depending on the condition [25]. Research shows that loss of fluids equivalent to 2% of body mass can cause decreased performance and loss of fluids by 5-6% of body weight will increase the pulse rate[26]the work of the heart will automatically increase.To maintain stable blood flow in supplying oxygen and energy fuel to muscles, giving effective fluids will minimize changes in the pulse so that will delay fatigue and shorten the length of the pulse recovery period [27,28]. The main response that occurs during physical activity is an increase in body metabolism. All energy supply systems are involved in this response with a relative proportion of contribution, depending on the intensity and duration of activity [25] while physical exercise/ exercise also induces an increase in oxygen uptake associated with a 10 to 20-fold increase in cellular metabolism and intensive production of radicals oxygen [13,18].

When doing physical activity or exercising, it will result in an increase in pulse which is caused by reduced oxygen consumption in the body. Free radicals formed can react with macro molecules in cells such as DNA and proteins or with membrane lipids, causing damage to cell function [29]. If the number of free radicals exceeds the body's ability to cope with it, a condition called oxidative stress can arise [15,26,30]. The presence of oxygen radicals as a result of the use of oxygen by these cells can be overcome by an antioxidant system that is both enzymatic and nonenzymatic contained in body or those from outside the body (exogenous)[22,23,31]. As an antioxidant, Vitamin C has the ability to be 2 times higher than  $\alpha$ -carotene and 10 times better than  $\alpha$ -tocopherol. Antioxidants will protect important cellular biomolecules, including lipids, proteins and DNA thereby creating an initial defense against free radicals in the body[24,29,32].

Thus, giving vitamin C will increase the body's ability to ward off free radicals that arise as a result of an increase in cellular metabolism during physical activity or exercise. To find out the comparison of the two types of treatment in restoring the return of the exercise pulse to the resting pulse, it is seen through the paired t test. Based on the results of data analysis, it can be seen that the average pulse recovery in treatment 1 is given 250 cc of vitamin C which has been dissolved in water after physical activity (push-ups, sit ups, and Harvard step tests) for 3 minutes and treatment 2, given 250 cc of unsweetened syrup before doing the same physical activity is significant, which was seen as  $p = 0.000$  ( $p < 0.05$ ).

#### 4 Conclusion

There were significant differences. The results of data analysis showed that the group which was given Vitamin C is greater than the group that was only given unsweetened syrup with

comparison 48,60 and 39,60. Thus, can be concluded that the provision of vitamin C has better effects on pulse recovery compared to the group that was only given unsweetened syrup to hockey athletes of PON South Sulawesi after physical activity in the new normal era.

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# Body Mass Index Profile of Physical Education Teacher Candidates

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**Abstract.** This study aims to analyze the Body Mass Index (BMI) of PE teacher candidates of Sriwijaya University during the Covid-19 pandemic. A survey used as the research method (n=159). The data was collected by measuring the height and weight of the candidates, and the BMI was calculated using the formula of body mass divided by the square of the height in kg/m<sup>2</sup> units. The quantitative data analysis that was used in this study was the percentage of the candidates to map the physical fitness profile based on the BMI. The result of this study shows that the BMI of the candidates were as follows: underweight 28 (17,61%); normal or healthy weight 123 (77,36%), overweight 8 (5,03%). The underweight and overweight candidates are suggested to evaluate and improve their physical activity and nutrition in order to make their physical fitness better and their body weight ideal.

**Keywords:** BMI, PE teacher candidates.

## 1 Introduction

Physical education (PE) is an important part of education holistically, which aims to improve some aspects of students' life through physical activities that are planned systematically to achieve education goals. However, the main aspect which developed through physical activity in physical education is physical fitness, because physical activity encourages students to use their bodies actively and sustainably. Physical activity has been documented to have many benefits among students [1], [2]. The benefit of physical fitness on resilience is in part based on the recognition that physical fitness, achieved through physical activity and/or regular exercise, can induce positive psychological benefits, protect against the potential consequences or stressful events, and prevent many chronic disease [3]. Physical fitness is an important indicator of healthy status in children and adolescents, and certainly a good predictor of health status in life [4].

In an educational context, students identify teachers as role models who play an important role in their learning processes [5]. PE teachers require to be fit as the role model of students. A positive role-model that facilitates learning healthy life skills can be developed in a physical education setting [6]. When students see PE teacher in a good shape and practicing healthy lifestyle, they are more likely to want to be fit or practice those healthy behaviors themselves. Ironically, while PE teachers need to fit, previous studies found that some PE teachers deficiencies in physical activity and health-related fitness content knowledge [7], [8]. Without

sufficient knowledge, it will be more difficult for PE teachers to maintain fitness, let alone teach students practicing healthy lifestyle.

Undergraduate students, whose major is Physical Education, are PE teacher candidates. The students are projected to be PE teachers in the future by studying various aspects related to health science, sports training, sports coaching and other social sciences. While studying, they are also expected to be fit and maintain their physical fitness. The habit of living healthy is one of important factor the undergraduate students must have because they will be the role model of their future students. Although the students are expected to be fit, a previous study shows that more than 20% undergraduate PE students in overweight or even obesity category [9].

Sriwijaya University is one of state university in Indonesia that has PE major under the Physical Education, Health, and Recreation study program. There are several practical courses (e.g. Basic Basketball Skill, Basic Volleyball Skill, Basic Athletic Skill, etc.) that expected to help maintaining or even improving the undergraduate PE students of Sriwijaya University body mass index (BMI) level. The problem is that during this Covid-19 pandemic there are no practical class and all of classes have been being done online. As schools and universities were ordered to close to contain the spread of the coronavirus, traditional physical classes were transitioned to an online mode of learning. PE centers on physical activity and is clearly distinct from general knowledge-based subjects [10], therefore, online practical learning effectiveness still needs to be tested.

This study aims to analyze the BMI of PE teacher candidates, during the Covid-19 pandemic. The teacher candidates are the undergraduate students of Sriwijaya University Physical Education, Health, and Recreation study program, that still undergoing practical courses using multiple online based learning.

## **2 Method**

The research method used in this study was survey method. 159 (97 male and 62 female) undergraduate students of Sriwijaya University Physical Education, Health, and Recreation study program participated in this study through an accidental sampling. The data was collected by measuring the height and weight of the candidates. The measurement was done gradually under covid-19 health protocol. BMI was calculated using the formula of body mass divided by the square of the height in kg/m<sup>2</sup> units. The quantitative data analysis that was used in this study was the percentage of the candidates to map the physical fitness profile based on the BMI.

## **3 Results**

The results which show the overall BMI level of PE teacher candidates in Sriwijaya University Physical Education, Health, and Recreation study program, both male and female can be seen in Table 1.



**Table 1.** Weight and height of teacher candidates

Data	Male		Female	
	Mean	St.Dev	Mean	St.Dev
N	97		62	
Age	20,38	1,25	19,97	0,96
Weight (kg)	60,85	8,29	52,39	5,89
Height (m)	169,26	5,38	158,35	5,70
BMI (kg/m <sup>2</sup> )	21,20	2,38	20,89	2,03

Table 1 shows that male PE teacher candidates have a greater body weight, body height and BMI than female candidates. Based on the data in table 1, the physical education teacher candidates in Sriwijaya University Physical Education, Health, and Recreation study program during the Covid-19 pandemic, as follows: The BMI of male PE teacher candidates average is 21,20 kg/m<sup>2</sup> which is in the normal category, while the status of the average female candidates is 20,89 kg/m<sup>2</sup> which is also in the normal category (healthy weight).

The detailed profile data of BMI categories for all male and female subjects can be seen in Table 2.

**Table 2.** BMI category of teacher candidates

Category	Frequency	Precent
Underweight	28	17,61
Normal	123	77,36
Overweight	8	5,03
Obese Class I (Moderately Obese)	0	0
Obese Class II (Severely Obese)	0	0
Obese Class III ( Very Severely Obese)	0	0
Total	159	100

Table 2 shows that the BMI of physical education teacher candidates in Sriwijaya University Physical Education, Health, and Recreation study program during the Covid-19 pandemic. There were 123 (77,36%) subject were normal (healthy weight), 28 (17,61%) subject were underweight, and 8 (5,03%) subject were overweight.

## 4 Discussion

PE teacher candidates will certainly become the role models for their students in the future, including in terms of ideal body shape as an example of a healthy lifestyle [11], because one of the task of the PE teachers is teaching about the application and habits of healthy living. Covid-19 pandemic is striking all over the world, and this has certainly reduced people's physical activity. If the physical activity decreases, the level of physical fitness also decreases and of course people will have a hard time to control their body weight. In addition, body mass index

(BMI) is an important factor affecting the level of cardiovascular fitness. Fitness is calculated per unit body weight, thus increasing body fat means decreasing fitness level [12], [13].

The ideal BMI can be obtained by adopting habits of active and healthy living, such as diet planning, balancing nutritional intake, and doing adequate physical activity. A general recommendation for adults to be physically active is to achieve at least 150 minutes of moderate-intensity exercise or 75 minutes of vigorous-intensity exercise per week or a combination of both types [14], [15]. Likewise, there is general concern about the negative health implications of physical inactivity and sedentary behavior [16]. Sedentary behavior is defined as any everyday behavior that is practiced while lying down, sitting or standing, which involves energy expenditure  $\leq 1.5$  metabolic equivalents [17], [18].

Obesity is recognized as an important risk factor for various diseases. Previous studies shown an increase in all causes of mortality with an increase in BMI, especially the mortality from cardiovascular disease in men [19]. The prevalence of obesity in children and adolescents is increasing along with changes in socio-economic environment and lifestyle patterns [20]–[22]. Obesity in children is assumed to be related to the risk of obesity and other diseases, such as type II diabetes mellitus or cardiovascular disease. BMI has been considered as an indicator of obesity and is widely used as a screening method for obesity because it is a well-known index for predicting obesity and assessing health risks. High BMI level in childhood will effect the life in adulthood which associate with obesity and high blood pressure [23], [24], and a higher risk of various diseases such as type II diabetes mellitus, stroke, heart attack, atherosclerosis and total mortality (25,26).

The research data shows that from all the participating PE teacher candidates ( $n = 159$ ), the majority (77.36%) are in the normal BMI category while the rest are in the underweight (17.61%) and overweight (5.03%) categories. This could be due to the maintained physical activity of the PE teacher candidates even though they are still in the Covid-19 pandemic condition. Although lectures, both theory and practice, are carried out online, several activities of the PE teacher candidates, who are students of the Physical Education Study Program of Sriwijaya University, are still actively carried out. Student activities such as the *Penjas Bicycle Community* and the *Balbalan Penjas* are still active, which are shown in the updated photos on these activities' social media. Even though these activities are actively running, they are not official university activities, so there are no restrictions in implementing them as long as the students still follow the applicable health protocols. These activities are suspected to be the cause of the majority of the PE teacher candidates' normal BMI category. Meanwhile, the PE teacher candidates who are in underweight category are suspected of not meeting nutritional needs or have an ectomorph body type, so it is quite difficult to increase body weight without good nutrition and/or doing weight training, while the PE teacher candidates who are in overweight category are suspected to be less active in participating in activities that are involves physical activity or not maintaining their nutritional balance.

In this study, the level of physical activity and passive activity, or the nutritional intake of the research subjects was not measured, so that the causative factor from the BMI image obtained from this study was unknown. Even so, this research can be used as an initial description to be used as a minimum standard in recruiting students (teacher candidates), especially PE teacher candidates.

## 5 Conclusion

General description of the BMI of PE teacher candidates, who are currently studying at the Sriwijaya University Physical Education, Health, and Recreation study program, is the absence of the obesity category and a small proportion (17.61%) in the underweight category. This must be evaluated individually, both in diet and physical activity, so that the BMI turn into the normal category, and those that have entered the normal category still have to maintain their healthy patterns and habits, so that they are not prone to disease.

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# Environmental Management Action (EMA) To Fight Dengue Hemorrhagic Fever In Coastal Areas

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**Abstract.** Genuk Subdistrict is a coastal area which becomes an endemic area for DHF (Dengue Hemorrhagic Fever). To build clean and healthy life behavior of school children in preventing and controlling the proliferation of dengue vector mosquitoes, is by applying the Environmental Management Action (EMA). The study was conducted with a one group pretest posttest design. Samples were taken by purposive sampling which are 24 students. The research data was processed using a quantitative descriptive approach. Implementing EMA; 1) Modified Action in the home and surrounding environment, 2) Environmental and surrounding Manipulation Action and 3) Action Changing Behavior of students and Family Members. Data collection instruments are questionnaires. EMA Education Results in schools showed an increase in both Student Knowledge about DHF, Student Attitudes in Preventing DHF, Environmental Modification and Manipulation, and also in Changing Behavior in preventing DHF. The highest increase can be seen in the highest delta, namely the Student Attitude variable in Preventing DHF. EMA education can be an alternative in raising awareness and attitudes of students to maintain their behavior in preventing DHF in their environment.

**Keywords:** Environmental Management Action, environmental manipulation, behavior change, DHF, students.

## 1 Introduction

Early 2019, several regions in Indonesia experienced an outbreak of Dengue Hemorrhagic Fever (KLB DBD). For example, in the Bekasi, DKI Jakarta, Central Java areas such as Sragen, East Java, Gorontalo and other areas experienced an increase in dengue cases in early 2019. Likewise, the incidence of dengue fever in Semarang City has also increased. Early 2019, there were 67 cases of dengue fever in Semarang City.

DHF is a disease that can cause illness and death for sufferers. DHF is a disease caused by the dengue virus which is transmitted through the bite of the *Aedes aegypti* mosquito as the main vector. Until now, DHF is still one of the public health problems in Indonesia that cannot be controlled optimally. The incidence of DHF can increase due to environmental factors, climate, geographical conditions, behavior, and immunity conditions [1], [2].

One of the efforts that have been made to tackle dengue fever is focused on eradicating adult mosquitoes as transmitters, namely *Aedes aegypti* [3]. The community needs to get sufficient education and knowledge to be able to carry out vector eradication independently. The eradication of mosquitoes by means of fogging can only kill adult mosquitoes but cannot simultaneously kill mosquito eggs and larvae [4].

One of the provinces in Indonesia that is still a dengue endemic area in Central Java is Semarang Regency. The incidence rate (IR) of DHF in Semarang Regency in 2016 has increased compared to the previous year. IR DBD in 2016 was 98.7 per 100,000 population out of 993 cases found and handled. The community still thinks that fogging is the most effective way to eradicate dengue, so it rules out the Eradication of Mosquito Nests (PSN) which is actually the most effective way to eradicate DHF [5].

Genuk Subdistrict is a tidal area which is an endemic area for DHF. Every year the incidence of DHF has increased, even Genuk Subdistrict is ranked number three with the highest number of sufferers. Eradicating mosquito nests in Rob's area really requires the participation and awareness of the community in managing the environment to prevent vector breeding places. The participation of young groups such as school children is needed to help prevent mosquito breeding in their home environment.

SMP Islam Sultan Agung 4 Semarang is located in a coastal area where tidal water will inundate the school environment every 12.00 to 15.00 WIB. Based on the results of interviews with researchers with the school, which in this case is represented by one of the homeroom teachers named Mr. Ahmad Solihul Hadi, M.Pd.I, Al Hafidz, explained that students have health problems related to infectious diseases such as dermatitis, dengue fever, scabies, diarrhea, which are diseases that have become a habit in the school environment and around the school. In addition, the habit of students throwing garbage in any place causes garbage / food wrappers to scatter in the school yard, in parks, and even into drains / sewers. Garbage and food scraps are often found in their desk drawers. This habit will certainly not be much different from their habits in the home environment.

To overcome these problems, students need support and assistance from various parties, including support from friends and school authorities. However, one thing that should not be forgotten is the awareness and concern of the individual students themselves to change and become individuals who are willing to create healthy environmental management actions. In an effort to build a clean and healthy lifestyle in preventing and controlling the reproduction of the dengue mosquito vector, one of them is by implementing the Environmental Management Action Education method [6]. The essence of the application of EMA Education is vector control education by school children in their home environment in the activity of creating a healthy environment free of *Aedes aegypti* mosquito vectors so that they are willing and able to live clean and healthy. Through this EMA education, it is hoped that disease vector control can be sustained. So that in the end awareness and concern for the importance of a clean and healthy life and a healthy environment can grow well in students.

Eradication of the dengue mosquito vector at an early stage requires a precise and complete method for optimal results. Modifications, manipulations and changes to student habits need to be done so that efforts to combat dengue can be successful. This method is a process in the implementation of EMA (Environmental Management Action) in controlling the vector of DHF according to WHO guidelines, where this EMA method has been carried out in America in the prevention and control of DHF vectors [7]. For this reason, research on "Environmental Management Action (e-Modification, Manipulation, and Changes to Human Habitation) needs to be carried out in involving students to Combat DHF.

## 2 Method

The study was conducted with a one group pretest posttest design. Samples were taken by purposive sampling with a total of 24 students. The research data was processed using a quantitative descriptive approach. The solution offered for partner problems is EMA-Environmental Management Action (Modification, Manipulation, and Changes to Human Habitation) Education in Combating DHF in coastal areas. This method is offered because the target is junior high school students who are expected to become agents of change. The implementation of EMA education in fighting dengue by students begins with coordination with the principal and teacher guardians for the implementation of activities, then disseminates to teachers and students, and organizes students for EMA.

Target students are given training in implementing the EMA, namely:

- a. Action Modification of the environment at home and around the house
- b. Home Environment Manipulation Action and around the house
- c. Behavior Change Action for Family Members

The implementation of EMA is carried out at the household level whose implementation is assisted by students in preventing DHF. The success of preventing DHF through the application of EMA by students must be supported by stakeholders, the community, community leaders and religious leaders in order to be successful and sustainable.

Through this activity, it is hoped that the following benefits can be taken:

- a. Increase the monitoring of dengue vectors by students, so that household awareness to maintain personal and environmental hygiene increases.
- b. Instilling the attitude of clean and healthy life behavior (PHBS) in students.
- c. Improve the sustainability of the program for the prevention and control of DHF by students.
- d. Environmental management seeks to change the environment to prevent or minimize vector spread and human contact with pathogens by destroying, altering, removing or recycling non-essential containers that provide habitat for *Aedes aegypti* larvae. This action should be a mainstay of dengue vector control.

The type of environmental management is defined:

- Environmental modification and manipulation - changes to vector habitats that involve managing containers and environments critical to preventing the emergence of breeding places for mosquitoes, such as frequent emptying and cleaning by scrubbing of water storage vessels, flower vases and desert air conditioning; cleaning gutters; protects stored tires from rain; recycling or proper disposal of discarded containers and tires; Management or removal of surrounding plants such as ornamental or wild bromeliads that collect water in leaf axils.
- Changes in human habitation or behavior - measures to reduce human-vector contact, such as installing mosquito screens on windows, doors and other entry points, and using mosquito nets while sleeping during the day. The choice of approach must be effective, practical and appropriate to local circumstances. Important actual or potential container types that cannot be removed from the area should be handled in situ.

Stages of Implementing Environmental Management Action Education in Student Engagement to Combat DHF in Coastal Areas:

1. Licensing and coordination with the Principal
2. Outreach with Teachers and Students at school
3. Preparation of guidelines for implementing EMA education.
4. Implementation of EMA Education by the student service team, namely 1) Modification Action in the home environment and its surroundings, 2) Action to Manipulate the Environment and its surroundings and 3) Behavior Change Action for students and Family Members
5. Direct practice of environmental prevention and control with the EMA Method by students.
6. The process of measuring the results of service and data processing
7. Evaluation and dissemination of community service activities

The data collection instrument was a questionnaire to measure EMA knowledge, attitudes and practices. The target audience for this Community Service is Students at the Sultan Agung 4 Islamic Junior High School in Semarang.

### **3. Result and Discussion**

SMP Islam Sultan Agung 4 Semarang is one of the junior high schools in the city of Semarang. This school consists of 364 students who are divided into 14 classes, for this new academic year the female students are separated from the male students. SMP Islam Sultan Agung 4 whose address is Jl. Raya Kaligawe KM. 4, Genuk Semarang City, Central Java Province 50112. The main activity at the school is teaching and learning, which is complemented by religious and extracurricular activities every evening. Most of the students and students who attend Islamic Junior High School Sultan Agung 4 Semarang come from sub-districts which are endemic areas for DHF, namely Genuk, Terboyo, Tambak Lorok and Tri Mulyo sub-districts.

Activities began in April 2019. The research began with coordination and licensing with school leaders. After being allowed to research at school by the management, the research team coordinated with the school administrator. After determining a schedule that was adjusted to the student's time, the researchers conducted interviews with school administrators regarding the clean and healthy lifestyle of the students and also about the behavior of maintaining environmental sanitation in preventing the dengue vector disease in their homes and around their homes.

The results of the interview with the school stated that the health problems that occurred in students were dermatitis (rashes on the skin), scabies, in addition to dengue fever. The state of personal hygiene for each student is still lacking, for example, rarely changing clothes, throwing garbage in the gutter, throwing trash in the classroom desk drawer, throwing trash in the school yard. While the condition of the cleanliness of the environment around the school is around the school surrounded by sewers, tidal water often stagnates every 14.00-15.00 WIB. It is also possible that their behavior at home is reflected in their behavior at school. For this reason, pengabdian began to conduct education services for Environmental Management Action to help students in fighting dengue in their homes and around their homes.

Respondents consisted of 24 students of SMP Islam Sultan Agung 4 Semarang who were randomly selected from each class so that they became agents of change in their respective classes after service activities were completed. EMA education is provided using the guidelines in Table 1.



**Table 1.** EMA Education for Students in Preventing DHF in students in Coastal Areas

No	Criteria	Environmental Management Action (EMA) Education in Preventing DHF
1	Environmental modification and manipulation	Provide a closed trash can Keeping the trash can clean Ensure that waste can flow smoothly to the disposal site / does not stagnate Empty the container that can serve as a water reservoir Using a non-permanent bathtub (bucket) Use of closed latrines Manage trash Keeping the bathtub clean Change the water in the flower vase / bird drinking water regularly at least once a week Change the bird's drinking water regularly at least once a week Raising fish to eat mosquito larvae in ponds that are difficult to clean Managing used materials / bottles in the environment around the house
2	Changes in behavior	People of all walks of life and age groups must participate in eradicating mosquito nests Drain the bath once a week Close the water reservoir Maintain Cleanliness of water reservoirs Don't hang clothes Wearing a mosquito net while sleeping in the early morning Apply mosquito repellent if necessary Check for the presence of mosquito larvae once a week in their own homes and residents' homes Tell the public to do the 3M Plus DBD PSN behavior The implementation of 3M Plus starts with yourself and your family All people must carry out the 3M Plus PSN regularly and simultaneously Immediately dispose of larvae living in puddles Check your health immediately if you find symptoms such as dengue fever

**Table 2.** Results of Environmental Management Action (EMA) Education in Preventing DHF

No.	Variable	Application of EMA		
		Average Before (%)	Average after (%)	delta
1	Students' knowledge about DHF	63,3	84,2*	20,9
2	Students' Attitudes in Preventing DHF	45,8	76,7*	30,9
3	Environmental Modification and Manipulation	86,7	92,5*	5,8
4	Behavior changes in preventing DHF	94,6	97,5*	2,9
The Average Score of Improved DHF Prevention		72,6	87,7	15,1

Source: Primary Data, 2020

The results of EMA education in schools show that there is an increase in both Student Knowledge about DHF, Student Attitudes in Preventing DHF, Environmental Modification and Manipulation, and also in Behavior Change in preventing DHF. We can see the highest increase in the highest delta, namely the variable Attitudes of Students in Preventing DHF.

Efforts to prevent the spread of DHF can be done by utilizing the potential of existing resources. There are several potential resources that can be managed in preventing the spread of DHF; (1) The potential to utilize natural resources as an effort to cultivate mosquito repellent plants. (2) Potential utilization of the PHBS program as a manifestation of a healthy paradigm in shaping clean and healthy living habits, and (3) Utilization of symmetrical environmental management in the *Aedes aegypti* mosquito-borne attack environment and human activity environment as a potential for environment-based prevention of disease spread [8].

Students as members of the community participate actively in activities to prevent Dengue Hemorrhagic Fever from an early age through environmental management actions. Communication, information and education provided to students by involving discussions and group discussion forums will foster motivation and awareness in creating a solid team for the management of DHF prevention. Interventions that are formed based on mutual agreement and according to students' abilities will form the foundation for the sustainability of the program after the implementation of the research..

Institutions such as schools are places that have the potential to become a habitat for disease vector development. School canteens that do not get enough attention can be the cause of the arrival of vectors, including waste which must always be managed properly. Vector control can be done with a single method or integrated vector control. Vector control can be done biologically, chemically, physically / mechanically, genetic engineering for vectors or through environmental management [9-12]. Vector control in schools should be followed by the involvement of all elements of its inhabitants who are the subject of vector control implementation, namely teachers, students and food vendors in the canteen. vector control that involves the role of all parties including stake holders in schools will make the program sustainable [5].

Willingness to take preventive measures and vector control supported by intensive coordination will result in behavior that can last a long time, so that it can become a habit. [13]. Research conducted in Malaysia on the control activity of the *Aedes aegypti* mosquito states that most of the cost of preventing dengue fever is spent on fogging[14] As in Indonesia, most people still think that fogging is the most appropriate choice for eradicating mosquito nests. In fact, fogging is a chemical vector control whose use should be minimized because it is less environmentally friendly [15]. Fogging can cause environmental pollution and mosquitoes become resistant if the dosage used is not correct. In addition, fogging activities should be an alternative if the environment is already an emergency due to a dengue outbreak [16]. If there has been no dengue outbreak, the community should carry out activities to eradicate mosquito nests by burying, closing and draining the tub every 1 time a week regularly and simultaneously to all communities [10].

The prevention and control of DHF in the community is the responsibility of all parties in the community [11]. Such as community leaders, religious leaders, local government, and community members themselves who are at the forefront of successful environmental management in preventing infectious diseases [17]. Strengthening at the family level is very important because the basis for the sustainability of environmental management in the household is very much influenced by family members including parents and children. Prevention and control of DHF in the household or family, in essence, is to involve parents (father and mother) as the head of the family, students / children to participate in driving activities to eradicate the mosquito nest of dengue disease in the home and in the surrounding environment. So it is hoped that environmental management action can run sustainably [9], [18], [19].

#### 4. Conclusion

The results of EMA education in schools show that there is an increase in both Student Knowledge about DHF, Student Attitudes in Preventing DHF, Environmental Modification and Manipulation, and also in Behavior Change in preventing DHF. We can see the highest increase in the highest delta, namely the variable Attitudes of Students in Preventing DHF. EMA education can be an alternative in increasing awareness and attitudes of students to maintain their behavior in preventing DHF in their environment.

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# Clinical Characteristics and Positivity Rate of COVID-19 in Semarang, Central Java, Indonesia

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**Abstract.** Data regarding the positivity rate and clinical characteristics of COVID-19 in Semarang was still rare. Even though, the data was needed to make policies in dealing with COVID-19 pandemic. This study will present data of positivity rate and clinical characteristics of COVID-19 in Semarang. The data sources used in this study were secondary data from scientific journals and official government news. On March 5, 2021, the number of COVID-19 in Semarang was 431 patients with 219 of them were males (50,81%) and 212 were females (49,19%). If grouped by age, patients aged 20-54 years had the highest number with 239 patients (55,45%). Then the positivity rate of COVID-19 in Semarang on March 5, 2021 was 19,97%. The positivity rate of COVID-19 in Semarang was very high if compared to the WHO standard which is only 5%. In Semarang, men and young people were more susceptible to exposure to COVID-19.

**Keywords:** COVID-19, clinical characteristics, and positivity rate.

## 1 Introduction

In March 11, 2020, World Health Organization (WHO) declared COVID-19 or *Coronavirus Disease-2019* as a global pandemic [1]. COVID-19 is a disease that occurred by a virus called *Severe Acute Respiratory Syndrome Coronavirus 2* (SARS-CoV2). SARS-CoV2 is a new type of virus from the *Coronavirus* family that was first discovered in Wuhan, China in December 2019. This disease affected in the respiratory tract of human and originally this SARS-CoV2 was transmitted from animals to human, and now SARS-CoV2 transmitted from human to human. Because the transmitted of COVID-19 was from human to human and spreads via droplets, so the spread of COVID-19 is very quickly due to human mobilities [2] [3].

A patient who is confirmed positive of COVID-19 is someone who has tested positive for the COVID-19 virus as proven by RT-PCR laboratory examination. This is accordance with KMK-RI No. HK.01.07/MENKES/413/2020 concerning Guidelines for the Prevention and Control of CORONA VIRUS DISEASE (COVID-19) [4]. Confirmatory cases can be divided into two, namely confirmation cases with symptoms (symptomatic) and confirmation cases without symptoms (asymptomatic) [2] [3]. Confirmed patients with symptoms will be directed to seek treatment at a health facility, while for patients without symptoms will be self-isolated. The main symptoms that occur in patients who are positive for COVID-19 are fever, dry cough, dyspnea, fatigue, muscle aches, and headache. Apart from these symptoms, other symptoms of the gastrointestinal tract and neurological manifestations were also reported [5].

The COVID-19 pandemic has been running for more than a year, but the positive number of COVID-19 is still increasing every day. As of March 15, 2021, in the world there were

78.412.817 confirmed cases of COVID-19 and 1.740.865 cases died [6]. Meanwhile in Indonesia there were 1.425.044 positive cases, 1.249.947 recovered cases, 38.573 cases died, and 136.524 active cases [7]. The number of positive COVID-19 in Indonesia has made Indonesia ranked 19<sup>th</sup> from 192 countries that exposed to COVID-19 in the world [8]. In addition, Indonesia ranks first with the highest active cases of COVID-19 among countries in Southeast Asia [9].

The number of confirmed cases of COVID-19 in Indonesia has spread across 34 provinces [2] [3]. Central Java is in the 3<sup>rd</sup> rank of the highest positive daily cases in Indonesia with the addition of cases on March 15, 2021 was 700 patients [7] [10]. So that the total active cases in Central Java as of March 15, 2021 were 6.033 patients with Semarang in the first rank with the highest number of active cases [2] [10] [11]. On March 5, 2021, the number of active COVID-19 cases in Semarang reached 431 patients with 219 patients were males and 212 patients were females [12]. Data regarding the positivity rate and clinical characteristics of COVID-19 in Semarang is still rare. Even though, the data is needed to make policies in dealing with COVID-19 pandemic. So, this study will present data of positivity rate and clinical characteristics of COVID-19 in Semarang. Hopefully that the results of this study will provide information to the public regarding the COVID-19 case in Semarang, Central Java.

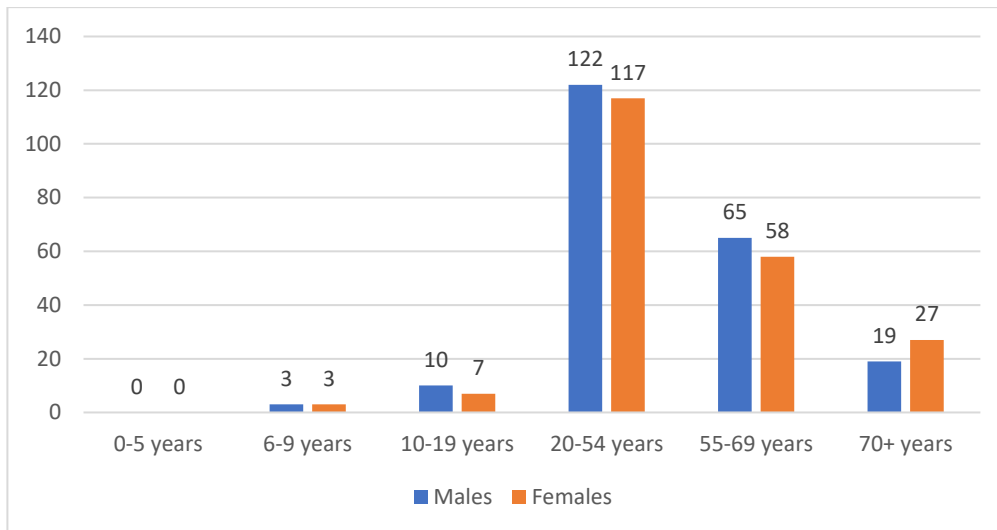
## 2 Materials and methods

This research uses descriptive research design. The data sources used in this research are secondary data from the recording of COVID-19 patients reported to the Department of Health of Semarang, scientific journals, and official government news. The data source to analyze clinical characteristics of COVID-19 were data from COVID-19 patients in Semarang until March 5, 2021 which is the number of COVID-19 patients were 431 patients. Then the data source to analyze the positivity rate of COVID-19 in Semarang was data from the number of people who confirmed positive for COVID-19 compared to the number of people who were tested for COVID-19. The positivity rate of COVID-19 in Semarang will be shown monthly from November 2020 until March 2021.

## 3 Results

### 3.1 Distribution of active cases of COVID-19 by age and gender

The total active cases of COVID-19 in Semarang, Central Java, Indonesia in March 5, 2021 was 431 patients. The distribution by gender show that from 431 patients, 219 patients (50,81%) was males and 212 patients (49,19%) was females. Then the distribution by age show that from 431 patients, 6 (1,39%) patients aged 6 – 9 years, 17 (4,11%) patients aged 10 – 19 years, 239 (55,45%) patients aged 20 – 54 years, 123 (28,53%) patients aged 55 – 69 years, and 46 (10,67%) patients aged more than 70 years [12]. The data shows that there are more cases in male than in female. Besides that, COVID-19 is also infected more young people which aged between 20 – 54 years. The distribution of active cases of COVID-19 in Semarang by age and gender shows in the fig. 1.



**Fig. 1.** Distribution of active cases of COVID-19 by age and gender

### 3.2 Distribution of active cases of COVID-19 by the origin

Active Cases of COVID-19 in Semarang spread in 16 districts with 117 sub-districts and there are 98 patients of COVID-19 who are outside Semarang but the data is included in the data of active cases of COVID-19 in Semarang. The distribution of active cases of COVID-19 by the origin is presented in table 1. The table shows that the highest active cases of COVID-19 are from outside Semarang with 98 cases (22,54%). Followed by the District of Tembalang with 42 cases (9,66%). Then followed by the District of Pedurungan with 38 active cases (8,81%). The lowest active cases of COVID-19 were from District of Tugu with 5 cases (1,15%) [12].

**Table 1.** Distribution of active cases of COVID-19 by the origin

Sub-district	Number of Active Cases	Percentage (%)
<b>District of North Semarang</b>		
Plombokan	1	0,23
Dadapsari	2	0,46
Kuningan	8	1,84
Panggung Kidul	2	0,46
Bandarharjo	2	0,46
Panggung Lor	4	0,92
Purwosari	3	0,69
Tanjungmas	3	0,69
Bulu Lor	11	2,53
<b>District of East Semarang</b>		
Kebonagung	1	0,23
Rejosari	3	0,69
Bungangan	1	0,23
Sarirejo	3	0,69

<b>District of South Semarang</b>		
Peterongan	2	0,46
Lamper Tengah	5	1,15
Pleburan	2	0,46
Mugassari	1	0,23
Barusari	10	2,30
Randusari	2	0,56
Lamper Lor	3	0,69
Bulustalan	1	0,23
Lamper Kidul	1	0,23
<b>District of Central Semarang</b>		
Jagalan	1	0,23
Brumbungan	1	0,23
Purwodinatan	2	0,46
Sekayu	1	0,23
Pekunden	1	0,23
Kembangsari	2	0,46
Kranggan	2	0,46
Karang Kidul	1	0,23
Pindrikan Kidul	4	0,92
<b>District of West Semarang</b>		
Bongsari	1	0,23
Salamanmloyo	1	0,23
Krapyak	1	0,23
Ngemplak Simongan	1	0,23
Kembangarum	2	0,46
Gisikdrono	6	1,38
Cabean	2	0,46
Kalibanteng Kulon	1	0,23
Krobokan	2	0,46
Karangayu	2	0,46
Bojong Salaman	3	0,69
Tawang Mas	1	0,23
Manyaran	3	0,69
Tawang Sari	1	0,23
<b>District of Gayamsari</b>		
Pandean Lamper	2	0,46
Kaligawe	3	0,69
Gayamsari	5	1,15
Sambirejo	4	0,92
Tambakrejo	2	0,46
<b>District of Candisari</b>		
Jomblang	3	0,69
Karanganyar Gunung	4	0,92
Tegalsari	5	1,15
Candi	5	1,15
Jatingaleh	3	0,69
Wonotinggal	4	0,92



<b>District of Ngaliyan</b>		
Kalipancur	3	0,69
Wates	1	0,23
Wonosari	7	1,61
Tambakaji	3	0,69
Purwoyoso	2	0,46
Gondoriyo	2	0,46
Bringin	2	0,46
Podorejo	4	0,92
Ngaliyan	2	0,46
<b>District of Banyumanik</b>		
Padangsari	1	0,23
Srondol Kulon	3	0,69
Srondol Wetan	5	1,15
Banyumanik	2	0,46
Pudak Payung	2	0,46
Ngesrep	3	0,69
Pedalangan	2	0,46
Tinjomoyo	1	0,23
Sumurboto	2	0,46
<b>District of Genuk</b>		
Bangetayu Wetan	2	0,46
Bangetayu Kulon	2	0,46
Gabangsari	1	0,23
Genuksari	6	1,38
<b>District of Tembalang</b>		
Jangli	2	0,46
Metesh	2	0,46
Tandang	3	0,69
Kramas	1	0,23
Sendangmulyo	17	3,91
Sambiroto	2	0,46
Tembalang	3	0,69
Mangunharjo	2	0,46
Rowosari	2	0,46
Sendanguwo	4	0,92
Kedungmundu	4	0,92
<b>District of Gajahmungkur</b>		
Karangrejo	2	0,46
Petompon	1	0,23
Sampangan	4	0,92
Lempongsari	4	0,92
Gajahmungkur	3	0,69
Bendan Duwur	1	0,23
<b>District of Pedurungan</b>		
Kalicari	4	0,92
Tlogosari Kulon	11	2,53
Palebon	4	0,92
Pedurungan Tengah	3	0,69

Gemah	3	0,69
Pedurungan Lor	2	0,46
Tlogomulyo	5	1,15
Muktiharjo Kidul	4	0,92
Tlogosari Wetan	2	0,46
<b>District of Gunungpati</b>		
Sukorejo	5	1,15
Patemon	1	0,23
Plalangan	2	0,46
Sadeng	3	0,69
Gunungpati	2	0,46
Mangunsari	2	0,46
Pongangan	1	0,23
<b>District of Tugu</b>		
Tugurejo	2	0,46
Jrakah	3	0,69
<b>District of Mijen</b>		
Jatisari	2	0,46
Wonolopo	2	0,46
Mijen	1	0,23
Bubakan	1	0,23
<b>Other Regency</b>	98	22,54
<b>Total</b>	431	100,00

### 3.3 The symptoms of COVID-19 in Semarang, Central Java, Indonesia

The main symptoms of COVID-19 are cough, fever, and dyspnea [13]. In some cases, other symptoms have been reported such as diarrhea, fatigue, shivering, colds, nausea, sore throat, asphyxiate, headache, and stomach pain [14] [15]. Apart from symptomatic patients, nearly 50% of the COVID-19 patients in Semarang are reported to be asymptomatic [16] [17]. The Semarang City Health Office also stated that there were several COVID-19 patients who experienced happy hypoxia [12]. Happy Hypoxia is a condition where patients have low oxygen saturations as measured by pulse oximetry ( $S_p O_2 < 90\%$ ), but where no significant respiratory distress and often appear clinically well [18] [19] [20]. Even so, the symptoms of COVID-19 in Semarang are quite varied but the majority experience cough and fever.

### 3.4 Positivity rate of COVID-19 in Semarang, Central Java, Indonesia

The trend of positivity rate of COVID-19 in Semarang is shown in fig. 2. The positivity rate of COVID-19 in Semarang in the last five months has never been less than 15%. The highest number of positivity rate from November 2020 until March 2021 in Semarang is in February 2021 with 20,02%, it means that every 100 people tested for COVID-19, at least there are 20 people confirmed to COVID-19. Then the lowest number of positivity rate from the last five months in Semarang is in November 2020 with 16,65% [12]. Which is the average of positivity rate of COVID-19 in Semarang from the last five months was 18,36%.

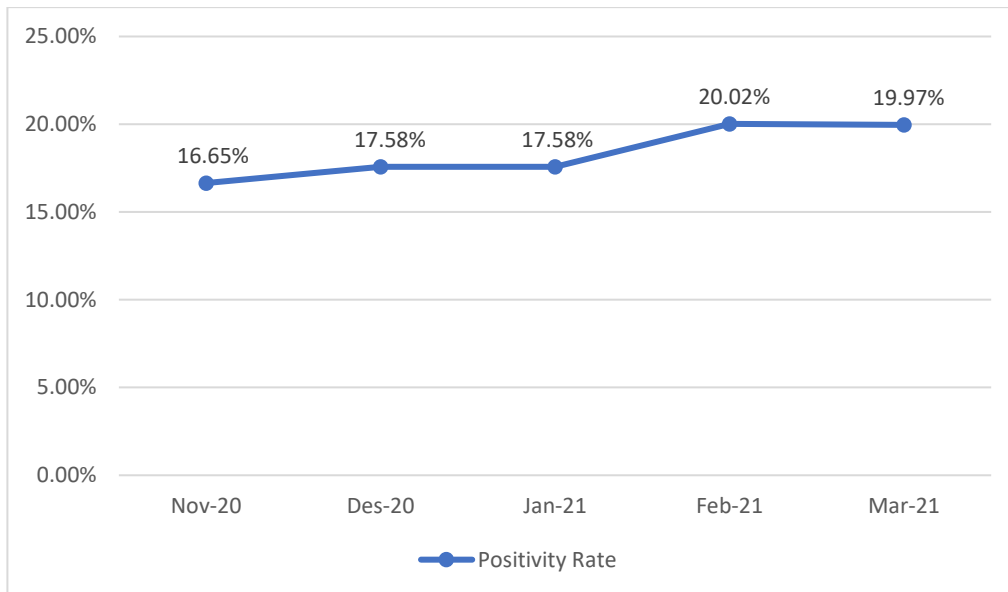


Fig. 2. Positivity rate of COVID-19 in Semarang in last five months

#### 4 Discussion

The number of active cases of COVID-19 in Semarang, Central Java, Indonesia until March 5, 2021 was 431 patients. In the cases based on gender, the number of males were 219 patients or 50,81% while for females were 212 patients or 49,19%. Similar to the distribution of COVID-19 patients based on sex in Indonesia, where of the total cases that occurred in Indonesia, 57% were male patients and 43% were female [2] [21]. This is also the same as research with case studies in China, where of the 44.672 confirmed cases of COVID-19, 51,4% were male and 48,6% were female [2] [3] [22]. However, this is in contrast to the study conducted in Zhejiang, where 59,34% of COVID-19 patients were female and 40,66% were male [23]. Then based on age, the number of COVID-19 patients in Semarang aged 0-5 years was 0 patients, aged 6-9 years were 6 patients or 1,39%, aged 10-19 years were 17 patients or 3,94%, aged 20-54 years were 239 patients or 55,45%, aged 55-69 years were 123 patients or 28,53%, and aged 70+ years were 46 patients or 10,67%. The same thing happened in a study in Beijing with the highest number of patients of COVID-19 at the age of 13-44 years (adults) with 42,7% of the total patients [24].

There are 16 districts in Semarang, Central Java, Indonesia with the highest active cases of COVID-19 are residents of Semarang who are outside Semarang with 98 cases (22,54%). Based on the Decree of the Minister of Health of Republic of Indonesia Number HK.01.07/MENKES/413/2020 concerning Guidelines for the Prevention and Control of Coronavirus Disease 2019 (COVID-19), when a new confirmed case of COVID-19 is found, the variables that must be completed when recording the notification of case discovery are: name, NIK, gender, address, mobile contact number that can be contacted, date of onset (symptoms appear), symptoms related to COVID-19, history (contact/travel/none),

accompanying conditions, epidemiological status (suspect/probable/confirmation), and actions (referral/care/independent isolation). Address variable is filled with residential address in the last 14 days [4]. This shows that 98 COVID-19 patients outside Semarang are people who in the last 14 days have been in Semarang but were confirmed positive for COVID-19 outside the city of Semarang.

The main symptoms of COVID-19 are cough, fever, and dyspnea. In addition, there are several other symptoms that have been reported in COVID-19 patients, such as diarrhea, fatigue, shivering, colds, nausea, sore throat, asphyxiate, headache, and stomach pain. Apart from symptomatic patients, nearly 50% of the COVID-19 patients in Semarang are reported to be asymptomatic. Even so, the symptoms of COVID-19 in Semarang are quite varied but the majority experience cough and fever. Other studies have shown that the highest symptoms seen in patients of COVID-19 were fever with 91,3%, followed by cough with 67,7%, fatigue with 51%, and dyspnea with 30,4% [25]. The most common symptoms in COVID-19 patients are symptoms of acute respiratory disorders such as fever, cough, and asphyxiate [26].

Positivity rate of COVID-19 in Semarang from November 2020 until March 2021 has never been less than 15%. During the last five months, the highest positivity rate was in February 2021 with 20,02%, meaning that for every 100 people tested for COVID-19 at least 20 people were confirmed positive for COVID-19. Then followed by March 2021 with a positivity rate of 19,97%. The positivity rate for COVID-19 in Semarang needs attention because it has far exceeded the standard limit for the positivity rate of COVID-19 set by World Health Organization (WHO), which is no more 5% [27]. The method of calculating this positivity rate is by dividing the number of patents confirmed positive for COVID-19 by the number of people who have tested for COVID-19 and then multiplying by 100.

## 5 Conclusion

The number of confirmed cases of COVID-19 in Indonesia has spread across 34 provinces. Central Java is in the 3rd rank of the highest positive daily cases in Indonesia. In Central Java, Semarang ranks first with the highest number of active cases. The active cases of COVID-19 in Semarang in March 5, 2021 were 431 patients with 219 patients (50,81%) were males and 212 patients (49,19%) were females. Based on the age, the highest number of active cases of COVID-19 in Semarang is at the age of 20-54 years or in adulthood with 239 patients or 55,45%. Active cases of COVID-19 in Semarang spread in 16 districts with 117 sub-districts, with the highest active cases of COVID-19 are from residents outside Semarang with 98 cases (22,54%). Followed by the District of Tembalang with 42 cases (9,66%). Then the lowest active cases of COVID-19 were from District of Tugu with 5 cases (1,15%). Based on symptoms, the symptoms that often appear in COVID-19 patients in Semarang are cough, fever, and dyspnea. However, nearly 50% of COVID-19 patients report no symptoms. Then, the positivity rate of COVID-19 in Semarang requires attention because the positivity rate was far exceed the standard limit for the positivity rate for COVID-19 set by WHO, which is the average from last five months was 18,36%.

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# The Benefits and Uses of Red Dragon Fruit in Food Consumption

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**Abstract.** Red dragon fruit is a fruit that contains a lot of benefits. Dragon fruit can be consumed in various forms, such as yogurt, juice, and syrup. This article is a literature review, where the researcher collects several relevant articles, then they are reviewed, analyzed, and discussed systematically, to be able to make conclusions from the analysis. Based on several articles analyzed, it can be concluded that the way to consume the red dragon fruit are to make it into yogurt, fruit juice, syrup, *dodol*, sticks, jam, juice, candy, and ice cream. Red dragon fruit has positive effects on health, including blood circulation, neutralizes toxins in the blood, prevents cancer, lowering level of fat in the blood, as antioxidant, balancing blood sugar levels, and treats vaginal discharge.

**Keywords:** Red Dragon Fruit, Processed Foods, Fiber, Thrombocyte, Antioxidants.

## 1 Introduction

Indonesia is a country that has a tropical climate. In addition, land in Indonesia is fertile and has abundant natural resources. The soil fertility and good climate factors make Indonesia to be one of the countries that has tremendous potential in the fields of agriculture, plantations, forests, and matters related to farming. Because of Indonesia is one of the countries with a tropical climate, so it has the potential to produce typical fruits that grow in the tropics. One of the fruits that can thrive in tropical areas is dragon fruit [1]. Dragon fruit is a fruit that has oval shape or slightly round. It has skin with dragon-like, and has a red color. There is also dragon fruit which has yellow skin. Because of this fruit has fins similar to a dragon, so it known as the dragon fruit [2].

Dragon fruit is a fruit that is very suitable to be cultivated in areas that have tropical climates. Dragon fruit has many benefits, one of which is to improve blood circulation, reduce plaque, and also neutralize toxins in the blood. In addition, other benefits of dragon fruit are to prevent colon cancer and reduce levels of fat in the blood. Based on the results of the study, dragon fruit contains many nutrients, including flavonoids, polyphenols, and C vitamins which is quite high, where C vitamins is effective as an antioxidant, even though each dragon fruit species has different nutritional levels. Apart from the fruit, dragon fruit skin is also very useful, including as a natural dye for food and beverages. In the world of health, dragon fruit peel can be used as herbal medicine which has natural antioxidant properties [3]. This is supported by Rakhmadhan & Riki's research which states that the red dragon fruit peel extract with a concentration of 1 gram can provide a percentage of antioxidant activity of 20.867% with an IC value of 3.14 grams / 100ml or 31.040 ppm. Rakhmadhan & Riki's research proves that red dragon fruit skin has potential as an antioxidant, because based on their research, dragon fruit peel has antioxidant activity, where super dragon fruit peel waste has higher antioxidant

compounds compared to ordinary red dragon fruit peel [1]. So far, the skin of dragon fruit has been underutilized by the community, and has only been disposed of as waste.

## 2 Methods

This article is a literature review, where the researcher collects several relevant articles, then they are reviewed, analyzed, and discussed systematically, to be able to make conclusions from the analysis. In conducting article searches, researchers used google scholar, with the keyword "Dragon Fruit". At the first stage search, 516 articles were found. Then the researchers narrowed the scope of time, by selecting articles published in 2016-2021. From this second stage search, there were 53 articles. From the 53 articles, the researchers manually selected articles that discussed the use of dragon fruit in food consumption, and obtained 25 articles. Then the researchers sorted the articles based on the quality of the articles. The final step, the researcher reviews, analyzes, and synthesizes the article to make conclusions from the analysis.

## 3 Result and Discussion

After researchers browsed through several research articles on the utilization of dragon fruit and dragon fruit parts, we synthesized and analyzed some of these articles. One of the articles we analyzed was an article written by Rakhmadhan & Riki, who examined super quality red dragon fruit skin extract as an antioxidant using the DPPH method to determine % antioxidant activity and IC<sub>50</sub> in super red dragon fruit peel extract grown in South Kalimantan. This study aims to determine the % antioxidant activity and the IC<sub>50</sub> value contained in the super red dragon fruit peel extract. This research was conducted using a spectrophotometric technique with DPPH reagent on viscous extracts which were divided into several concentrations, namely 1%, 0.5%, 25%, 0.125%, and 0.0625%. Measurement of antioxidant activity is measured until IC<sub>50</sub> is obtained by entering the y value ( $y = 50$ ) in the line equation  $y = bx + a$ . Based on the results of Rakhmadhan & Riki's research, it was found that the greatest % activity value was at a concentration of 1%, which was 36.73%, while the lowest % activity value was at a concentration of 0.0625% which was 10.48%. The IC<sub>50</sub> value obtained was 1.583% or 15,830 ppm with a very weak category of antioxidant activity. Even though it is very weak, we can say that in the super red dragon fruit peel extract grown in the plantation of Tajau Pecah Village, Tanah Laut Regency, there is antioxidant activity [4]. Based on field observations, dragon fruit peels constitute thirty-five percent of the total dragon fruit parts. It can be said that dragon fruit culture is a byproduct that has not been used optimally and in society it is usually only thrown into garbage or waste, even though dragon fruit skin actually has large levels of flavonoids such as fruit flesh which can be used as antioxidants [5].



**Table 1.** Research about the benefits of dragon fruit

Authors	Title	Result
Rakhmadhan Niah, Nirwan Baharsyah	Uji Aktivitas Antioksidan Ekstrak Etanol Kulit Buah Naga Merah Super ( <i>Hylocereus costaricensis</i> )	There is antioxidant activity in the super red dragon fruit peel extract grown in the plantation of Tajau Pecah Village, Tanah Laut Regency
Hernawati, N A Setiawan, R Shintawati, D Priyandoko	The Role of Red Dragon Fruit Peel ( <i>Hylocereus polyrhizus</i> ) to Improvement Blood Lipid Levels of Hyperlipidaemia Male Mice	Dragon fruit skin has large levels of flavonoids which can be used as antioxidants
Siti Rofiatun Nisa, Hari Santoso, Ahmad Syaui	Analisis Kadar Vitamin C pada Selai Stroberi ( <i>Fragaria</i> sp.) - Buah Naga ( <i>Hylocereus costaricensis</i> )	Dragon fruit has great benefits for health to balance blood sugar levels, preventing diabetes and colon cancer, and reduce cholesterol levels in the body
Reni Heryani.	Pengaruh Ekstrak Buah Naga Merah Terhadap Profil Lipid Darah Tikus Putih Hiperlipidemia	Dragon fruit can be processed into various processed products including fruit juice, syrup, jam, <i>dodol</i> , sticks, jam, and ice cream
M. Ilmi Hidayat, Inda Ilma Ifada, Gusti Khairu Ni'mah	IbM Pengolahan Buah Naga Sebagai Upaya Meningkatkan Nilai Tambah Dan Pengendalian Harga Buah Naga Di Kabupaten Tanah Laut	Dragon fruit can be made into various kinds of processed products, namely various dragon fruit snacks, dragon fruit juice, dragon fruit sticks, dragon fruit jam, and dragon fruit ice cream
Nia Rochmawati	Utilization of Red Dragon Fruit ( <i>Hylocereus polyrhizus</i> ) Peel as Flour for Making Cookies	The content of crude food fiber in red dragon fruit is 10.1 grams per 100 grams. The content of vitamins A, C and E in this fruit were 102.13 µg, 540.27 µg and 105.67 µg per 100 grams of dry weight. Red dragon fruit is usually consumed directly or processed as juice, candy, ice cream, syrup, and so on
Suci Nur Nur Laxmi, Tjandrakirana Tjandrakirana, Nur Kuswanti	Pengaruh Filtrat Kulit Buah Naga Merah ( <i>Hylocereus polyrhizus</i> ) terhadap Kadar Glukosa Darah Mencit <i>Mus Musculus</i> ) yang Diinduksi Glukosa	The skin of white dragon fruit was used 15% as a substitute for wheat flour. The dragon fruit peel will affect the fiber, ash, and carbohydrate content of the cookies. The protein, fat, ash, and fiber content of the red dragon fruit skin were 8.98%, 2.60%, 18.76% and 25.56%
Ni Made Indah Ayuni	Efek Buah Naga Merah ( <i>Hylocereus polyrhizus</i> ) Terhadap Penurunan Kadar Glukosa Darah Pada Diabetes Tipe 2	The red dragon fruit has benefits for lowering blood glucose levels
Kresto Ratimba, Valen Ruterlin, Joni Tandil	Uji Aktivitas Fraksi Buah Naga Merah Terhadap Penurunan Glukosa Darah Tikus yang Diinduksi <i>Streptozotocin</i>	Red dragon fruit ( <i>Hylocereus polyrhizus</i> ) is believed to balance blood glucose levels
Yuska Novi Yanty, Vetria Ade Siska	Ekstrak Kulit Buah Naga Merah ( <i>Hylocereus polyrhizus</i> ) Sebagai Antioksidan dalam Formulasi Sediaan Lotion	Dragon fruit has a fairly high antioxidant content, including flavonoid compounds, vitamin C, and polyphenols. In addition, dragon fruit also has color pigments in the form of anthocyanins which also function as antioxidants

I Gede Gelgel Bayu Surya Putra, Dorta Simamora	Potensi Jus Buah Naga Merah ( <i>Hylocereus polyrhizus</i> ) terhadap Perbaikan Jaringan Organ Otak Tikus ( <i>Rattus norvegicus</i> ) Diabetes	Dragon fruit is rich in antioxidants and contains many other nutrients such as calcium, beta-carotene, B1 vitamins, B2 vitamins, C vitamins, phosphorus, and flavonoids
Rekna Wahyuni	Pemanfaatan Kulit Buah Naga Super Merah ( <i>Hylocereus costaricensis</i> ) Sebagai Sumber Antioksidan dan Pewarna Alami pada Pembuatan Jelly	Dragon fruit is also a potential free radical inhibitor because it contains betasianin and can help lower blood glucose levels and can prevent the risk of heart disease in diabetics
Sasi Gendro Sari, Susi, Nurlely	Komposisi Kandungan Gula Buah Naga <i>Hylocereus costaricensis</i> Yang Tumbuh Di Perkebunan Anorganik Banjarbaru, Kalimantan Selatan	Dragon fruit is believed to lowering blood glucose levels, because dragon fruit contains antioxidant compounds in the form of flavonoids which are protective against beta cell damage, which functions as a producer of insulin and can increase insulin sensitivity
Winda Agustina, Mustika Handayani	Widia N Pengaruh Penambahan Wortel ( <i>Daucus carota</i> ) terhadap Karakteristik Sensori dan Fisikokimia Selai Buah Naga Merah ( <i>Hylocereus polyrhizus</i> )	Red dragon fruit ( <i>Hylocereus polyrhizus</i> ) contains vitamin C and a fairly high water content, which is around 9.4 mg or 90.20%
Siti Syariful Akhmad Khumaidi	Nuari, Anam, Isolasi dan Identifikasi Senyawa Flavonoid Ekstrak Etanol Buah Naga	Dragon fruit contains flavonoid, phenolic, and polyphenol chemical compounds. The isoflavone content in flavonoid compounds can reduce the risk of heart disease, kidney diabetes, and osteoporosis

Increasing public knowledge about the use of dragon fruit can also be found in an article written by Ilmi Hidayat et al, where in the article, namely about dragon fruit processing as an effort to increase added value and control the price of dragon fruit in Tanah Laut Regency, explained that in South Kalimantan, cultivation Dragon fruit only started in 2007. The types of dragon fruit grown are mainly red dragon fruit. At first the people were not familiar with dragon fruit, but because of its sweet and fresh taste, and its benefits are quite high, so that this red dragon fruit is increasingly known in the community. The increasing public interest in dragon fruit has led to an increasing trend of dragon fruit cultivation [6]. In addition, dragon fruit cultivation is technically quite easy to develop, because dragon fruit plants can grow in any soil and altitude. The thing to note is that this plant is quite greedy for nutrients, so that if it is planted in soil that contains good fertilizer, it will grow well. According to research, dragon fruit has great benefits for health, namely being able to balance blood sugar levels, preventing diabetes and colon cancer, and being able to reduce cholesterol levels in the body [7].

The cultivation of dragon fruit, which is getting more and more, causes the stock of dragon fruit is also quite a lot. This is detrimental to the farmers because the price is decreasing. This happens because many cultivate plant dragon fruit, but there is no further processing. This of course will be detrimental to farmers, so to overcome this problem it is necessary to design an appropriate post-harvest handling strategy from upstream to downstream so that farmers are not harmed. Apart from being marketed in fresh form, dragon fruit can also be processed into various processed products including fruit juice, syrup, jam, *dodol*, sticks, jam, and ice cream. Dragon fruit peel which weighs about 30-35% of the weight of the fruit with a red color with certain techniques can be processed into functional drinks, namely as a source of antioxidants that are useful for health and can be used as natural dyes. The business opportunity for dragon

fruit processed products is still wide open because dragon fruit has several advantages compared to other fruits, namely having properties that are beneficial to human health, including as a balancing of blood sugar levels, protecting oral health, preventing colon cancer, reducing cholesterol, preventing bleeding, and treating complaints of vaginal discharge, so that dragon fruit processed products can be used as functional food [8] [9].

In the article written by Ilmi Hidayat et al., it is known that the problems in the community are: 1. Not having skills and knowledge to increase added value in the form of processed dragon fruit products; 2. The price of dragon fruit and farmers' income continues to decline while the number of farmers cultivating it is increasing; 3. The need for innovation development in order to sustain their business and increase their income; 4. The absence of sufficient business capital and tools to make processed food products from dragon fruit. Based on these community problems, dragon fruit processing training activities were held by making several tiger products made from dragon fruit as raw material and business management training. The results of these activities indicate that: 1) Dragon fruit can be made into various kinds of processed products, namely various dragon fruit snacks, dragon fruit juice, dragon fruit sticks, dragon fruit jam, and dragon fruit ice cream; 2) Based on the level of consumer acceptance, processed dragon fruit products range from 'like' level to 'very like' for color and 'like' level for taste, aroma, and overall [6].

Based on the article from Nia Rochmawati, it is stated that dragon fruit, which is a cactus species, consists of red dragon fruit (*Hylocereus polyrhizus*), white dragon fruit (*H. undatus*), and yellow dragon fruit (*Selenicereus megalanthus*) [10]. Red dragon fruit has a high water and fiber content. The content of crude food fiber in red dragon fruit is 10.1 grams per 100 grams. In addition, the content of vitamins A, C and E in this fruit were 102.13 µg, 540.27 µg and 105.67 µg per 100 grams of dry weight, respectively. Red dragon fruit is usually consumed directly or processed as juice, candy, ice cream, syrup, and so on. While the by-product in the form of skin as much as 22% of the red dragon fruit is just thrown away. Red dragon fruit skin contains pectin, betasianin pigment, and dietary fiber with a soluble dietary fiber: insoluble dietary fiber ratio of 1: 3.8. A research on the use of cookies from white dragon fruit peel has been conducted by Suci et al. In that study, it was stated that the skin of white dragon fruit was used as much as 15% as a substitute for wheat flour. The results obtained indicate that the addition of dragon fruit peel will affect the fiber, ash, and carbohydrate content of the cookies. The protein, fat, ash, and fiber content of the red dragon fruit skin were 8.98%, 2.60%, 18.76% and 25.56%, respectively. Dietary fiber is a part of carbohydrates that cannot be digested by the body [11]. Dietary fiber is categorized into two based on its solubility in water, namely soluble dietary fiber and insoluble dietary fiber. The average adult fiber requirement is 30 g/d [12]. A food can be claimed as a source of fiber if it meets 3 g/100 g of solid weight of a food. Based on the article from Nia Rochmawati, it was found that dragon fruit skin cookies from a chemical perspective were obtained from the proportion of dragon fruit skin flour: wheat flour (90:10) had a water content of 8.06%, an ash content of 6.81%, a protein content of 5.63%, a fat content of 27.03%, carbohydrate content of 52.47%, and fiber content of 31.26%. Each serving also meets several requirements required as standard quality cookies except for water content standards [10].

Based on research from Ni Made Indah Ayuni, red dragon fruit is easy to find in various regions and tastes sweet. This causes dragon fruit to be very popular with the community. In addition to its delicious taste, red dragon fruit also has benefits for lowering blood glucose levels, so Ni Made Indah Ayuni wants to research the effect of red dragon fruit in reducing blood glucose levels in people with type 2 diabetes mellitus [13]. According to Kresto Ratimba, one of the traditional medicinal plants that can be used by the community is red dragon fruit

[14]. This is because red dragon fruit (*Hylocereus polyrhizus*) is believed to balance blood glucose levels. Red dragon fruit (*Hylocereus polyrhizus*) is a plant that comes from dry tropical climates. Dragon fruit has a fairly high antioxidant content, including flavonoid compounds, vitamin C, and polyphenols. In addition, dragon fruit also has color pigments in the form of anthocyanins which also function as antioxidants [15]. Dragon fruit is rich in antioxidants and contains many other nutrients such as calcium, beta-carotene, B1 vitamins, B2 vitamins, C vitamins, phosphorus, and flavonoids [16]. Dragon fruit is also a potential free radical inhibitor because it contains betasianin and can help lower blood glucose levels and can prevent the risk of heart disease in diabetics [17]. Based on research, dragon fruit is believed to have the effect of lowering blood glucose levels, because dragon fruit contains antioxidant compounds in the form of flavonoids which are protective against beta cell damage, which functions as a producer of insulin and can increase insulin sensitivity [18]. The way flavonoids work is by inhibiting the absorption of glucose in GLUT-2 and causing the major glucose transporter in the intestine to decrease, causing the glucose level in the blood to also decrease. It can be said that the flavonoids contained in dragon fruit can also prevent diabetes mellitus. Dragon fruit also contains high fiber which is important for digestive health. Dragon fruit also contains lycopene compounds, which are pigments that give red color. The function of lycopene can affect insulin hormone resistance, so that it can cause the body's tolerance to glucose to increase [19]. The fiber contained in dragon fruit can bind water, so that glucose is less likely to come in contact with the intestinal wall and enter the blood. This causes the pancreas to produce less insulin, because the level of glucose that enters the blood is low, resulting in a decrease in glucose levels in the blood [20].

Based on the research, it is known that the effect of dragon fruit with higher doses will have a tendency to decrease blood glucose is greater for people with type 2 diabetes mellitus. This is in line with research conducted by Siti, that red dragon fruit contains many bioactive compounds that have potential as anti-free radicals, for example betasianin [7]. In addition, according to Kristanto, 2013, red dragon fruit (*Hylocereus polyrhizus*) also contains vitamin C and a fairly high water content, which is around 9.4 mg or 90.20% [21]. Dragon fruit contains flavonoid, phenolic, and polyphenol chemical compounds. According to Asih, 2012, the content of flavonoid compounds in red dragon fruit can reduce glucose levels in the blood. In addition, the isoflavone content in flavonoid compounds can also reduce the risk of heart disease, kidney diabetes, and osteoporosis [22].

#### **4 Conclusion**

Based on the discuss above, it can be concluded that dragon fruit can be consumed directly in fresh form, or processed in various forms, including yogurt, fruit juice, syrup, *dodol*, sticks, jam, juice, candy, and ice cream. Dragon fruit peel can be processed into functional drinks. The benefits of consuming dragon fruit are to improve blood circulation, reduce emulsions, and neutralize toxins in the blood, prevent colon cancer and reduce fat levels in the blood. In addition, dragon fruit also contains antioxidants, balances blood sugar levels, prevents diabetes and colon cancer, lowers cholesterol levels in the body, protects oral health, prevents bleeding and treats vaginal discharge complaints. Dragon fruit is proven to be able to reduce blood glucose levels in people with type 2 diabetes mellitus, preventing the risk of heart disease, kidney diabetes, and osteoporosis. The nutrients contained in dragon fruit include calcium, beta-carotene, B1 vitamins, B2 vitamins, C vitamins, phosphorus, flavonoids, phenolic, and polyphenols. In addition, dragon fruit skin can also be used as a natural dye for food and beverages, natural antioxidants, and ingredients for making cookies.

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# Devising and Testing Revised Validity and Reliability of Strategic Knowledge, Efficient Behaviour, and Affective Value in Outdoor Evaluation Questionnaire

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**Abstract.** This research aims to obtain revised validity and reliability of an outdoor survey instrument to self-evaluate strategic knowledge, efficient behaviour, and affective value among students aged 13-17 years. The researchers used six survey evaluation, namely the Tennessee Self Concept Questionnaire, Multifactor Leadership Questionnaire (MLQ), Participant Motivation Questionnaire (PMQ), Cooper Smith Inventory, Group Environment Questionnaire (GEQ), and Outdoor Education Manual (MPL) to develop an outdoor self-evaluation questionnaire on strategic knowledge, efficient behaviour, and affective value (SKEBAV). The Development of the survey instrument involved 120 male and female research samples aged between 13 and 17 years old who were selected through purposive random sampling. The research method applied is in the form of pre-experimental one group pre-test-post-test design. Results of the analysis showed that overall activity expert validity is  $r = .90$  and language expert validity is  $r = .93$ , while the Cronbach alpha reliability correlation value of outdoor education instrument evaluation survey is  $r = .90$ . Next, this survey was tested again for construct validity using factor analysis method for statistical analysis where it validates each item to be either correctly evaluated according to the components or not. Analysis results showed that Bartlett's test is significant at  $p < .05$  and Kaiser-Meyer-Olkin index range is  $r = .80$ . A variant of 90.16 percent is explained from 18 components which were analysed with more than one eigenvalue. A total of 50 survey items were produced out of the survey's 100 items based on this factor analysis method. Research has shown that the survey instrument developed is valid and reliable to be used for Sabah's Co-curricular Camping activities.

**Keywords-** Validity, Reliability, Strategic knowledge, Efficient Behaviour and Affective

## 1 Introduction

Outdoor Education is an individual's transformation process that involves his or her knowledge, skills, or behavior due to experience [1]. Outdoor Education has the capability to liven up its curriculum scene, where it links theory and reality in a natural environment. It helps students to comprehend the environment better in addition to stimulating the physical activities in Outdoor Education.

Apart from that, Outdoor Education assists the development of cognitive, affective, and psychomotor values on top of an individual's social values whenever Outdoor Education learning is being applied [2]. It is a unique education niche due to its amalgamation of the teaching process with learning that is based on theory and practice carried out in a natural

environment, or the nature. The usual activities in Outdoor Education includes camping, kayaking, orienteering, flying fox, wall climbing, rock climbing, learning adventure, mountain climbing, cycling, start aid and many more [3].

Outdoor Education philosophy describes nature as a living laboratory abundant with the sources of knowledge. It can be intertwined with practices that could enrich experience and nurtures fine values that would give birth to an individual that is mentally, spiritually, and physically sound, in a bid to foster integration among the society and create national unity [4]. It is a common consensus that in Malaysian schools, Outdoor Education program scope spans over the knowledge of nature and the development of positive outlook towards it. Outdoor Education can develop moderation in self-efficacy in addition to enhancing the leadership quality in an individual and the society. This program also serves as the finishing touches to academic knowledge in a real or realistic situation and employs the behavioral efficiency skills when interacting with the nature frequently [5].

In line with the National Education Philosophy, the Malaysian Ministry of Education has established co-curriculum centers in each state as a concept hoped to promote Outdoor Education to students. These state co-curriculum centers aim to provide learning experience through real life activities, in addition to emphasizing enhancement in knowledge, skills, discipline, self-confidence, and fine value fortifications that could lead to an individual's excellence [6].

The co-curriculum center serves as an Outdoor Education institution that organize activities involving core curriculum and elective curriculum. Core curriculum are curriculums compulsory in each program. In contrast, elective curriculum comprises of religious and moral education, patriotism, motivation, nature education, start aid and social services. Land activities, air activities, and high-risk activities are the choices of activities available in Outdoor Education. Land activities primarily involves activities like camping craft, orienteering, survival, cycling, mountain climbing, obstacle clearing and marching. On the other hand, water activities included self-confidence and water safety activities, swimming, kayaking, rafting, tubing, and snorkeling. High-risk activities are classified as activities such as wall climbing, flying fox, repelling and rope skills [6].

The Outdoor Education program organized by Sabah State Co-curriculum Center is rapidly gaining favorable response from schools in Sabah. The organized program was found to have a positive impact on motivation, group unity, self-efficacy, and human development [6]. However, the 2012 Annual Sabah Co-curriculum Center report did not present the strategic knowledge, efficient behavior and participant's affective aspect using a validated, reliable, systematic, and consistent instrument when assessing the participants of Outdoor Education program in this center.

Consistent testing, measurement, and evaluation plays an imperative role in ensuring the achievement of Outdoor Education objectives. Method of assessment is an integration of information gathering, information interpretation or evaluating the procured information, and decision making [7]. Curated information based on outdoor education study should be systematic and orderly to ensure an assessment could be conducted. An Outdoor Education instrument that consisted of consistent testing, measuring, and assessment can be used to test and collect information or data for a study. An assessment had to be conducted to determine an individual's achievement in Outdoor Education. To fulfill the objectives of an instrument, only the testing, measurement, and evaluation based on valid and reliable assessment instruments can accurately analyze the data [8].

Validity and reliability instruments are pivotal in ensuring instrument accuracy against errors. The higher the value and degree of validity and reliability of an instrument, the more



accurate the data obtained for creating a good and high-quality study in Outdoor Education is [9]. The validity and reliability of an instrument should closely follow the set criteria to ensure its capacity to measure, assess and evaluate correctly. To date, the only available validated and reliable education evaluation instrument for the measurement of strategic learning, behavior efficiency and affective for students aged 15 and 16 in Sabah co-curriculum center are international ones. Hence, this study aims to establish the validity and reliability of the Outdoor Education assessment instrument for secondary school students aged 13 to 17.

In this study, the researchers employed Multiple Intelligence Theory [10] and True Score Theory [11], which are highly relevant to the study. The domains of strategic knowledge, behavior efficiency, and affective that were coupled with validity and reliability played a key role in developing an accurate and correct assessment instrument to test the Outdoor Education evaluation instrument [12-17]. Several appropriate test instruments were selected to be used in this study by the researchers, based on prior studies. Ahmad Hashim (2004) stated that an instrument or test to be used in the measurement and assessment of an information should have the characteristics of reliability, objectivity, and validity. Only tests boasting these features could provide an accurate measurement.

The objective of this research is to find the outdoor education camping instrument through several change factors that are related to the students who fully participated in the camping activity. To attain this goal, the researchers have underlined several research objectives such as determining the instrument validity based on activity experts and language experts, outdoor education instrument's reliability and validity of outdoor education instrument isolated construct.

## 2 Methods

This study strives to develop a questionnaire and establish the validity and reliability of an outdoor education evaluation instrument. To achieve this goal, a pre-experimental study by the method of one group pretest–posttest was performed. The experimental design for one group pretest–posttest method consisted of three steps [18]. First, administrating the pre-tests to measure dependent variable; second, treatment application or intervention to the subjects; and third, re-administration of post-tests to dependent variables. This study is divided into three parts, the first part being to obtain the validity of content and the validity of Language from appointed experts for the constructed instrument. The second part involves acquiring the reliability of constructed instrument post activity and the third part aims to get the construct validity via principal component analysis test to ensure each item in each three components truly represents the said components and did not deviate from the true component.

The researcher has adapted and changed several questionnaires and manual taken from other studies in order to develop the questionnaire specifically for the aspects of strategic knowledge, efficient behaviour and affective domain, similar to the survey on Tennessee self-concept [19], multifactor leadership questionnaire [20]; participant motivation questionnaire [21] Cooper Smith inventory [22] and group environment questionnaire [23]. The Outdoor education manual [24] was used to develop a questionnaire for strategic knowledge and affective domains. This questionnaire was selected based on first, possessing high validity and reliability; second, successfully meeting the requirements of Gardner's Multiple Intelligence Theory and true score theory; third, the questionnaire items could fulfill the measurement aspect for strategic knowledge components, behavior efficiency and affective; and lastly, is suitable to use by

students aged 13 and 17 of both genders. All questionnaires were tested using the five-point scale. A total of 100 items for the questionnaire were developed to be tested during the outdoor education camping. The amount of questionnaire items for strategic knowledge component is 25, efficient behaviour has 25 items whilst affective was given 50 items.

For data collection, the researchers use SPSS version 17.00. The analysis used included field experts and language experts' validity analysis; to enable every item asked the ability to fulfil the criteria required and to focus on the right component. Next, Cronbach Alpha statistic was used to obtain reliability while isolated construct validity was used with factor analysis method. The extraction technique applied in this analysis was Principal Components Analysis. Orthogonal rotation factor which is the Varimax rotation method was also used. This factor analysis method was carried out according to three main steps. Firstly, it involves evaluating suitable data for factor analysis method. Secondly, the extraction factor, and thirdly, the application of rotation factor and interpretation [25]. To evaluate whether the data is suitable, the researchers had examined the correlation coefficient matrix values at 0.3 and above [26]. Bartlett's test (Bartlett's test of sphericity) was used to see whether the sample is sufficient. Factor analysis method would be suitable when the results from Bartlett's test is significant ( $p < .05$ ) and *Kaiser-Meyer-Olkin (KMO)* index range is in between 0 to 1, with  $r = .3$  suggested as the minimum value for a good factor analysis [27]

## 2.1 Sample Size and Subjects

Table 1 depicted the sample size selection for this study, which was done according to Power Tables for Effect Size (ES) [28]. Past researchers agreed that sampling power value at .80 is reasonable and realistic for a behavioral science research [29]. The researchers used minimum size effect value ( $d$ ) .50 for sample to lessen the degree of error effect. A significant level of  $\alpha = .05$  was set by the researchers in this study. A total of 120 subjects will be used as study samples (60 = male, 60 = female), of whom will participate in outdoor education camping and are made up of students aged 13 to 17 years old from secondary schools of every district in Sabah. This is finalized after considering the possibilities of absence or mortality [18]. The students involved are individuals with basic knowledge of Outdoor Education activities. Following that, the researchers drafted sampling framework by using intact sampling strategy, which is also known as purposive sampling [30-31].

**Table 1.** Study Sample Size Based on Power and Effect Size

<i>Power</i>	<i>ES Power=.80 for <math>\alpha = .05</math> and .50</i>										
	<i><math>\alpha_2 = .05</math> (<math>\alpha_1 = .025</math>)</i>										
	<i>d</i>										
	.10	.20	.30	.40	.50	.60	.70	.80	1.00	1.20	1.40
.25	332	84	38	22	14	10	8	6	5	4	3
.50	769	193	86	49	32	22	17	13	9	7	5
.60	981	246	110	62	40	28	21	16	11	8	6
2/3	1144	287	128	73	47	33	24	19	12	9	7
.70	1235	310	138	78	50	35	26	20	13	10	7
.75	1389	348	155	88	57	40	29	23	15	11	8
.80	1571	393	175	99	<b>64</b>	45	33	26	17	12	9

.85	1797	450	201	113	73	51	38	29	19	14	10
.90	2102	526	234	132	85	59	44	34	22	16	12
.95	2600	651	290	163	105	73	54	42	27	19	14
.99	3675	920	409	231	148	103	576	58	38	27	20

### 3 Results and Discussion

Results from the analysis of activity expert correlation validity value for outdoor education survey instrument analysis are as follows: expert one is .85, expert two is .90 and expert three is .92. As for the whole expert validity, it was at  $r = .90$ . According to Sidek and Jamaludin<sup>32</sup> and Tuckman and Waheed<sup>33</sup>, the value  $r = .70$  was considered as mastery or attainment of the highest achievement level. As for the analysis of language expert correlation validity value for outdoor education survey instrument, the details were as follows; language expert one,  $r = .90$ , language expert two,  $r = .89$  and the third expert,  $r = .91$ . Total value of reliability for language expert validity was  $r = .91$ . In addition, total value of *Cronbach Alpha* for strategic knowledge component was  $r = .89$ , efficient behaviour  $r = .88$ , and affective  $r = .90$ .

The whole outdoor education survey instrument had the Cronbach Alpha correlation value of  $r = .90$ . This shows that the survey instrument that was adapted and developed can be used. However, factor analysis was still conducted to ensure that each item that was developed were able to test the right component and are non-repetitive. This research analysis showed that all questionnaire items in this study had correlation coefficient value of  $r = .3$  and above. The KMO value obtained was  $r = .809016$  and Bartlett's test was significant ( $p = .000$ ), therefore factor analysis was deemed suitable to be used in the next test. *Kaiser's criterion* technique was used to determine the number of components. Components with only *eigenvalue* one or more were selected in this analysis. There were 18 analysis components which had more than one *eigenvalue*: all of these 18 analysis component explained 85.13 percent variance. Matrix component showed loading in each line and expressed each survey item's correlation with strategic knowledge, efficient behaviour, and affective domains. To maintain three components for the next analysis, the researchers used varimax rotation method to minimize the number of survey items that had high correlation on each factor. According to Tabachnick and Fidell, results based on orthogonal rotation was easier to translate and report.

Table 2 shows the results from the three components rotation using the varimax rotation method. Results showed that the first component explained 11.255 percent of variance, the second component explained 10.927 percent of variance, and the third component explain 10.544 percent variance. The total amount of variant available which could be explained by all three components was 66.16 percent variance and remain unchanged after rotation.

**Table 2.** Total Variance Explained (Extraction Method: Principal Component Analysis)

Component	Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	10.692	11.255	11.255
2	10.380	10.927	22.182
3	10.016	10.544	32.726

Based on Principal Component Analysis, from 100 survey items only 50 showed high communality score. Component line one represented the outdoor evaluation instrument which

measures strategic knowledge, the second line represented outdoor evaluation instrument which measures affective domain, while the third line represented outdoor education evaluation instrument which measured efficient behaviour.

Table 3 shows a total of 50 items from 100 survey items that consisted of strategic knowledge, efficient behaviour and affective components were eliminated during the factor analysis processes. This was due to the loading factor being lower than .30, with no relation between survey item and the component [34].

**Table 3.** Item before and after principal component analysis

Component	Item for Analysis Factor (100 Items)	Item selected after Analysis Factor (50 items)
Strategic knowledge	S1, S2, S3, S4, S5, S6, S7, S8, S9, S10 S11, S12, S13, S14, S15, S16, S17, S18, S19, S20, S21, S22, S23, S24, S25	S9, S24, S11, S12, S13, S14, S15, S16, S17, S18, S5, S2, S1, S3, S22,
Efficient behavior	S26, S27, S28, S29, S30, S31, S32, S33, S34, S35, S36, S37, S38, S39, S40, S41, S42, S43, S44, S45, S46 S47, S48, S49, S50,	S28, S30, S32, S33, S34, S35 S36, S37, S38, S39, S42, S47, S48, S49, S50
Affective value	S51, S52, S53, S54, S55, S56, S57, S58, S59, S60, S61, S62, S63, S64, S65, S66, S67, S68, S69, S70, S71, S72, S73, S74, S75, S76, S77, S78, S79, S80, S81, S82, S83, S84, S85, S86, S87, S88, S89, S90, S91, S92, S93, S94, S95, S96, S97, S98, S99, S100	S54, S55, S58, S60, S62, S64, S66, S68, S69, S75, S76, S77, S81, S83, S86, S88, S91, S93, S94, S95

Selection for construct component for strategic knowledge, efficient behaviour and affective domain in this study was based on high main loading and it was found to exceed the correlation coefficient value  $r = 0.50$ . This was caused by a high correlation value of a test on a measured factor, that indicates close relation with the factor. Thus, by referring to Pallant<sup>35</sup>, this finding is significant and consequently the 50 strategic knowledge, efficient behaviour and affective survey items in this analysis are accepted as valid for outdoor education survey items in this research.

Hence, it is hoped that this reconstructed questionnaire is of high quality and could have a high impact in evaluating the learning in Outdoor Education for the three components, namely strategic knowledge, behaviour efficiency, and affective; in addition to be widely used in Outdoor Education of Sabah secondary school camping activities.

A certain test instrument must be measured using several statistical methods so that the test instrument that was measured is consistent and reliable [35-37]. This is supported by Baumgartner and Chung who stated that an instrument which has construct validity is a valid and reliable instrument and could be used on any population that is being tested. Having formed 50 out of 100 outdoor education evaluation survey instrument that is valid and reliable, it could now provide the right and accurate information and feedback to the Sabah State Education Co-curricular Department in order to make improvement for whatever that is lacking currently and in the future. One of the common issues is the inability to provide accurate and correct feedback prior to the camping activity initiation.

This study findings are consistent with those of D'Amato and Krasny and Thapa that demonstrated how students who have participated in Outdoor Education showed positive changes post assessment. The conducted activities were found to help the students to comprehend Outdoor Education better from the aspects of skills, knowledge, and societal values. This result was also supported by the studies of Sibthorp and Jostad and Gordon, who demonstrated a significant improvement among students who participated in Outdoor Education, since the students were highly interested in fun activities. Besides, the students learned novel knowledge while gaining experience and applied it in their school learning. Outdoor Education also conveyed positive implications towards learning and motor skills, knowledge in Outdoor Learning, and affective values that could be applied in school. This demonstrated that a built instrument could aid the identification of the weaknesses and the strengths of a participant while engaging a camping activity; where the weaknesses can be addressed rapidly and consequently help each participant to find and manifest their hidden potentials, which could simultaneously create future leaders [43-45].

#### 4 Conclusion

Based on the study of Outdoor Education Instrument Validity and Reliability done by the researchers, it was found that each item developed with the statistical factor analysis method was valid and reliable. Out of the 100 items constructed, a total of 50 items were obtained via the factor analysis statistical method. The developed questionnaire was retested based on construct validity to ensure the item's validity and reliability. It is hoped that this reconstructed questionnaire is of high quality and could have a high impact in evaluating the learning in Outdoor Education for the three components, namely strategic knowledge, behaviour efficiency, and affective; in addition to be widely used in Outdoor Education of Sabah secondary school camping activities.

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# Implementation of Health Education for The Prevention of Covid 19 In Magelang Regency

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**Abstract.** Magelang Regency is an orange zone area (as of August 31, 2020), so it is mandatory to make efforts to prevent the transmission of COVID-19. Based on the situation analysis, there are still insufficient efforts to prevent COVID-19. As for the efforts to prevent COVID-19 that have not been implemented, namely education about COVID-19, education on Adaptation to New Habits, and data collection of people elderly to COVID-19. The method used in data collection was through kuesioner need assessment for residents and Block Leader, and also from interviews with Block Leader. The results showed that the provision of education about COVID-19 was able to change attitudes and improve behavior in preventing COVID-19. Providing education regarding New Habit Adaptation has not been able to change knowledge, but providing education on New Habit Adaptation has been able to improve attitudes and improve behavior in the prevention of COVID-19.

**Keywords** : COVID-19, health education.

## 1 Introduction

In March 2020, COVID-19 cases were first reported in Indonesia with 2 cases and since then COVID-19 has spread throughout Indonesia. In August 2020, the number of COVID-19 cases increased to 147,211 with 6,418 deaths. Central Java Province ranks third with the highest COVID-19 cases in Indonesia with 13,157 cases and 1,218 deaths. [1] Magelang Regency is one of the regencies in Central Java Province. Magelang Regency has also felt the COVID-19 pandemic. As of August 2020, Magelang Regency had 42 positive cases with 7 people having died [2].

Health education and promotion plays a major role in handling COVID-19. During the pandemic, the government has recommended all citizens to apply 3M, namely using masks, washing hands, and maintaining distance. With good health education and promotion, the level of spread of COVID-19 can be reduced.

There is still a lot of knowledge, attitudes and behavior of residents regarding the COVID-19 pandemic. This is evidenced by the Need Assessment which was carried out by generating data. As many as 11.1% of residents did not understand the meaning of COVID-19 and the signs and symptoms of COVID-19, 88.9% of residents still left the house even though there was no interest 77.8% of residents still do not wear a mask when leaving the house, 44.4% of residents do not understand about the New Habits Adaptation, and 44.4% of residents who leave their homes do not do Physical Distancing.



Health Data Collection is an effort to monitor and carry out early prevention for residents who are elderly to being exposed to COVID-19. However, data collection on Health is still not comprehensive. This is evidenced by the Need Assessment that 44.4% of residents do not feel that there have been health workers who have conducted health data collection and 77.8% of residents admit that there has been no record of data entering and leaving the area.

## **2 Methods**

This research was conducted to find out how the implementation of the COVID 19 education program, New Habit Adaptation education for elderly. The method used is a mixed method, namely qualitative data collection by interviewing regional heads, and qualitative by measuring the level of knowledge and attitudes. The population in this study were all heads of families in the Magelang regency. The sample was taken by random sampling.

## **3 Result and Discussion**

### **3.1 Results of the Data Collection Program for Eldery**

The Data Collection Program is a program used to monitor Public Health, especially during the COVID-19 Pandemic. This data collection program was carried out once. The data collection program for elderly residents was carried out by door to door for one week. This program is implemented in conjunction with educational programs so that it can make it easier for writers to implement the program. The data collection program for elderly people is expected to be the outcome of the data collection program for elderly people, namely that policy recommendations derived from policy briefs can produce a new policy in Magelang Regency. The objective of the Elderly Population Data Collection Program is that it is hoped that the output of the data collection program for elderly people can be used by stakeholders to make a new policy to prevent COVID-19 in Magelang Regency.

Based on the analysis of the situation in Magelang Regency, data collection on people elderly to COVID-19 has not been carried out. Even though the Governor of Central Java has issued letter number 443.5 / 0009625 regarding Control of the COVID-19 Pandemic and the Acceleration of Handling Elderly Groups in Districts / Cities. There are four points in letter number 443.5 / 0009625, one of which is about data collection of COVID-19 susceptible groups with comorbidities.

Covid-19 susceptible groups are toddlers, the elderly, and congenital diseases [11]. There are several residents in Magelang who are aged, and have covid-19 comorbidities.

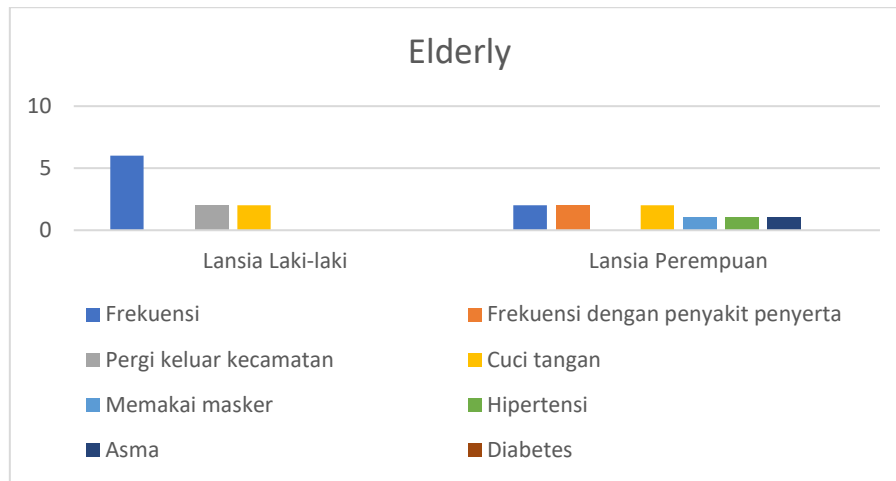


Figure 1. Distribution of Elderly by Gender, Comorbid COVID-19 and COVID-19 Prevention Behavior

The elderly are people who are elderly to contracting COVID-19. Elderly with a history of chronic disease are very at risk of being infected with the Corona Virus [11]. There are residents who have comorbidities, namely hypertension one person and asthma one person with the same person. There are two elderly who travel outside the district. The elderly who travel out of town are all male. In addition, only four elderly people who wash their hands after leaving the house, two are male and two are female. Only one elderly wears a mask when leaving the house.

### 3.2 Results of the COVID 19 Education program

The COVID-19 Education Program is a program that functions to increase public knowledge, attitudes and behavior in preventing COVID-19. COVID-19 health education program using posters, infographics, and flyers. The education provided includes information about COVID-19 such as symptoms, modes of transmission, preventive measures, issues of discrimination, HOAX news, and important information about handling COVID-19.

**Table 1.** Before and after health education COVID 19

	Knowledge			Attitude		Behavior		
	Good	Medium	Low	Good	Low	Good	Medium	Low
Before	23,08	26,92	50,00	13,14	86,86	57,33	17,01	25,66
After	80,77	11,54	7,69	86,86	13,14	65,33	22,36	12,31

At the beginning, before being given education about COVID-19, people's knowledge was low (50%). After being given education about COVID-19, people's knowledge has increased. As many as 80.77% have good knowledge. A person's knowledge shows a behavior that is positively related to adherence [3]. Based on the

sig statistical test, 0.006 ( $p < 0.05$ ), which means that  $H_0$  is rejected and  $H_a$  is accepted. Thus it can be concluded that there are differences / influences on the knowledge of the citizens before and after the intervention is given. It is known that 99% of Indonesians have good knowledge, 59% have a positive attitude, and 93% have good behavior towards COVID-19 prevention. The existence of a high level of knowledge is supported by the level of education of a community. This shows that the higher the level of knowledge, the easier it is to get information about a health problem, namely COVID-19 [4].

The attitude of the residents is quite good. Before getting education on COVID 19, the bad attitude of residents was 86.85%. After being given education about COVID-19, the attitude of the residents who were previously bad became good. This is in accordance with the literature which shows that public knowledge and prevention efforts have an interrelated relationship. Public knowledge and awareness have a high enough influence on the prevention of a disease [5]. So that there is an influence on the level of education or intelligence on public awareness in preventing COVID-19. Based on the analysis, it is obtained sig 0.006 ( $p < 0.05$ ), which means there is a change in attitude between before and after being given COVID-19 education.

The behavior of the residents is good, but there are still those who are still behaving badly. This is evidenced by the value of the behavior of residents when doing a pre-test before being given education on COVID 19 as many as 25.66% still have not implemented the Health protocol in their daily behavior. there are still residents who leave the house without wearing a mask, there are residents who still leave the sub-district even though they have no interest, there are residents who still do not do physical distancing, and there are residents who do not wash their hands after returning from outside the house. Based on the Wilcoxon test, it is known that the sig value is 0.006 ( $p < 0.05$ ), which means that  $H_0$  is rejected and  $H_a$  is accepted. Thus it can be concluded that there are differences / influences on the behavior of residents before and after being given COVID 19 education. This is in accordance with the literature which states that one's experiences can increase the ability to interact with the environment. The more experience a person has, the easier it is to behave which is useful in gaining new knowledge. This is related to prevention taken to tackle COVID-19 [6].

According to B. Bloom, there are three domains of behavior, namely knowledge, attitude, and practice [7]. The implementation of health protocols in preventing COVID-19 is influenced by the knowledge and attitudes of the community. Providing education is one way to increase citizen knowledge. In the implementation of the program the author uses the offline education method by door to door. Based on the results that have been carried out after the intervention, knowledge, attitudes and behavior in implementing COVID-19 prevention for residents are getting better. This is in line with the dedication that has been carried out by Suhadi who states that after being given an offline intervention, there is knowledge and increased awareness in implementing behaviors [8].

### 3.3. The Results Of The New Habit Adaptation Education Program

**Tabel 2.** Before and after health education about adaptation to new habits

	Knowledge			Attitude		Behavior		
	Good	Medium	Low	Good	Low	Good	Medium	Low
Before	8,99	25,11	65,90	72,00	28,00	85,40	11,66	2,94
After	70,13	19,66	10,21	85,40	14,60	96,10	2,33	1,57

The New Habit Adaptation Education Program is a program that functions to increase people's knowledge, attitudes and behavior in implementing New Habit Adaptation. At the beginning, before being given education about Adaptation to New Habits, people's knowledge was bad. After being given education about Adaptation to New Habits, the knowledge of the residents increased. The educational program regarding the Adaptation of New Habits has been carried out once. According to the residents, education regarding the implementation of the New Habit Adaptation was very good. This can be seen from the value given to residents on the evaluation form. Education is carried out with the help of posters, infographics and leaflets. The rate of change in knowledge of knowledgeable citizens is low. Initially, 65.90% decreased to 10.21%, for respondents with good knowledge, initially it was only 8.99%, increasing to 70.13%. Based on the statistical test, the sig value is 0.223 ( $p < 0.05$ ), which means that  $H_0$  is accepted and  $H_a$  is rejected. Thus, it can be concluded that there is no difference / influence of citizen knowledge before and after the intervention is given. This is in accordance with the literature which shows that the level of knowledge is influenced by internal and external factors. One of the external factors is information, socio-culture, and environment. A person who has knowledge not only from education, but also from exposure to mass media information, namely radio, newspapers, television, magazines, and others. In addition, motivation also plays a role in a person's desire to seek information about something [7].

The attitude of the residents was classified as good. The people who had a bad attitude towards adapting to new habits before getting education were 28.00% down to 14.60% after receiving education on the adaptation of new habits. Based on statistics, it is known that the sig value is 0.076 ( $p < 0.05$ ), which means that  $H_0$  is rejected and  $H_a$  is accepted. Thus it can be concluded that there are differences / influences on the attitudes of the citizens before and after the intervention is given. This is in accordance with the literature which states that the factors that influence attitudes are information and knowledge. Knowledge is the result of sensing a particular object. Attitudes based on knowledge can last longer than attitudes that are not based on knowledge [9]. This statement is in accordance with the level of knowledge, attitude and good behavior in dealing with COVID-19.

The behavior of the residents is still relatively good. This is evidenced by the value of good behavior of residents when pre-test before education was 85.40%, this figure increased to 96.10 after receiving education about adaptation to new habits. Residents began to learn to live side by side with COVID 19. the house must wear a mask, there are residents who do not leave the house unless they have an interest, but there are still residents who still do not do physical distancing, and there are residents who do not

wash their hands after returning from outside the house even though the numbers are low. The behavior of the residents increases along with the increase in people's knowledge. Based on the statistical sig test, 0.064 ( $p < 0.05$ ), which means that  $H_0$  is rejected and  $H_a$  is accepted. Thus it can be concluded that there are differences / influences on the behavior of the citizens before and after the intervention is given. This is in accordance with the literature which shows that a person's education level has an influence on knowledge. Knowledge of health, of course, also affects behavior in the medium term. So that health behavior certainly has an influence on increasing public health indicators as the output of health education [10].

#### 4 Conclusion

Coronaviruses are a large family of viruses that cause illness ranging from mild to severe symptoms. Magelang Regency is feeling the impact of the COVID-19 pandemic. On August 20, 2020, Magelang Regency had 42 positive cases with 7 people dying. Prevention of COVID-19 can be done in several ways, such as providing education to residents about COVID-19, socialization and education to residents regarding the application of New Habit Adaptation.

The author provides an intervention in the form of providing education to the elderly about COVID-19, socialization and education to elderly residents regarding the application of New Habit Adaptations in Magelang Regency. Providing education about COVID-19 has been able to change attitude knowledge and improve behavior in preventing COVID-19. Providing education regarding New Habit Adaptation has not been able to change knowledge, but providing education on New Habit Adaptation has been able to improve attitudes and improve behavior in the prevention of COVID-19.

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# Duration of Diabetes Mellitus and Mild Cognitive Impairment among People with Type 2 Diabetes Mellitus in Semarang City, Indonesia

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**Abstract.** The prevalence of type 2 Diabetes Mellitus (T2DM) at Gunungpati Primary Healthcare Center (PHC) in 2017-2019 were 1,323, 1,168, and 864 per 100,000 population. Complications of DM are mild cognitive impairment (MCI), leg ulcers, and death. The prevalence of MCI among people with T2DM at Gunungpati PHC was 70% (54%-86%). We investigated the association of duration of T2DM and other risk factors with MCI. It was a case-control study. The sample was 68 cases and 68 controls. Variables were assessed with structured questionnaires and MMSE. Data were analyzed with logistic regression. Of the total 136 subjects, there were 61 subjects (44.85%) with duration of T2DM $\geq$ 5 years and 75 subjects (55.14%) with duration of T2DM $<$ 5 years. After adjusted for other variables, risk factors associated with MCI were duration of T2DM (OR: 3.24; 95%CI: 1.42-7.42), age (OR: 6.67; 95%CI: 2.15-20.73), physical activity (OR: 3.65; 95%CI: 1.61-8.26), and stress (OR: 4.37; 95%CI: 1.36-14.06).

**Keywords:** Duration, T2DM, MCI

## 1 Introduction

Non-Communicable Diseases (NCD) cause more deaths than other causes, and it is projected that this number will continue to increase from 38 million deaths in 2012 to 52 million deaths in 2030 [1]. Seventy percent of the total deaths in the world and more than half the burden of the disease is Diabetes Mellitus (DM) [1]. Based on data from the Basic Health Research, the prevalence of people with DM aged 15 years and over increased from 6.9% in 2013 to 8.5% in 2018 [2]. In Central Java, the prevalence of DM was 20.6% after hypertension at 57.1% in 2018 [3]. While in Semarang City, DM cases increased significantly after hypertension with the most cases in the age group of 45-65 years. In Gunungpati Primary Healthcare Center (PHC), the prevalence of Type 2 DM (T2DM) during 2017-2019 was 1,323, 1,168, and 864 per 100,000 population, respectively.

Some common complications of T2DM are Mild Cognitive Impairment (MCI), angina, dialysis, foot ulcers, proteinuria, amputations, peripheral arterial disease (PDA), heart disease and stroke, neuropathy (nerve damage), diabetic retinopathy, kidney failure, and death [4]. MCI is a condition of objective cognitive impairment based on neuropsychological tests with clinical symptoms leading to the occurrence of dementia [5]. The diagnosis of MCI is based on amnesic

dysfunction, including learning, memory, perceptual, and central functions of executive impairment. Study showed that MCI is referred to as a clinical condition between aging and Alzheimer's disease in which a person experiences memory loss to a greater extent with age, but there are no clinical symptoms of Alzheimer's disease [6]–[10]

MCI is the prodromal stage of Alzheimer's disease which is influenced by gender differences. According to previous studies, T2DM is a risk of MCI that can develop into Alzheimer's due to vascular dysfunction, oxidative stress, and inflammation. Epidemiological studies show that T2DM is a risk factor for cognitive impairment, dementia, and Alzheimer's disease. Among people with T2DM, 41.6% of them did not have a cognitive impairment, 41.6% had MCI, and 16.8% had Alzheimer's disease [9]. The prevalence of MCI among people with T2DM at Gunungpati PHC was 70% (54%-86%).

The incidence of MCI is higher in individuals with T2DM than those who do not have T2DM. Although the pathophysiology of MCI in T2DM is unclear, many studies show that changes in pathoglycaemia, DM complications, and psychological status are significant risk factors. Previous research indicates that DM correlates with cognitive impairment and neurodegenerative diseases. Prevention on modifying the risk factors might reduce the risk of MCI and dementia [8], [9], [11]–[17].

Several studies of risk factors for MCI among T2DM patients have shown inconsistent results. It might be due to differences in study design, study subjects, diagnostic criteria for T2DM or MCI. However, it might also be due to the duration or severity of T2DM. In this case-control study, we investigated the association between duration of T2DM and risk factors of severity (such as age, sex, physical activity, BMI, hypertension, stroke, medication compliance, smoking, and stress) with MCI.

## 2 Methods

We did a case-control study with 68 cases and 68 controls. Case was defined as all subjects with T2DM who participated in this study and were found to be affected by MCI. Control was defined as all subjects with T2DM who participated in this study and were found to be cognitively normal. We assessed MCI among people with T2DM and the risk factors. i.e duration of T2DM, age, sex, physical activity, BMI, hypertension, stroke, medication compliance, smoking, and stress. MCI was assessed using Mini-Mental State Examination (MMSE), whereas the risk factors were assessed using structured questionnaire. We used logistic regression models to know the association between duration of T2DM with MCI after adjusted with other risk factors.

## 3 Results and Discussion

We assessed 136 subjects with T2DM. Based on demographic characteristics and risk factors (Table 1), there were 61 subjects (44.85%) with duration of T2DM  $\geq$  5 years and 75 subjects (55.14%) with duration of T2DM  $<$  5 years. It also showed that 104 subjects aged 50-60 years (76.47%) and 32 subjects aged 40-49 years (23.52%). Then, there were 108 females (79.41%) and 28 males (20.58%). Subjects with risky physical activity were 73 (53.67%) and non-risky physical activities were 63 (46.32%). Then it is known that subjects with obese BMI were 39 (28.67%) and subjects with normal BMI were 97 (71.32%). Subjects who hypertension were 80 (58.82%) and subjects who did not have hypertension were 56 (41.17%). Subjects with



stroke were 14 (10.29%) and 122 subjects without stroke (89.70%). Then, there were 68 subjects (50%) who complied with taking the medicine and 68 subjects (50%) did not comply. Subjects who had smoking habits were 21 (15.44%) and did not have smoking habits were 115 (84.55%). Then, for subjects who had stress were 25 (18.38%) while those who were not stressed were 111 (81.61%).

**Table 1.** Demographic characteristic and risk factors among 136 people with T2DM in Semarang City, Indonesia

Risk Factors	N	%
Duration of T2DM		
≥5 years	61	44.85
<5 years	75	55.14
Age		
50-60 years	104	76.47
40-49 years	32	23.52
Sex		
Female	108	79.41
Male	28	20.58
Physical activity		
<3 times a week	73	53.67
≥3 times a week	63	46.32
BMI		
Obesity	39	28.67
Normal	97	71.32
Hypertension		
Yes	80	58.82
No	56	41.17
Stroke		
Yes	14	10.29
No	122	89.70
Medication compliance		
No	68	50.00
Yes	68	50.00
Smoking		
Yes	21	15.44
No	115	84.55
Stress		
Yes	25	18.38
No	111	81.61

The collected data were tested by chi-square test. It showed from Table 2 that some risk factors are associated with MCI ( $p$  value < 0.05), i.e. duration of T2DM, age, physical activity, hypertension, medication compliance, and stress. Otherwise, sex, BMI, stroke, and smoking were not shown to be significantly associated with MCI. Based on the result from duration of T2DM, the Odds Ratio (OR) was 3.64 (95% CI: 1.79-7.43), which means that subjects who had duration of T2DM  $\geq$  5 years had a 3.64 times higher risk of getting MCI than those who had duration of T2DM < 5 years. In age variable, OR was 6.39 (95% CI: 2.42-16.87), which means that subjects aged 50-60 years had a 6.39 times higher risk of getting MCI than those who were 40-49 years. OR of physical activity, hypertension, medication compliance, and stress were 3.17

(95% CI: 1.57-6.41), 2.09 (95% CI: 1.04-4.19), 2.3 (95% CI: 1.16-4.58), and 3.14 (95% CI: 1.21-8.11), respectively. The risk of getting MCI among people with less physical activity, hypertension, lack of medication compliance, or stress was almost three times higher than in people with physical activity  $\geq 3$  times a week, no-hypertension, medication compliance, and no-stress.

**Table 2.** Bivariable analysis of risk factors of MCI among 136 people with T2DM in Semarang City, Indonesia

Risk Factors	Cases (n=68) n (%)	Controls (n=68) n (%)	OR (95% CI)	p-value*
Duration of T2DM				
$\geq 5$ years	41 (60.3)	20 (29.4)	3.64 (1.79-7.43)	0.01
$< 5$ years	27 (39.7)	48 (70.6)		
Age				
50-60 years	62 (91.2)	41 (61.8)	6.39 (2.42-16.88)	0.01
40-49 years	6 (8.8)	26 (38.2)		
Sex				
Female	52 (76.5)	56 (82.4)	0.69 (0.3-1.61)	0.39
Male	16 (23.5)	12 (17.6)		
Physical activity				
$< 3$ times a week	46 (67.6)	27 (39.7)	3.17 (1.57-6.41)	0.01
$\geq 3$ times a week	22 (32.4)	41 (60.3)		
BMI				
Obesity	17 (25.0)	22 (32.4)	0.69 (0.33-1.47)	0.34
Normal	51 (75.0)	46 (67.6)		
Hypertension				
Yes	46 (67.6)	34 (50.0)	2.09 (1.04-4.19)	0.04
No	22 (32.4)	34 (50.0)		
Stroke				
Yes	8 (11.8)	6 (8.8)	1.37 (0.45-4.2)	0.57
No	60 (88.2)	62 (91.2)		
Medication compliance				
No	41 (60.3)	27 (39.7)	2.3 (1.16-4.58)	0.02
Yes	27 (39.7)	41 (60.3)		
Smoking				
Yes	12 (17.6)	9 (13.2)	1.4 (0.55-3.59)	0.48
No	56 (82.4)	59 (86.8)		
Stress				
Yes	18 (26.5)	7 (10.3)	3.14 (1.21-8.11)	0.01
No	50 (73.5)	61 (89.7)		

\*Chi-square test

The multivariable analysis was done in the variables of duration of T2DM, age, physical activity, and stress. This model was the best model because all risk factors are significantly associated. It is adjusted for sex, BMI, hypertension, stroke, medication compliance, and smoking. The adjusted ORs were significantly elevated 3-fold for subjects with T2DM with duration of T2DM  $\geq 5$  years.

**Table 3.** Multivariable analysis of risk factors of MCI among 136 people with T2DM in Semarang City, Indonesia

<b>Risk Factors</b>	<b>AdjOR (95% CI)*</b>	<b>p-value</b>
Duration of T2DM	3.24 (1.42-7.42)	0.01
Age	6.67 (2.15-20.73)	0.01
Physical activity	3.65 (1.61-8.26)	0.01
Stress	4.37 (1.36-14.06)	0.01

\*Adjusted for sex, BMI, hypertension, stroke, medication compliance, and smoking

The results showed that there was association between duration of T2DM and MCI. The duration of getting T2DM  $\geq 5$  years was associated with greater cerebral macrovascular disease, clinical cerebral infarction, and subclinical infarction that impaired cognitive function. Longer experience of T2DM is associated with chronic hyperglycemia, which increases the likelihood of microvascular disease and can contribute to neuronal damage, brain atrophy, and MCI [8]. Besides the duration of T2DM, the risk factors for age, physical activity, and stress also showed significant association to MCI. It is not only the elderly population who are likely to get MCI. Another study reported that the decline in cognitive function has started to occur in middle age, starting at 45-49 years of age. The risk of developing MCI in middle adulthood may increase if there are metabolic factors [7]. With increasing age, a degenerative process occurs in the brain which is characterized by brain atrophy. Atrophy in the hippocampus results in decreased memory function which causes MCI [18].

The study also indicated that the higher the physical activity, the better the cognitive function. The level of physical activity is positively related to brain volume, white matter volume, and gray matter volume. Physical activity can increase neurogenesis and neurotrophic factor brain derived neurotrophic factor (BDNF) which can increase the resistance and growth of several types of neurons, including glutamatergic neurons. Brain derived neurotrophic factor (BDNF) acts as a major mediator of synaptic efficacy, nerve cell liaison, and nerve cell plasticity. Significantly, this effect occurs in the hippocampus, the region of the brain where learning and memory are centered. Physical activity can increase brain vascularity and contribute to maintaining cognitive function during aging [17].

MCI is also determined by stress. The cells and tissues that are most susceptible to oxidative stress are brain cells. Oxidative stress can result in damage to glial cells and neurons which can lead to decreased cognitive function [19].

#### 4 Conclusion

The study revealed that the duration of T2DM was significantly associated with MCI among people with T2DM. Based on multivariable analysis, we also know that not only duration of T2DM, but also age, physical activity, and stress also showed significant association to MCI.

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# Healthy Lifestyle During The Pandemic Through Sport Activities

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**Abstract.** Maintaining an ideal body weight during a pandemic like this is very difficult, especially when the government recommends staying away from crowds and reducing unnecessary activities outside the home. So, everyone's healthy lifestyle is affected, like untreated food. A lot of appetite increases the width of a person's body, especially if it is not balanced with exercise. Aim to maintain a healthy lifestyle by eating nutritious foods, avoiding stress, exercising regularly, and getting adequate rest. When a pandemic occurs, preventing the Covid-19 virus requires self-awareness by complying with health regulations, namely washing hands with soap, wearing masks, and maintaining distance. Physical exercise also supports sports by training endurance, speed, frequency, intensity, agility, flexibility, balance, coordination and timing. The result of literature review is that the number of target characteristics in this case usually occurs in sportsmen, children, and the elderly.

**Keyword:** Healthy lifestyle, Pandemic, Physical exercise, Characteristics

## 1 Introduction

Maintaining an ideal body weight in times of a pandemic like this is very difficult, moreover the government recommends staying away from crowds and reducing nonessential activities outside the home. Everyone needs to adopt a healthy lifestyle by maintaining cleanliness, exercising, eating nutritious food and getting adequate rest. Especially during a pandemic like this, all people in the world, especially Indonesia, are required to pay more attention to their own health. The case of Covid-19 in Indonesia has shocked the public and caused fear from various circles [1]. Covid-19 is a disease caused by the SARS CoV-2 virus with general symptoms of both mild and severe acute respiratory disorders including fever, cough, shortness of breath, fatigue, runny nose, sore throat and diarrhea. In general, this virus transmission occurs through droplets or body fluids that are splashed on a person or objects around them that are 1-2 meters away through coughing and sneezing. The government recommends staying indoors if there are no very important activities.

Health is a prosperous state of body, soul, and social, which enables everyone to live productively socially and economically [2]. If the healthy body will feel fresher, doing activities for a long time will not be felt. Maintain a healthy lifestyle from the food consumed, namely nutritious and clean food. If the food is guaranteed, the body will easily digest it properly. Exercise regularly, three times a week. Sport as a physical activity plays an important role in improving one's physical fitness and maintaining an ideal body weight.

Physical fitness can be maximized through the fulfillment of balanced nutrition. Adequate rest, sleep approximately 6 to 8 hours.

Among the parents, children and even athletes must have problems in terms of weight. This is because when the government implements lockdown regulations, people tend to carry out monotonous and limited activities. Thus, it causes boredom and activities such as playing cellphones, watching television, and eating are not controlled. Most people feel this way and eventually, they gain weight. To stop this problem, we can do sports activities at home that can help the body from getting wider. An athlete must feel the same way. So that the body does not expand, then do sports activities even if only at home.

Regular exercise is one way to maintain a healthy lifestyle, don't forget to try to keep your body fresh and happy. Because this can increase the dopamine hormone which acts as the body's defense system. Exercise is very important to do during the Covid-19 pandemic so that the body remains in shape and maintains an ideal body weight. Training activities that can be carried out include; resistance training, speed training, agility training, flexibility training, balance training, and coordination. A good degree of health is able to create a healthy body condition and quality human resources.

The goal of maintaining a healthy lifestyle with physical exercise also supports resistance training, speed, intensity, agility, flexibility, balance, coordination and time so as to improve physical fitness during this pandemic. The body also does not increase in width and body weight can remain ideal.

## **2 Methods**

Library Research the method used in the preparation of this article is the library research method, which is to search for books, documents, internet sources and other references that are relevant to the issues discussed in this discussion. Read from these sources, cited materials that are important and what is sought, then summarized, and compiled into a writing. Website Study (internet study) is a technique of collecting data or materials by searching through existing websites, with the help of a network or internet connection. Unfortunately, studies conducted by means of website studies or internet studies, depend on the presence or absence of an internet network. In addition, this website or internet study depends on the strength or weakness of the internet network. Even though the presence or absence of the internet and the strength or weakness of this internet network in each region in Indonesia varies. Literature Study aims to make it easier for readers to find references in the bibliography. Especially in conducting studies on healthy lifestyles with publish applications, and mendeley desktop.

## **3 Result and Discussion**

Health is one of the basic needs of society, so health is a right for every citizen protected by the Constitution [3]. Every country recognizes that health is the biggest asset to achieve prosperity. Maintaining an ideal body weight during a pandemic like this is very difficult, especially when the government recommends staying away from crowds and reducing unnecessary activities outside the home. So, everyone's healthy lifestyle is affected, like untreated food. A lot of appetite increases the width of a person's body, especially if it is not balanced with exercise. Maintain a healthy lifestyle by eating nutritious foods, avoiding

stress, exercising regularly, and getting enough rest. When a pandemic occurs, preventing the Covid-19 virus requires self-awareness by complying with health regulations, namely washing hands with soap, wearing masks, and maintaining distance.

Physical exercise also supports sports by training endurance, speed, frequency, intensity, agility, flexibility, balance, coordination and timing. The number of characteristic targets in this case usually occurs in sportsmen, children, and the elderly. Physical exercise also supports sports by training endurance, speed, frequency, intensity, agility, flexibility, balance, coordination and time. Physical exercise can be in the form of work out at home, with back ups, push ups, sit ups, yoga, jumping rope, and so on. Exercise is defined as a systematic exercise activity that is repeated over a long period of time accompanied by a gradual and continuous increase in load according to each individual's ability, the goal is to form and develop physiological and psychological functions [4].

Not only parents and athletes, but the elderly must also apply light sports activities and often bask in the sun for about 10 minutes to be healthier. As we know that the elderly are susceptible to the Covid 19 virus, therefore it is recommended to take care of their elderly parents. Gaining weight if you want to lose back is very difficult.

The cause of a person not maintaining a healthy lifestyle is too stressful, does not maintain his eating habits, is lazy to exercise and stays up late too late. When we want to maintain a healthy lifestyle, especially in the current pandemic era, which are vulnerable to viruses. Supposedly by paying attention to dietary patterns, exercise training and health protocols.

At this time many people have a poor lifestyle, especially in their diet, sleep, and exercise incorrectly. Eat without care about the nutritional content in these foods, or vice versa because you want to lose weight body, eat less because you want to get your ideal body weight quickly. Maintaining a diet is very important so that we can adjust it according to the needs of the body. Apart from maintaining a diet, another important thing is doing sports activities [5]. Moreover, in Indonesia there are many fast food, so people at home can order food through the grabfood application or the like.

Increasing age also tends to be followed by the emergence of various chronic diseases, not a few elderly who have chronic diseases, such as heart disease, diabetes, asthma, or cancer. With fast food it is not good to be consumed continuously [6]. It is true that the government recommends staying at home, but must maintain a nutritious diet. For the elderly themselves, the immune system is vulnerable to Covid 19, so it must be maintained. As a child, they have to take care of their parents to be diligent in exercising lightly and keeping up with nutritious foods.

One of the diseases that is currently endemic is the novel coronavirus or often called the corona virus. There are at least two types of coronavirus that are known to cause diseases that can cause severe symptoms such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). Coronavirus Disease 2019 (Covid 19) is a new type of disease that has never been previously identified in humans. The virus that causes Covid 19 is called sars-cov-2. Corona viruses are zoonotic (transmitted between animals and humans). Common signs and symptoms of Covid 19 infection include symptoms of acute respiratory problems such as fever, cough and shortness of breath. The average incubation period is 5-6 days with the longest incubation period of 14 days. In severe cases of Covid 19 it can cause pneumonia, acute respiratory syndrome, kidney failure and even death. A healthy lifestyle is a person's effort to keep his body healthy. Most of them think that a healthy lifestyle is a difficult lifestyle to live. Sports activities that are recommended to maintain health are physical fitness activities [7].

Indonesian Community Lifestyle During Covid-19. Lifestyle is a habitual pattern of a person as reflected in his daily activities, interests and opinions. The way a person interacts with their environment is reflected in their lifestyle. A healthy lifestyle is a choice from a lifestyle that is carried out by a person [8]. Healthy lifestyle recommended during the Covid-19 pandemic include: (1) consumption of high protein foods every day; (2) daily consumption of fresh fruits and vegetables; (3) drink water not less than 1500 mL every day; (4) adopting a diverse diet of various types, colors and sources. (5) Consumption of adequate nutritional intake; (6) if malnourished, take supplements; (7) regular rest for at least 7 hours per day; (8) exercise routine.

Life during the Covid-19 pandemic requires humans to spend a long time every day at home. A person who has a static lifestyle can interfere with the body's immune system which can cause various diseases, both non-infectious (degenerative) and infectious. Efforts to prevent the spread of Covid-19 can be done by improving the physical quality of the body. The frequency of doing sports activities every week can affect the performance and ability of a person's physical condition. The low level of a person's activity can have a negative impact on physical fitness. The negative impact of low fitness levels is that the body becomes tired quickly, is overweight, and is prone to symptoms of sedentary disease. Fitness is very important to support someone in carrying out their daily activities without experiencing excessive fatigue [9].

On the other hand, excessive or strenuous sports activities can reduce immunity or immunity. Clinical immunity deficiency occurs due to the combined effect of several small changes in several immune parameters. Small changes in immune parameters can cause a resistant/ immune effect against minor diseases, for example in upper respiratory tract infections. Exercise has both positive and negative effects on immune function and susceptibility to disease incidence. A study states that someone who does light exercise can improve immune function, increase immunity levels, and last for a long time. Meanwhile, very intensive/ excessive sports activities will be able to interfere with immune function or cause immune suppression.

To avoid contracting the Covid-19 virus, the Government has appealed to the public to always maintain cleanliness and lead a healthy lifestyle. A healthy lifestyle is by maintaining immunity by exercising based on FITT (Frequency, Intensity, Time, and Type). People are also advised to maintain nutritional intake and hydration. In addition, people are also advised to pay attention to body recovery because a tired body will be susceptible to various kinds of viruses and diseases.

Virtual socialization about healthy cultural behavior to the public of students and their families living in rural areas has been well organized and is in accordance with the protocol for preventing the transmission of Covid-19. Awareness and discipline to practice a culture of healthy living must continue to be built and implemented [10]. Good living habits need to be managed routinely so that they become a lifestyle that is settled for each individual. Consistency is the most important thing to maintain survival and productivity together in this pandemic.

Therefore, in times of pandemic, such as maintaining a healthy lifestyle is very important. Physical exercise :

### **The Concept of Fitness**

#### 1. Definition of Muscle Strength

The definition of fitness is the ability of a person to carry out activities or daily work effectively without causing significant fatigue and still be able to carry out subsequent activities in good condition and still be able to enjoy their spare time.



Individual fitness includes physical fitness, mental fitness, emotional fitness, and social fitness (total fitness). There are three levels of fitness: static fitness, dynamic fitness, motor fitness

2. Fruit Tip  
Eating (nutritious), Rest (quality) and Exercise (regular)

### **Basics of Fitness Training**

1. Definition of Fitness Exercises  
The definition of fitness training is a systematic training process using movements aimed at improving or maintaining the quality of body functions which include fitness components.
2. Principles of Fitness Exercise  
SPORT (Specific, Progressive, Overload, Reversible, Training Effect).
3. Stages of Fitness Training  
Warming up, Conditioning and Calming.
4. Fitness Exercise Measures  
FIT (Frequency, Intensity, Time).

### **Method of Fitness Exercise**

1. Basic Methods of Fitness Training  
MOLIS (Move / move, Lift / lift, Stretch / stretch).
2. Method of Fitness Training  
Cardiac endurance training methods (definition, characteristics, exercise dose, model, training program). Methods of strength and endurance training (definition, characteristics, exercise measure, training model, training program). Methods of joint flexibility training (understanding, characteristics, exercise measures, training models, training programs). Methods of body composition training (understanding, characteristics, training rates, training models, training programs).

### **Planning of Fitness Exercises**

1. Periodicity of Fitness Exercises  
Period of diagnosis, The grounding period, The period of improvement and Maintenance period.
2. Fitness Service Flow  
Medical history and lifestyle screening, Health and fitness checks, Formulation of training programs (training objectives, program priorities, selecting training models, selecting training tools), The training process and Evaluation of exercise results.

### **Measurement of Fitness Status**

1. Measurement of Heavy Lung Resistance  
Treadmill running test, 12 Minute Running Test, Run 2.4 km and Multistage fitness test.
2. Measurement of Muscle Strength and Durability  
Muscle Strength (1 RM Test) and Muscle Endurance (Push-Up Test).
3. Measurement of Joint Flexibility  
Reach Sitting Test (flex the hip joint) and Leg Lift Test
4. Measurement of Body Fat  
Body Fat Thickness Test with Fat Caliper (biceps, triceps, suprailiac and subscapula).

**Exercise Measures**

1. Exercise frequency : 3-5 times/week
2. Exercise intensity : 75 - 85% maximal heart rate (old age starts 60% continue to increase)
3. Time (training duration) : 20 - 60 minutes without stopping

**Training Model**

Continuous modeling (jogging on the court / on the treadmill, cycling on the field / stationary, swimming, rowing, aerobics) etc. football, badminton, tennis.

**Exercise Methods for Muscle Strength and Durability**

Muscle strength is the ability of a group of muscles to resist the load in one effort. ex. the ability of the arm muscles to lift the chair. Muscle endurance is the ability of a group of muscles to carry out a series of work for a long time ex. the ability of the arm muscles to move the chair from a certain place to another at the same time and a considerable distance.

Exercise measure are carried out 1-8 reps, 3-5 sets, rest 2 - 5 minutes.

Training model own weight ex : sit ups, push ups etc, real weights : free machine / gym machine and free weight / duple, barbell etc and several weight training systems to train muscle fitness: system sets, super sets and compound sets.

**Joint Exercise Methods**

Flexibility is the ability of the joints to move freely. Quality of flexibility is influenced by joint structure, quality of muscles, tendons and ligaments, age, temperature, etc. Flexibility of joints affects a person's mobility & work dynamics. Flexibility is synonymous with long life.

Exercise measures, frequency: can be done every day, intensity: a measure of the intensity, the limit of pain and pain in the muscles and time: 4 - 30 sec (Rep: 1- 3 repetitions)

Training model, static stretching, dynamic stretching

**Body Composition exercise Method**

Body composition is the ratio of body weight consisting of fat to lean body weight. Normal body fat for men 15-20%, Normal body fat for girls 20-25%.

Exercise measures frequency: 3-5 times / week, intensity: 65 - 75% max. Heart rate and time: 20 - 60 mt.

Training model, jogging, cycling, aerobics, swimming etc. There will be changes after 3 months of training.

With the routine exercises described, the body will experience changes in muscles, joints, and others. To maintain a healthy lifestyle, especially for children, exercise can be done at home during the pandemic with light exercise in order to maintain the ideal body towards a healthy lifestyle. Moreover, the special training for athletes will be different from ordinary people. Athletes will train with portions that are long enough and there are usually one that can train 3 times a day. Therefore, it is possible for athletes who are accustomed to strenuous training will regulate their lifestyle, especially the problem of ideal body.

A simple way to get used to a healthy and clean lifestyle during this pandemic is to apply hand washing using soap [11]. It is highly recommended to always wash your hands

with soap before doing activities. If there is no running water, you can use a hand sanitizer to replace the running water. Maintaining a healthy lifestyle today is not only towards an ideal body, but also maintains a healthy body so that it is not attacked by viral diseases. People who do not do enough physical activity are at twice the risk of heart disease when compared to people who do not active [12].

The nature of human physical fitness tends to decrease accordingly getting older. Naturally humans will grow old, so too with physical fitness, gradually the function of the organs of the body will decreasing and finally it doesn't work or matt at all [13]. This reduction process is overcome by maintaining a dynamic healthy lifestyle, namely regulating the rhythm of life that is balanced between physical needs and demands spiritual so as not to cause significant stress in life.

Sports activities greatly affect a person's physical fitness, moreover, these activities contribute directly to the components of physical fitness [14]. The importance of one's physical fitness should get very much attention. Therefore, self-awareness is needed to maintain a healthy lifestyle by regularly exercising and eating nutritious foods for all ages.

#### **Fitness activities for children**

Children are the buds of the nation that are growing and developing so that they become hope as the next generation in the future. One of the efforts to prepare candidates succession is through sporting activities. Sport is one of the means for improving human resources. This we must realize the benefits of exercise through the results that can be felt when someone does sports activities. We better be doing sports activities from an early age. Primary school age children (6-12 years) who have started. Having various kinds of activities both at school and outside of school requires conditions a body that is always in shape.

According to Djoko Pekik fitness related to physical is ability a person to be able to do daily work efficiently without fatigue excessive so that you can still enjoy your free time. Still according to fitness classified into three, namely :

1. Static fitness: the state of a person who is free from diseases and disabilities or is called healthy.
2. Dynamic fitness: The ability of a person to work efficiently that is not require special skills.
3. Motor fitness: The ability of a person to work efficiently is demanding special skill.

Physical fitness or physical fitness is a condition in which a person performs a task or physical work and do not feel tired while doing the work or task. So being fit is not the same as being healthy. Someone who feels healthy is not necessarily fit. For doing one's job is not only required to be healthy but also have fitness because someone will be able to do a good job if not tired. There are several advantages when children have a good level of physical fitness among others:

1. increase children's learning capacity
2. increase resistance to disease
3. reduce the number of school absences.

In connection with these several advantages, physical fitness is very necessary. Further benefits in the future for children who have good physical fitness after later maturity is :

1. Have a better performance
2. Have good health quality
3. Will be better prepared to face all the challenges of life

For that children must really pay attention to the level of physical fitness. Several things what must be considered so that physical fitness is maintained properly is to adjust the pattern eat, rest and exercise.

1. diet, namely by consuming healthy foods, in sufficient quantity as well the quality.
2. rest, namely maintaining a balance between performance and rest so that the recovery process or the original return period goes well so that the body will get back in shape after break
3. exercising, namely doing exercise regularly, measured and in accordance with the goals or the goal of the sport. So that it can be safely and effectively improve fitness.

#### **AEROBIC FITNESS EXERCISES FOR CHILDREN**

Before we get into aerobic fitness training, it's good to know what it is practice. Exercise is a conscious process of refining athletes to achieve something maximum performance by being given physical, tactical and mental burdens on a regular, targeted, increasing, gradually, and repeatedly in time. Another definition about exercise according to Rusli Lutan is a physical activity that is planned, structured, and carried out in the form of repetition of body movements with the intention of perfecting, or maintains one or more components of physical fitness. fitness training is a process systematically through stimulation of motion, aiming at the body, which includes the quality of the endurance of the heart, strength, and muscle endurance, flexibility and body composition. While Aerobic fitness is a measure of the heart's ability to pump oxygen-rich blood to it

Other parts of the body and the ability to adapt and recover from physical activity. From the three definitions above, the meaning of aerobic fitness training is a physical activity that is planned, structured and carried out in the form of repetition of movements body with a view to increasing or maintaining the quality of functional abilities the heart to pump oxygen-rich blood to other parts of the body and its ability to adjust and recover from physical activity. So to get a level of fitness The optimal body must compose a systematic, measured, and orderly training in order to exercise aerobic fitness is more effective.

Aerobic fitness training will stimulate the heart muscles. By increasing strong heart muscle, the blood pumped from the heart will be more so that it supplies oxygen throughout the body will be more too. But in applying fitness exercises aerobics must pay attention to the rules so that things that are dangerous do not happen. The thing that the main concern is who is doing aerobic and fitness exercises the purpose of the exercise. There are three goals of aerobic fitness training, namely: (1) a basic level aims to achieve a dynamic health degree, (2) intermediate level which aims achieve a level of fitness to carry out sports activities, and (3) fitness for achievers aims to produce athletes who excel in sports. To improve fitness physical elementary school children are sufficient at basic level fitness goals, so it must be pay attention to the principles of fitness training as described in table 1 so that this does not happen overload, illness, etc. that are negative in nature.

**Table 1** Principles of aerobic fitness training

<b>Component Principle</b>	<b>Fitness level Basic</b>	<b>Fitness level medium</b>	<b>Fitness level achievement</b>
<b>Frequency</b>	3 times per week	3-5 times per week	5-6 times per week
<b>Intensity</b>	50% -60% Pulse Maximum pulse / minute	60% -70% Pulse Maximum pulse / minute	60% -90% Pulse Maximum pulse / minute
<b>Time</b>	30 minute	40-60 minute	60-120 minute
<b>Type</b>	Walk, jog, run, game	Walk, jog, run, game, competition between class	run, competition sports, programs practice, competition between classes / schools
<b>Loading excess</b>	There's no need for children	There must be increase and decreased load and long rest	There must be increase and decreased load and short rest
<b>Kemajuan Dan kekhuasan</b>	Develop on your own	Programs vary	Peningkatan prinsip latihan

The characteristics of aerobic fitness training are movements involving large muscles, motion continuous and rhythmic, as well as the nature of aerobic motion. Aerobic fitness training methods various, but in principle it aims to train the ability of the lungs and heart to better at supplying oxygen. The methods are:

1. Interval is a form of aerobic fitness training by combining implementation load training with rest periods. For example, a child runs 2 minutes later rest 15 seconds and so on according to the training load given.

2. Fartlek is a form of aerobic fitness training by running at speed that is fickle. For example, a child sprints / sprints 15 seconds and then runs slow / jog 15 seconds and so on according to the training load given.

3. circuit is a form of exercise consisting of several posts where the form of movement is in each post is different. To find out how hard the exercise is given to children, it can be seen from the pulse maximum heart rate per minute. The way is to feel the carotid artery which is located neck and beats counted for one minute. Then compare the results calculations in the formula as follows :

$\text{Max DN} = 220 - \text{age}$
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Table 2. The formula calculates the maximum heart rate per minute

For example, a 10 year old child will train fitness with an intensity of 60% the maximum pulse rate per minute for the child is:

$$\text{DN}_{\text{max}} = 220 - 10$$

= 210

Furthermore, the result of the reduction is multiplied by the intensity of the exercise so charged the result :

$$80.60 \times 210 = 126$$

So the maximum heart rate per minute of the child is 126, if after finishing training the maximum pulse is calculated and the result exceeds that number then the training will be tough for the child.

### **Fitness activities for the elderly**

#### **AEROBIC EXERCISE PROGRAM**

Useful aerobic exercise better for the health of the elderly meet the FITT criteria (frequency, intensity, time, type). The frequency is how often the activity is carried out, how many days of the week. Intensity is how hard an activity is done. Usually classified into intensity low, medium, and high. Time refers on duration, how long an activity is done in one meeting, while the type of activity is the type - the type of physical activity that is done. Type-types of physical activity in the elderly according to Kathy, covering aerobic exercise, strengthening of muscles (muscle strengthening), flexibility, and exercise balance. Aerobic exercise is a exercise to develop the heart lungs or cardiorespiratory resistance or frequent called its aerobic freshness is a dynamic activity, continuous, and involving large muscles. Sukadiyanto stated that aerobic exercise is a form of organ apparatus ability training the body in inhaling, transporting, and using the necessary oxygen during the activity.

## **4 Conclusion**

To avoid contracting the Covid-19 virus, the Government has appealed to the public to always maintain cleanliness and lead a healthy lifestyle. Healthy lifestyle, namely by maintaining immunity by exercising. Awareness and discipline to practice a culture of healthy living must continue to be built and implemented. Good living habits need to be managed routinely so that they become a lifestyle that is settled for each individual. Consistency is the most important thing to maintain survival and productivity together in this pandemic. Maintaining a healthy lifestyle during a pandemic need to be done so that the immune system is strong and avoid viruses. To maintain a lifestyle, it can be applied by maintaining a diet, sleeping pattern, not stressing and exercising regularly. Implement health protocols by using masks, washing hands with soap, and maintaining distance when in crowds. Keep exercising regularly at home and maintain a diet so that the body remains ideal.

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# Optimization of Practicum Guidelines for Biomedic and Epidemiological Laboratories Based On Information Systems

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**Abstract.** With the covid-19 pandemic, which requires changes in the teaching and learning process of practicum in the laboratory, it requires changes in the teaching system. The learning mechanism from face to face to an online system requires the laboratory to prepare a method of delivering teaching materials in the form of electronic modules so that it is easy to download by students and laboratory users. The development of practicum teaching materials in this research is to integrate teaching materials that are currently in the form of files that have not been properly archived into digital files that are uploaded through the laboratory web with the address <https://silabkemas.ikm.unnes.ac.id>. The silabkemas web-based laboratory practicum guide makes it easier for users in the laboratory service process. 85% of respondents stated that the silabkemas web appearance was good and could be easily operationalized (Userfriendly), and 95% of respondents had used online learning module services in the form of SOPs and guidelines for using laboratory equipment. The silabkemas have been put to good use by students of the IKM FIK UNNES Department, but it is necessary to develop another platform so that it can accommodate large files and practicum instructions in the form of videos.

**Keywords:** Laboratory, guide material, information system

## 1 Introduction

Strengthening the function of the laboratory is carried out by optimizing the function of the laboratory as a support for the activities of the Tri Dharma of Higher Education including teaching / learning laboratories, research and community service. Meanwhile, the expansion of laboratory functions is carried out by accelerating the distribution of knowledge to the public through programmed scientific activities. Currently, the use of learning media in the form of softcopy or modules does not reflect the conservation spirit carried out by UNNES. The spirit of conservation which is reflected in the vision of UNNES to become an international standard conservation-minded university. This is because the use of modules must use paper. Current technological developments facilitate the distribution of lecture materials using the help of the web. So that the module printing



process can be reduced. With this research, researchers will compile SOP for lectures, SOP for inspection, safety standards and handling of materials and tools into learning media which is uploaded through the [silabkemas.ikm.unnes.ac.id](http://silabkemas.ikm.unnes.ac.id) website which is currently used by the IKM laboratory for laboratory management. The use and development of web-based e-modules can be used as material in learning in the form of multimedia and can increase the achievement of students' knowledge competencies [1].

The laboratory of the IKM FIK UNNES department has 9 laboratories, including an epidemiology laboratory and a biomedical laboratory. These two laboratories have a fairly dense practicum usage schedule, from the IKM laboratory data, in the odd semester of 2019/2020, there were 4 subjects using the epidemiology laboratory and 3 courses in the biomedical laboratory. The use of laboratories and IKM laboratory practicum activities must be in accordance with applicable standard procedures. So far, laboratory users are given practicum material in the form of files which are then copied as many as practicum members. This is considered ineffective in supporting lectures in the laboratory so that the development of teaching materials is needed.

In laboratory development, reference material is needed in practicum implementation, this reference material is needed as a basis for preparation and implementation of lecture activities in the laboratory. The development of practicum reference materials must develop following technological developments. This relates to changes in test methods and the basic basis of SOPs in handling materials and tools. Handling of materials and tools is very important, in order to avoid work accidents during practicum. However, the most important thing is the realization of a practicum that is in accordance with the implementation standards that are recognized in the world through ISO 17025.

The development of practicum teaching materials in this research is to integrate teaching materials that are currently in the form of files that have not been properly archived into digital files that are uploaded through the existing IKM FIK UNNES web laboratory. The IKM FIK UNNES laboratory has a [silabkemas.com](http://silabkemas.com) website which has been used to assist in managerial lending of laboratory materials and equipment. Later by integrating lecture material, practicum SOPs into downloadable file materials on the web will greatly facilitate laboratory users in preparing practicum besides that file storage by uploading via the web is considered safer from file damage and makes it easier to search for files.

Based on the background and problem formulation, this research has specific objectives, namely (a) Identifying the potential potential of lecture SOPs, materials and material handling so that they are carried out properly. (b) Arrange the collected documents into a webbase document so that they are easy to download again (c) Improve the IKM laboratory website to make it more familiar among laboratory users

## 2 Methods

This type of research is descriptive, where the reporting process is a description of the results of using and utilizing the download menu of the [silabkemas.ikm.unnes.ac.id](http://silabkemas.ikm.unnes.ac.id) web page which contains practicum guidelines on each type of parameter that is in the IKM FIK UNNES laboratory environment. The material that will be used as a module is how to implement practicum according

to standard methods, SOP for the use of equipment, SOP for handling materials and waste, SOP for how to borrow equipment, SOP for periodic maintenance of equipment and materials, legal basis and statutory reference, Threshold Value for inspection parameters. Evaluation of the use and effectiveness of the packaging silabus as online teaching materials using a questionnaire method and interviews with 20 respondents who are students in the IKM FIK UNNES Department. Interviews are used to determine weaknesses and to what extent the [silabkemas.ikm.unnes.ac.id](http://silabkemas.ikm.unnes.ac.id) can be used by users.

### 3 Result and Discussion

Specifically, there are six things that support the digestibility level of teaching materials, namely, logical exposure, coherent presentation of material, examples and illustrations that make it easier. According to Rusman (2012) "Web-based learning is a learning activity that utilizes website media that can be used. access via internet network".

The web-based teaching process has several advantages, According to Rusman (Rusman, 2012: 118) Access is available anytime, anywhere, in the world

1. The operational costs for each student to participate in learning activities are made more affordable
2. Supervision of student development becomes easier
3. Web-based learning design allows personalized learning activities.

#### 3.1 Application of using [silabkemas.ikm.unnes.ac.id](http://silabkemas.ikm.unnes.ac.id)

With the Covid-19 pandemic, lectures must be conducted online. So that the practicum system cannot be carried out by direct practicum activities in the laboratory. This makes the practicum not optimal. UNNES has facilitated the ELENA system which can be used for online lectures, but in order to improve the convenience of students who will conduct research and practicum, the laboratory has developed [silabkemas.ikm.unnes.ac.id](http://silabkemas.ikm.unnes.ac.id) so that it can also be accessed as a guide for practicum. This is done by adding the SOP menu embedded in the [silabkemas.ikm.unnes.ac.id](http://silabkemas.ikm.unnes.ac.id) website.

Laman [silabkemas.ikm.unnes.ac.id](http://silabkemas.ikm.unnes.ac.id) is a web-based laboratory service system that is operated in the IKM FIK UNNES laboratory environment. The use of the web [silabkemas.ikm.unnes.ac.id](http://silabkemas.ikm.unnes.ac.id) began in 2017. At first, the [silabkemas.ikm.unnes.ac.id](http://silabkemas.ikm.unnes.ac.id) were only used as a lending system for equipment used for lectures and research. However, with upgrading and maintenance carried out every year, currently the [silabkemas.ikm.unnes.ac.id](http://silabkemas.ikm.unnes.ac.id) web has been used to carry out equipment inventories. Including scheduling for equipment maintenance programs, taking stock of laboratory materials available in each laboratory and stored in the warehouse. so that the existence of [silabkemas.unnes.ac.id](http://silabkemas.unnes.ac.id) makes it easier in laboratory management. Some of the services that can be facilitated by [silabkemas.ikm.unnes.ac.id](http://silabkemas.ikm.unnes.ac.id) are:

- a. Borrowing laboratory equipment for lectures
- b. Laboratory consumables receipts for research and practicum as well as community service
- c. Laboratory equipment inventory, including maintenance schedules, user logbooks and realtime conditions
- d. Knowing the inventory of consumables in the laboratory and warehouse

e. Inform laboratory room usage schedule

f. As a medium for downloading practicum material.

Silabkemas.unnes.ac.id uses a wordpress-based system which is very easy in operation and maintenance. The silabkemas.ikm.unnes.ac.id page can be opened through all Android, Windows and MC-based browser software. It can even be opened using a cellphone so that it is easily accessible by users.

In terms of web maintenance, it is done by upgrading and backup files every time there is an update from wordpress which is usually once every 3 months. However, file backups are carried out every month. Initially, silabkemas.ikm.unnes.ac.id used a private domain so that it had the web address silabkemas.com, but since 2020 it has used the UNNES domain and server so that the web address has changed to silabkemas.ikm.unnes.ac.id. This migration process is not only for data security purposes but also to simplify system maintenance

From the results of the silabkemas.ikm.unnes.ac.id evaluation carried out by the questionnaire method on 20 IKM FIK UNNES laboratory users, it was found that 85% of the respondents stated that the web display was good, but it was suggested that the display be made more attractive. In the field of easy access, all respondents stated that the silabkemas.ikm.unnes.ac.id were very easy to use. Besides being accessible using an Android-based cellphone, the download file for validation can also be accessed directly and all respondents stated that the silabkemas.ikm.unnes.ac.id made it easier in laboratory services.

The types of silabkemas.ikm.unnes.ac.id used by the respondents, all of the 20 respondents, used the silabkemas.ikm.unnes.ac.id in the process of arranging a tool borrowing permit, but it is not mentioned here in the research process or in practicum. From other data, it was also obtained that only 20% of syllabic users took advantage of the space use menu. This is because not all students see the room schedule, only the class coordinator takes advantage of the space use menu. 95% of respondents have used online SOPs. This shows that the SOP menu and practicum instructions have been put to good use by students. Only 1 person did not use the packaging silabus to download the SOP because the respondent was included in the specialization and there was no practicum course in the curriculum.

**Table 1.** assessment of appearance of web silabkemas.ikm.unnes.ac.id

Very good	70 %
good	15 %
sufficient	15 %

**Table 2.** Use of the web

Borrowing equipment	70
Download SOP	15
Room Schedule	4
Use equipment	20

### 3.2 Module Teaching materials for practicum and SOP

SOP and practicum guide that can be downloaded on the [silabkemas.ikm.unnes.ac.id](http://silabkemas.ikm.unnes.ac.id) page. Files uploaded on the web are in PDF format, apart from having a small resolution, PDF files will not change format when downloaded using a browser. Unlike the MS Word file with the .doc format, which can change format when opened with hardware that has different software. In the laboratory SOP menu, 18 laboratory guide files have been uploaded.

The [silabkemas.ikm.unnes.ac.id](http://silabkemas.ikm.unnes.ac.id) web development process is a follow-up to laboratory user requests which are always evaluated after the practicum for one semester has been completed. Evaluation is also carried out when students are about to do laboratory free. The advantages and disadvantages of web-based systems

### **3.3 Wordpress management and web management [silabkemas.ikm.unnes.ac.id](http://silabkemas.ikm.unnes.ac.id)**

The [silabkemas.ikm.unnes.ac.id](http://silabkemas.ikm.unnes.ac.id) web development process is a follow-up to laboratory user requests which are always evaluated after the practicum for one semester has been completed. Evaluation is also carried out when students will do laboratory free in the graduation registration stage. One of the suggestions from the students is a request to make it easier to borrow laboratory equipment and materials. Another suggestion is that the lending system can be done easily in a system. From that input, a wordpress-based system was chosen.

In the web management process, the first step is to log in using the admin menu. After logging in, you will enter the wordpress management menu. In this menu, the admin can update the package data by adding information on the amount of material, the condition of the equipment, and adding the SOP file. Adding an SOP file can be done by creating a link that has previously been uploaded to the SOP file in pdf format. When the file has been uploaded, file management can be performed by renaming the file so that it is easier to read.

The use of wordpres in the basic [silabkemas.ikm.unnes.ac.id.unnes.ac.id](http://silabkemas.ikm.unnes.ac.id.unnes.ac.id) has several advantages and disadvantages. However, the use of wordpress is considered the most appropriate when compared to the use of other systems. Some of the advantages are

1. Easy operation, maintenance and data management
2. Can be opened in various types of browsers and various OS, including on Java-based mobile phones, Android and Windows
3. User friendly, the display and menu are very easy to use, even for those who are not familiar with [silabkemas.ikm.unnes.ac.id](http://silabkemas.ikm.unnes.ac.id) before
4. Save paper usage as laboratory manuals, and save printing costs.

However, the wordpress system also has several drawbacks, but these drawbacks can be covered by the advantages that can be exploited. These drawbacks are:

1. Cannot upload large files. Maximum 2 MB
2. Simple appearance, to enhance your appearance, you need a paid template and theme
3. Difficulty uploading files in the form of videos, but you can use them by providing embed video files from YouTube and other video providers

All of these shortcomings were felt by users where 60% of respondents wanted a platform that could be used to get practicum guides in the form of videos.

## **4 Conclusion**

By using [silabkemas.ikm.unnes.ac.id](http://silabkemas.ikm.unnes.ac.id) as a web-based information system that is used as a place to download and store practical guides and tool usage SOPs, it can be concluded that [Silabkemas.ikm.unnes.ac.id](http://Silabkemas.ikm.unnes.ac.id) can optimize IKM FIK UNNES laboratory services in terms of equipment management, materials and service systems. [Silabkemas.ikm.unnes.ac.id](http://Silabkemas.ikm.unnes.ac.id) can also be used as web-based information media that can be used for the location of storing SOP files and practicum instructions and most importantly, with the online SOP, laboratory users are more effective in the learning process.

Although the [silabkemas.ikm.unnes.ac.id](http://silabkemas.ikm.unnes.ac.id) provide convenience in laboratory services, further development is still needed to accommodate some of the deficiencies found in the use of wordpres-based syllabics. Then there is a need for other media so that it can accommodate and upload bear-sized files and can be downloaded easily by laboratory users and the development of the YouTube platform is needed to facilitate video files containing visual practicum guides.

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# Adolescent Knowledge of Anemia

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**Abstract.** Adolescent girls are the population group most vulnerable to anemia for various reasons. The purpose of study is to describe the level of knowledge of adolescents about anemia. The study used a cross sectional approach with a sample of 100 high school teenage girls who were taken by purposive method. Data collection was carried out using a closed questionnaire. The results showed that knowledge about anemia was mostly in the fairly good category (59.0%), followed by good knowledge (33.0%), and poor knowledge (8.0%). Most of the respondents did not understand the meaning, consequences, impact of anemia, and how to take blood booster tablets. There needs to be an effort to increase the knowledge of young women about anemia to prevent anemia.

**Keywords:** knowledge, anemia, adolescent girls.

## 1 Introduction

Anemia is one of the most common global nutritional problems and difficult to be managed, affecting both developing and developed countries with major consequences for human health and social and economic development. In all ASEAN member countries, except Thailand, more than 25% of female adolescents were anemic; in some countries the prevalence was 50% (WHO, 2011) [1]. The research in Nepal in 2014 found the incidence of anemia in female adolescents was 33.33% [2]. The types and causes of anemia vary widely, but the most common is iron deficiency anemia, which is anemia caused by iron deficiency. Iron deficiency anemia occurs at all stages of the life cycle, but is more common in pregnant women and children. Adolescents, especially women, are very vulnerable to iron deficiency [1],[3].

Adolescence is defined by the WHO as a period of life that includes ages between 10 and 19 years. Adolescents are at high risk of iron deficiency anemia because of the accelerated increase in demand, poor food intake, high infection rates, and worm infestations as well as the consequences of social norms from early marriage and teenage pregnancy.[1] Iron requirements peak during adolescence due to rapid growth, body weight, blood volume, and red blood cell mass, resulting in increased iron requirements for muscle myoglobin and hemoglobin in the blood. Whereas in female adolescents the occurrence of menstruation is added. Middle adolescent growth occurs between the ages of 12 - 15 years for girls and 1 to 2 years later for boys (between 13 - 16 years of age) [4], [5].

The high prevalence of anemia among adolescents if not handled properly will continue into adulthood. Iron deficiency anemia in female adolescents greatly contributes to maternal mortality, premature babies, low birth weight babies and stunted babies [6]. Iron nutrient anemia in rematriates greatly contributes to maternal mortality, premature births, low birth weight (LBW) and stunted babies. This incident is due to rematism at puberty a lot of iron loss during menstruation and is exacerbated by a lack of iron intake. During pregnancy, the need for iron increases threefold for the formation of the placenta and fetal growth. Serious countermeasures need to be done because the various effects of anemia can reduce the quality of human resources, especially in the first thousand days of life.[6]In female adolescents and women of childbearing age, iron deficiency anemia is still a public health problem if the prevalence is  $\geq 20\%$ . The Results of Basic Health Research stated that the incidence of anemia in female adolescent in 2007 was 6.9%, to 31% in 2011, and 22.7% in 2013 [7]. This shows that iron deficiency anemia in female adolescents has increased and still become a health problem in Indonesia.

The incidence of anemia in Central Java in 2013 reached 57.1%. The results of the study, which took 120 senior high school students in Purwokerto as the samples, found 92.9% of urban adolescents and 76% of rural girls suffer from anemia.[8] Research conducted on 109 female students from 3 high schools in Semarang Regency found that 61.5% of students had anemia [9].

In general, the high prevalence of iron nutrition anemia in adolescents can be caused by three factors, namely: inadequate iron intake, increased physiological needs, and loss of a lot of blood. Another cause is a combination of iron deficiency with other conditions such as socio-economic status [10]. Other factors that indirectly influence the incidence of anemia in adolescents are the mother's education and the adolescent's knowledge. Knowledge or cognitive is a domain that is very influential on a person's actions or behavior [11]. Health education will be an effective method to improve adolescents health through increasing knowledge and changing their attitudes [12]. This study aims to describe the knowledge level of adolescents about anemia.

## 2 Method

The design used in this study was descriptive with a cross sectional approach. The population in this study were all adolescents registered in Senior High Schools in Semarang Regency in the even semester of 2018/2019 as many as 30,230 students. The samples were taken purposively from SMAN 2 Ungaran, SMAN 1 Bergas, and SMA Muhammadiyah Sumowono as many as 100 female students. The consideration to choose research locations was to represent rural, semi-urban and urban areas. Data collection was carried out using a closed questionnaire. SPSS version 20 was used to analyze data descriptively. The level of knowledge is good if the correct number is  $> 75\%$  (score  $> 27$ ), sufficient if the correct number is  $56\% - 75\%$  (score 20-27), and poor if the correct number is  $< 56\%$  (score  $< 12$ ). This research has passed ethics from the Health Research Ethics Commission (KEPK), Faculty of Sport Sciences, Semarang State University (Ethical Clearance) Number: 188 / KEPK..



### 3 Result

In Table 1, it can be seen that the age of the respondents is almost similar, there were 46 respondents (46.0%) at the age of 16, and 44 respondents (44.0%) at the age of 15. The results of measuring knowledge by using a questionnaire consisting of 12 questions obtained a mean score (middle value) of 27.00 with the lowest score of 9 and the highest score of 31.

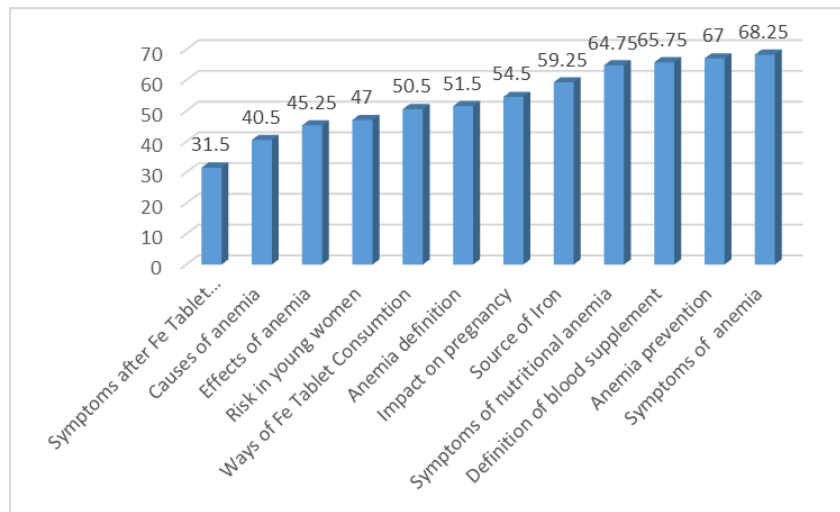
**Table 1.** The Description of respondents' age

Age (year)	f	%
14	3	3,0
15	44	44,0
16	46	46,0
17	6	6,0
18	0	0,0
19	1	1,0
Total	100	100,0

**Table 2** The description of knowledge level on anemia

Knowledge Level	Frequency	Percentage
Good	33	33,0
Sufficient	59	59
Poor	8	8,0
Jumlah	100	100,0

Table 2 shows that the highest percentage was respondents with sufficient knowledge of anemia, namely 59.0%, followed by good knowledge of 33.0%, and there were still 8% of respondents with poor knowledge.



**Grafik 1** The mean of knowledge dimentions

#### 4 Discussion

This study find that 59.0% of respondents have sufficient knowledge level, while 33.0% of respondents have good knowledge level, and there were still 8% of respondents with poor knowledge level. Poor knowledge of female adolescents about anemia can be caused by insufficient information about anemia. A person's understanding is obtained through knowledge which is the result of knowing and this occurs after people sense a certain object. Sensing occurs through the human senses, namely the senses of sight, hearing, smell, taste and touch. Most of human knowledge is obtained through the eyes and ears. Knowledge will underlie beliefs about an object and will form a habit, this is what will then bring out the desire that is raised in attitudes and behavior [11].

The measured knowledge is the knowledge that the respondent has about anemia which includes 6 indicators and 12 question items. The question items that many respondents know about are indicators of anemia symptoms and how to prevent anemia. Meanwhile, the question items that were fairly and less known by the respondents were indicators of understanding anemia, causes of anemia, due to anemia, and consumption of blood supplement tablets. This can be caused by a lack of complete information about anemia. Young women should gain knowledge about anemia through health education in schools, the mass media, or through counseling in health facilities. Based on information from respondents, they have received blood booster tablets from health workers who came to school, but they did not receive complete information about anemia.

The causes of iron deficiency anemia are chronic blood loss, insufficient iron intake and inadequate absorption and an increased need for iron to form red blood cells, which commonly occurs during infancy, puberty, pregnancy and breastfeeding. On male adult, most of the blood loss is caused by the bleeding process due to disease (trauma), or due to treatment of a disease, while on women occur because of natural blood loss every month [13].

Some people, after consuming iron tablets, can feel symptoms such as nausea, vomiting, pain in the stomach area, sometimes diarrhea and even difficulty passing stool [14]. For teenagers who do not know, they will immediately stop consuming blood booster tablet. It is recommended that iron tablets are taken at night to avoid the symptoms mentioned above. It is better if the consumption of iron tablets is not at the same time as consuming food and drugs such as; milk, tea, coffee and heartburn medicine. Milk has a high calcium content which reduces the absorption of iron in the intestinal mucosa. Coffee and tea contain caffeine and tannins which can bind iron into complex compounds so that iron cannot be absorbed. While ulcer medication serves to coat the surface of the stomach, this can inhibit iron absorption.

The older a person is, the more mature his mindset will be and the better his knowledge will be [15]. Therefore age can affect a person's knowledge because the older a person is, the better his mindset will be so that he is better at responding to an object or problem. The increasing age of a person can affect the knowledge he / she gets, but at certain ages or before elderly age the ability to accept or remember a knowledge will decrease. Experience is a source of knowledge, or experience is a way to obtain the truth of knowledge. Personal experience can be used as an effort to obtain something. Adolescents according to WHO (2013) are the population in the age range 10-19 years. Based on the results of the study, it can be seen that the age of the most respondents is 16 years old with 46 respondents (46.0%) and 44 respondents (44.0%) with an average age of respondents 15.59 years.

The results of this study are almost the same as several previous studies. Research on young women in New Delhi, India in 2015 found that the majority of respondents (64%) had average knowledge (sufficient), 36% of respondents had a good level of knowledge, and none of them had a low level of knowledge [16]. Research conducted on high school students in Medan shows that the majority of female adolescent knowledge about iron deficiency anemia is in the sufficient knowledge category, 73 respondents (77.7%), good category 18 respondents (19.1%), and poor category 3 respondents (3.2%).[17] Furthermore, research on female students at SMA Negeri 1 Talang Padang found that the knowledge level of young women about anemia was less 53.1% and 46.9% sufficient [18].

The results of this study are slightly different from the research conducted in India which showed that most of the girls (57.0%) had insufficient knowledge, only 43.0% had sufficient knowledge, and none had a good level of knowledge.[19] Research conducted on students of SMKN Tepus, Gunung Kidul, DIY in 2019/2020 also found different results from this study, namely 39 respondents (50.6%) had a good level of knowledge, and as many as 38 respondents (49.4 %) have a sufficient level of knowledge.[20] Furthermore, the results of this study are also different from previous research conducted in 2015 which took samples in 3 high schools in Semarang Regency, namely SMAN 2 Ungaran, SMAN 1 Ambarawa, and SMAN 1 Suruh, which obtained the results of most respondents 2%) have a good level of knowledge of anemia.[9] This difference can be caused by the objectives, timing of implementation, and the instruments used.

## 5 Conclusion

The knowledge of female adolescents about anemia is mostly in the sufficient category, namely 59%. To prevent anemia in adolescents, it is important to carry out

health education for adolescents about anemia in a complete manner using interactive information media

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# Development of Prediction Methods Nutritional Status Athletes Using Fat-Free Mass Indicator

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**Abstract.** Many assessments of nutritional status using the body mass index (BMI) indicators that are carried out on athletes produce high BMI scores so that these athletes are considered to have over weight or obesity. Body weight is an indicator of body composition which includes the proportion of fat mass and fat-free mass including muscle mass, water, and bone. This study suggests cross-checking the results of anthropometric using the BMI indicator with other indicators, namely the percent body fat mass or the circumference ratio based on height. The cross-sectional design was used. The sample consisted of 118 student athletes who were under the Student Education and Training Center (PPLP). Measurements were made using body weight, height and fat-free mass. The results showed that there is a significant relationship between the percentage of body fat content and the BMI which is indicated by a p value  $<0.05$ .

**Keywords:** nutrition status, athletes, fat-free mas.

## 1 Introduction

Nutrition status is a condition of one's health that is described through the balance between intake and nutrients requirement of the body for growth and development of the body, physical activity, maintenance of health status and fulfillment of other biological needs [1]. Nutritional status can be known either directly or indirectly. The assessment of nutritional status directly one of them by using anthropometry index is Body Mass Index (BMI). For adult and elderly age group populations, BMI is still a valid indicator of nutritional status assessment, but this does not apply to athletes [2] The BMI indicator only calculates nutritional status through a proportion of body weight based on square height. Athletes who have a high BMI score cannot be inferred as having an overweight or even obese nutritional status. Many nutritional status assessments using BMI indicators performed on athletes produce a high BMI score so that it is considered that the athlete has more nutritional status as well as obesity. This is because weight is an indicator of body composition that includes a proportion of fat mass and fat-free mass including muscle mass, water, and bone that certainly cannot be known specifically only through weight measurement [3].

According to another research on 173 male and female athletes showed that as many as 72% of athletes have a BMI score but the fat period belongs to the normal category. This study suggests doing crosscheck anthropometry assessment results using BMI indicators with other indicators namely percent body fat mass or waist phallus ratio based on height [4]. Other studies conducted on 40 male athletes (20 runners and 20 handball athletes) and 30 non-athletes as controls showed results that there was no significant BMI difference between the athletes group

(runners and handballs) and the control group (nonathletes). The body fat mass between the group of athletes and non athletes show a very significant difference, so BMI can not yet be used as an indicator describing nutritional status in athletes [5].

Measurement of nutritional status in athletes should pay attention to aspects of body composition both fat mass and fat-free mass. Therefore, the assessment of nutritional status in athletes will be more appropriate if done using indicators of body composition (fat mass and fat-free mass). Research on 57 male student athletes (football and handball) showed that REE (Resting Energy Expenditure) had an 84% correlation with fat-free mass [6]. Similar research conducted on 93 female student athletes (track and field events, swimming, lacrosse, basketball, judo, beautiful gymnastics, rowing, cheerleaders, badminton, and weight lifting) also showed a strong correlation (82%) between REE and fat-free mass [7]. The high correlation between REE and fat-free mass indicates that the higher the fat-free mass of an athlete, the higher the REE. Body fat mass that can be known by direct measurement (skinfold caliper or Bioelectrical Impedance Analysis or whole-body dual-energy X-ray absorptiometry scanner), fat-free mass can only be known through the estimation of several indicators of weight, height, and waist circumference which are then developed into an equation formula [8].

Therefore, researchers are interested in conducting research by means of trials and developing the equation formula in PPLP (Center for Student Education and Training) athletes in Central Java Province so that it can be a method to predict the nutritional status especially in athletes.

## 2 Methods

The type of research used in this study is crosssectional. A sample of 134 student athletes under the Center for Student Education and Training (PPLP) at Jatidiri Sport area complex. The subjects were selected using a purposive sampling. The inclusion criteria among subjects are not sick or have a history of cardiovascular disease, metabolic syndrome, immunity disorders and have not been used any medications or supplements that can effect muscle contraction. The subjects must fill informed consent form.

Anthropometric measurements using OMRON digital Personal Weight Scale Type HN-289 (0,1 cm precision level) and height measured using The GEA wireless Body Height Meter type H-721 (0,1 cm precision level). The thickness of the subcutaneous fat was measured using the karadascan body composition monitor tyoe HBF-375. Measurements are performed using weight, height, and fat-free mass.

Characteristic data including age, height, body weight body fat percentage, fat free mass. BMI, waist circumference were analyzed descriptively and display by table. Bivariate analysis used the spearman Rank test to asses the predictor of measurement nutritional status.

## 3 Results and Discussion

This research was located in the GOR (Sports Arena) complex of Jatidiri Semarang, Central Java. Gor Jatidiri complex is a center of education and sports training for central Java student athletes located in Karangrejo, Gajahmungkur Subdistrict, Semarang City. The athletes who are built from sports include rowing, wushu, basketball, rock climbing, athletics, sepak takraw, fencing, volleyball, boxing, roller skates, taekwondo, karate, sand volleyball, football,

wrestling, archery, pencak silat, weightlifting, swimming, athletics, and also disability athletics. The subjects in this study were 119 athletes from 16 sports including sepak takraw, weightlifting, swimming, fencing, basketball, rowing, volleyball, football, athletics, wrestling, wushu, karate, taekwondo, boxing, silat and judo.

The athletes who were the subjects in this study were only male athletes. Athletes who were the subject of the study conducted anthropometry measurements in the form of measurements of height, weight, body fat percentage, waist circumference, fat thickness (biceps, triceps, suprailiac, and subscapular), and fat-free mass. The body fat percentage is measured using two methods, namely with the BIA (Bio Impedance Analysis) tool that measures body fat percentage digitally and uses a manual method that is calculation based on fat thickness at some point. As for fat-free mass is also measured using BIA. However, BIA equations developed for specific athletes may also produce acceptable values and are still acceptable for use until more research is conducted. The use of a valid BIA equation/device should produce values similar to those of hydrostatic weighing and dual-energy X-ray absorptiometry. However, researchers and practitioners need to understand the individual variability associated with BIA estimations for both single assessments and repeated measurements [9]. In this study, anthropometry measurements are performed 3 times. During the study, there was 1 athlete who was dropped out because he was sick and could not follow the research, bringing the total sample to 118 male athletes. The complete characteristics of the study subjects are presented in Table 1 and Table 2 below.

**Table 1.** Characteristics of Research Subjects by Body Fat Mass

Characteristics	Charateristic of Body Fat Percentage Category								Total	
	Less		Good		Moderate		Over		N	%
	n	%	n	%	n	%	n	%		
BMI										
Wasting	0	0	1	0,8	0	0	0	0	1	0,8
Underweight	1	0,8	3	2,5	0	0	1	0,8	5	4,2
Normal	0	0	62	52,5	31	26,3	5	4,2	98	83,1
Overweight	0	0	6	5,1	2	1,7	6	5,1	14	11,9

Relationship test using Spearman Rank Test, significant at level 0.01

Relationship test results show a significant value of  $p=0,003$ , indicated by notation\*\*

Based on table 1, it can be known that correlation the results using Spearman Rank Test show that there is a significant relationship between the percentage of body fat levels and Body Mass Index (BMI) indicated by a value of  $p<0,05$ . Table 1 shows that BMI does not necessary describe body composition where there are subjects who have a wasting and normal BMI but measurement results show a slightly excessive percentage of body fat (0,8% and 4,2 %). In contrast, study subjects who had a good and sufficient percentage of body fat showed overweight BMI (5,1% and 1,7%). This research appropriate to the other research on 173 male and female athletes showed that as many as 72% of athletes have a BMI score but the fat period belongs to normal category. Other studies conducted on 40 male athletes (20 runners and 20 handball athletes) and 30 non-athletes as controls showed results that there was no significant BMI difference between the athletes group (runners and handballs) and the control group (non athletes). The body fat mass between the group of athletes and non-athletes showed a very significant difference, so BMI can not yet be used as an indicator describing nutritional status in athletes [4].

**Table 2.** Characteristic of Subject

Characteristic (n=118)	Mean $\pm$ SD	Min	Maks	p-value
Age (years)	16,18 $\pm$ 1,129	13,00	19,00	0,983 <sup>ns</sup>
Height (cm)	170,23 $\pm$ 6,994	154,00	186,6	0,0001**
Body weight (kg)	63,91 $\pm$ 9,122	47,15	93,85	0,0001**
Body Fat Percentage (%)	12,83 $\pm$ 3,824	5,40	24,40	0,005**
Fat Free Mass (kg)	55,52 $\pm$ 6,807	39,39	75,04	-
Body Mass Index /m <sup>2</sup> )	22,00 $\pm$ 22,386	16,64	29,40	0,0001**
Waist circumference (cm)	72,88 $\pm$ 5,155	61,75	87,80	0,0001**
Fat Thickness Under Skin				
Bisep	16,95 $\pm$ 9,618	4,00	38,00	0,012*
Trisep	20,43 $\pm$ 10,280	7,75	46,00	0,013*
<i>Suprailiac</i>	19,19 $\pm$ 9,289	5,00	47,00	0,007**
<i>Subscapular</i>	18,49 $\pm$ 9,559	5,00	47,00	0,019*
Body density (g/mL)	1,03 $\pm$ 0,011	1,01	1,06	0,003**

Test relationships with fat-free mass bound variables using Pearson's R test

Significant at the level of 0,05, indicated by notation\*

Significant at the level of 0,01, indicated by notation\*\*

Insignificant indicated by notation <sup>ns</sup>

Based on table 2, it can be known that the student athletes who were the subjects of the study had characteristics of age, weight, height, body fat percentage, fat-free mass, waist circumference, thick under-skin fat, and fairly varied body density. It is known that the age of student athletes ranges from 13-19 years. The weight of the study subjects also showed varied measurement results ranging from 47.15 – 93.85 kg. The height of the study subjects ranged from 154 – 186.6 cm. The body fat percentage of the study subjects varied between 5.40 – 24.40 %. The fat-free mass of the study subjects also varied considerably between 39.39 – 75.04 kg of the subject's total body weight.

The results of the correlation test using Pearson's R stated that height, weight, body fat percentage, Body Mass Index, waist circumference, thick fat under the skin (biceps, triceps, suprailiac, and subscapular), and body density were significantly related to the fat-free mass indicated by a  $p < 0.05$  value, whereas the age variable was not significantly related to the fat-free mass indicated by the  $p > 0.05$  value.

In athletic populations, anthropometrics commonly includes measurement of height, weight, body circumferences (waist, hip, mid-thigh, calf, bicep), and subcutaneous (“skinfold”) fat thickness. Assessment of body size and body composition can be a useful part of a general assessment but is particularly useful in athletes participating in weight class, gravitational, and esthetic sports where these factors may influence competition qualification, performance, or adjudication.<sup>10,11</sup> Based on the results of correlation tests using Pearson's R it has been known



that variables that are significantly related to fat-free mass are weight, height, body fat percentage, Body Mass Index, waist circumference, thick fat under the skin (biceps, triceps, suprailiac, and subscapular), and body density. Based on the results of correlation tests using Pearson's R it has been known that variables that are significantly related to fat-free mass are weight, height, body fat percentage, Body Mass Index, waist circumference, thick fat under the skin (biceps, triceps, suprailiac, and subscapular), and body density. The factors that will be studied greatly influence on the composition of fat-free mass only variable weight, height, waist circumference, and body fat percentage. These factors were then analyzed using multiple linear regression tests using the backward method [12].

The results of multiple linear regression analysis stated that height variables become insignificant if analyzed together with other variables indicated by the value  $p > 0.05$  ( $p = 0.414$ ) so that height variables are excluded from predictors. After the height variable is removed, other variables namely weight, body fat percentage and waist circumference indicate a significant association with fat-free mass ( $p = 0.0001$ ;  $0.0001$ ;  $0.0001$ ; and  $0.002$ ). With the addition of a constant of 19,582 combined with the variables of body weight, body fat percentage, and waist circumference is a combination of determining variables that significantly affect the variable body fat mass. The equations formed from these variables are :

$$\text{Fat-free mass (kg)} = 19,582 + 0,858 \cdot \text{BW} - 0,802 \cdot \text{Height} - 0,120 \cdot \text{Waist Circumference}$$

The above regression equation can be explained as follows :

Constant of 19,582 means that if the weight, height and waist circumference are 0 then the fat-free mass is the same as the constant.

Coefficient of regression of variable body weight of 0.858 atinya if other variables remain and the variable weight increases by 1 kg then the body fat mass will increase by 0.585 kg.

Coefficient of regression of variable height of -0.802 means that if other variables remain and variable height increases by 1 cm then body fat mass will decrease by 0.802 kg.

Coefficient of variable regression of waist circumference of -0.120 means that if other variables remain and variable circumference of the plate increases by 1 cm then the body fat mass will decrease by 0.120 kg.

## 4 Conclusion

Based on the above results and discussions, conclusions that can be taken include height, weight, body fat percentage, Body Mass Index, waist circumference, thick fat under the skin (biceps, triceps, suprailiac, and subscapular), and body density is significantly related to fat-free mass. The regression equation formed is fat-free mass (kg) =  $19,582 + 0.858 \cdot \text{BW} - 0.802 \cdot \text{TB} - 0.120 \cdot \text{Waist Circumference}$ , but this equation still cannot be used as a predictive equation.

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# Condom Use and HIV Testing on Female Sex Workers

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**Abstract.** This research is an descriptive-correlative study with cross sectional design using a quantitative approach to predict the practice of Condom-Use and HIV-Test among female sex workers in the lokalisasi area of Batang district. The population were all FSW in the localization area of Batang Regency, which are the population at highest risk of contracting and transmitting HIV/AIDS. The sample selection technique was simple random sampling. Data collection is done by filling out a questionnaire. Data analysis was carried out descriptively and correlatively with the Chi Square test. The results showed that the practice of using condoms in sexual activities carried out by FSW and their customers was still low, namely only 30.1%. Factors that significantly influence the practice of using condoms consistently in every sexual activity performed by FSW and their clients are perceptions of vulnerability to HIV transmission, perceptions of HIV/AIDS severity, perceptions of condom benefits, perceived barriers to condom access, customer support and self-efficacy. Factors that significantly influence the practice of HIV testing among FSW are perceptions of vulnerability to HIV transmission, perceptions of HIV/AIDS severity, perceptions of the benefits of HIV testing, perceptions of barriers to HIV testing, knowledge of HIV/AIDS, pimp support and self-efficacy.

**Keywords:** PMT, condom-use, HIV-test.

## 1 Introduction

HIV/AIDS is still a global and national health problem with the number of new cases increasing every year. Central Java is the province with the fifth largest HIV / AIDS case. Every day an average of 10 new cases were found [1].

One of the HIV/AIDS red zone areas is Batang district. This region has a high risk of HIV/AIDS transmission because of the large number of localizations that are scattered along the coast of Java Island. The Batang Regency AIDS Commission (KPA) said HIV/AIDS cases in Batang have always been on the increase. From 2007 to June 2018 there have been 1,039 HIV/AIDS cases, 165 of which have died. In the past year, in Batang District, 75 new cases of HIV/AIDS have been found and 10 people have died [2].

HIV/AIDS in Batang district in the past year was dominated by women (63%) and most of them came from female sex workers (FSW). FSW is the group that has the greatest risk factor due to sexual behavior that has multiple partners [2]. This fact shows that HIV / AIDS is increasingly worrying both from a quantitative and qualitative side.

The area in Batang district that has the highest number of HIV/AIDS cases is Banyuputih sub-district, with 22 cases, followed by Bandar sub-district with 20 cases and Gringsing sub-district with 16 cases [2]. This is indicated because in that region there are the most

prostitution brothels, namely 3 official brothels and some hidden localizations in the form of cafes and karaoke places [2].

This fact shows that FSW is the group most at high risk of contracting and transmitting HIV / AIDS. In Indonesia, it is predicted that more than 50% of FSW suffer from sexually transmitted diseases. The low knowledge of FSW related to HIV/AIDS and economic reasons are the main causes of the weak efforts to prevent HIV/AIDS transmission carried out by FSW in lokalisasi [3].

Consistent condom use is an effective strategy in the prevention of sexually transmitted infections and transmission of HIV/AIDS [4]. Condoms are currently still a versatile prevention technology that can prevent unwanted pregnancies and sexually transmitted infections including HIV. If used correctly and consistently, condoms can provide the optimal level of protection [5].

In addition to consistent use of condoms, HIV testing for high-risk groups must also be carried out as early as possible and periodically so that early detection of AIDS can be recognized immediately and efforts can be made for prevention and treatment. HIV testing is done to identify, stage, initiate, and monitor infected people with antiretroviral therapy in order to save a sufferer's life [6].

However, in fact, the consistent use of condoms and testing for HIV as early as possible and periodically by FSW as a risk group is still very low. The use of condoms in sexual behavior among FSW in Banyuputih sub-district, Batang district is still low (15.8%), participation in monthly STI screening is still low (28.1%), and periodic HIV testing every three months is also low (26, 7%) [7]. The cause of the low HIV/AIDS prevention behavior must be explored. An assessment of the dangers or threats and vulnerability of AIDS in the FSW group (threat appraisal) and efforts to prevent and handle it (coping appraisal) must be carried out by FSW as a risk group in order to avoid and protect themselves from the threat of HIV/AIDS transmission. Research in 50 countries states that female sex workers (FSW) have a 14-fold higher risk of HIV/AIDS than women of the same age in the general population [8].

The motivations that drive and the factors that prevent a person from engaging in personal protective behavior (Personal Protective Motivation Model) must be identified for interventions to reduce the prevalence of HIV/AIDS transmission today.

Research questions how the consistency of condom-use and HIV tests and their determinants with an assessment of the dangers or threats and vulnerability to AIDS in the FSW. The purpose of this study was to analyze the consistency of condom-use and HIV tests and their determinants using the Personal Protective Motivation (PMT) assessment.

## 2 Method

This type of research is a descriptive-correlative study with a cross sectional design using a quantitative approach. This study was conducted to predict the practice of Condom-Use and HIV-Test in female sex workers in the Banyuputih area, Batang district.

The population of this study were all FSW in the Batang district brothel, namely Penundan, Banyuputih and Jentolsari brothels totaling 274 people. The number of samples was calculated according to Slovin minimum sample calculation, which is obtained a number of 163 people. Simple random sample selection technique.

The research instrument in the form of a questionnaire refers to the PMT construction components which consist of:

- 1) Extrinsic factors, namely an assessment of peer support or participation in using condoms.
- 2) Intrinsic factors, namely an assessment of a person's personal perceptions which include: (1) psychological or physical perceptions of not using condoms, (2) perceptions of vulnerability to infection with STIs and HIV, (3) perceptions of the severity of HIV infection, (4) perceptions of effectiveness or the benefits of using condoms, (5) self-efficacy of condom use, and (6) perceptions of barriers or negative consequences of condom use.
- 3) The intention to use condoms consistently
- 4) Consistent use of condoms.

The data was collected by filling out a questionnaire which the researcher was waiting for. Data analysis was carried out descriptively to determine the frequency distribution of demographic characteristics, intention to use condoms and consistency of condom use. To analyze the determinants of PMT and condom consistency using the Chi Square test.

### 3 Result and Discussion

Based on the results of the study, of the 163 FSW in Batang, it was found that their average age was 29 years, the youngest FSW was 20 years old and the oldest was 47 years old.

**Table 1.** Female Sex Worker Characteristic

Characteristic	Frequency	%
<b>Education Level</b>		
No School	5	3.1
Elementary School	99	60.7
Junior High School	53	32.5
Senior High School	6	3.7
<b>Marriage Status</b>		
Single	16	9.8
Merried	27	16.6
Widowed / divorce	120	73.6
<b>Length of Work as FSW</b>		
<1 year	48	29.4
1-5 years	102	62.6
6-10 years	8	4.9
>10 years	5	3.1
<b>Condom Use</b>		
Not always	114	69.9
Always	49	30.1
<b>HIV Tes</b>		
Not routine every 3 months	102	62.6

Characteristic	Frequency	%
<b>Education Level</b>		
No School	5	3.1
Elementary School	99	60.7
Junior High School	53	32.5
Senior High School	6	3.7
Routine	61	37.4

Table 1 shows that the majority of FSW in Batang Regency are widows/divorced 73.6%. Even so, 16.6% of FSW were still married and there were 16 (9.8%) FSW who were not married.

Most of the FSW had low education, Elementary School 60.7%, and Junior High School 32.5%. There were 5 people (3.1%) who did not complete elementary school, and there were 6 people (3.7%) with high school education.

Most (66.7%) of FSW had their work as FSW between 1 and 5 years. There were 13 FSW (22.8%) who had been working as FSW for less than 1 year, and 2 (3.5%) had been a FSW for more than 10 years.

### 3.1 Factors Affecting Condom Use Practices in Sexual Activity of FSW

To analyze the factors that influence the practice of condom use in FSW sexual activity, a Chi square test was performed using a cross table.

**Table 2.** Crosstab between perceived vulnerability, perceived severity, perceived benefits, perceived barriers, knowledge, customer support, pimp support and self-efficacy with the practice of using condoms

Variabel	Condom Use		P Value
	Not always	Always	
Perceptions of Vulnerability to HIV transmission			
Not good	93 (76.2%)	29 (23.8%)	0.005
Good	21 (51.2%)	20 (48.8%)	
Perceptions of the seriousness of HIV/AIDS			
Not good	88 (75.9%)	28 (24.1%)	0.016
Good	26 (55.3%)	21 (44.7%)	
Perceptions of the Benefits of Condoms			
Not good	45 (90.0%)	5 (10.0%)	0.0004
Good	69 (61.1%)	44 (38.9%)	
Perceptions of Barriers to Condom Access			
Not good	33 (89.2%)	4 (10.8%)	0.007
Good	81 (64.3%)	45 (35.7%)	
Knowledge about HIV/AIDS			
Bad	18 (78.3%)	5 (21.7%)	0.448
Good	96 (68.6%)	44 (31.4%)	
Klien's Support			

Less supportive	97 (77.0%)	29 (23.0%)	0.001
Supportive	17 (45.9%)	20 (54.1%)	
<b>Pimp support</b>			
Less supportive	82 (73.9%)	29 (26.1%)	0.156
Supportive	32 (61.5%)	20 (38.5%)	
<b>Self Efficacy</b>			
Bad	91 (76.5%)	28 (23.5%)	0.005
Good	23 (52.3%)	21 (47.7%)	

The results of the data analysis showed that the factors that significantly influenced the practice of using condoms consistently in every sexual activity performed by FSW and their clients were: perceived vulnerability to HIV transmission (p 0.005), perceptions of HIV/AIDS severity (p 0.016), perceived benefits. condoms (p 0.0004), perceived barriers to condom access (p 0.007), customer support (0.001) and self-efficacy (0.005). Meanwhile, knowledge about HIV/AIDS (0.448) and support from pimps (0.156) did not influence the practice of using condoms consistently.

### 3.2 Factors Affecting HIV Testing Practices among FSW

To analyze the factors affecting HIV testing in FSW, a Chi square test was performed using a cross table.

**Table 2.** Crosstab between perceived vulnerability, perceived severity, perceived benefits, perceived barriers, knowledge, pimp support and self-efficacy with HIV testing practices among FSW

Variabel	HIV test		P Value
	Not routine every 3 months	Routine	
<b>Perceptions of Vulnerability to HIV transmission</b>			
Not good	84 (68.9%)	38 (31.1%)	0.008
Good	18 (43.9%)	23 (56.15)	
<b>Perceptions of the seriousness of HIV/AIDS</b>			
Not good	80 (69.0%)	36 (31.0%)	0,014
Good	22 (46.8%)	25 (53.2%)	
<b>Perceptions of the Benefits of HIV testing</b>			
Not good	37 (80.4%)	9 (19.6%)	0.006
Good	65 (55.6%)	52 (44.4%)	
<b>Perceptions of Barriers to HIV testing</b>			
Not good	36 (81.8%)	8 (18.2%)	0.004
Good	66 (55.5%)	53 (44.5%)	
<b>Knowledge about HIV/AIDS</b>			
Bad	20 (87.0%)	3 (13.0%)	0.018
Good	82 (58.6%)	58 (41.4%)	
<b>Pimp support</b>			
Less supportive	76 (68.5%)	35 (31.5%)	0.036
Supportive	26 (50.0%)	26 (50.0%)	
<b>Self Efficacy</b>			
Bad	83 (69.7%)	36 (30.3%)	0.003
Good	19 (43.2%)	25 (56.8%)	

The results of the cross-table analysis above, show that the factors that significantly influence the practice of HIV testing among FSW are: perceived vulnerability to HIV transmission (p 0.008), perceptions of HIV/AIDS severity (p 0.014), perceived benefits of HIV testing (p 0.006), perception of barriers in HIV testing (p 0.004), knowledge about HIV/AIDS (p 0.018) pimp support (0.036) and self-efficacy (0.003).

FSW is a population at high risk of contracting and transmitting HIV/AIDS due to unsafe sexual behavior. Prevention of transmission is very important for FSW, one of which is the compliance with condom use in risky sexual behavior. The non-compliance of condom use was because the FSW did not dare to refuse sexual intercourse without a condom [9].

The results of this study have proven that Protection Motivation Theory (PMT) which states that the reason for someone to do unhealthy behavior is based on their perception of danger or threat and their susceptibility to disease [10,11,12,13,14]. A person with bad perceptions has a greater tendency to engage in unhealthy behavior. FSW who feel that they are not a group that is vulnerable to HIV/AIDS transmission and think that HIV/AIDS is a common disease and it takes a long time to be infected, so they tend not to take good preventive measures, for example by consistently using condoms every time they have sex with their clients.

PMT theory also explains that when a person is faced with a health threat, there are two judgments that emerge, namely an assessment of the threat and an assessment of coping. Threat assessments provide an individual's assessment of their vulnerability to the threat of HIV infection and the severity of perceived threats. The assessment comes from both personal and intrapersonal perceptions of risky behavior, for example behavior not using condoms. Meanwhile, the coping assessment will compare the effectiveness of the behavior carried out with threats, namely comparing the behavior of using condoms with the threat of HIV infection. The two assessments will ultimately form the motivation (intention) for protective behavior against the threat of HIV infection.

Several previous studies have shown that PMT can predict risky sexual behavior including intention and condom use in the adolescent population [15,16,17,18,19]. In particular, coping assessments have estimated intention to initiate sex among Bahamian youth and intention to use condoms among South African youth [16,18]. Another study in China in 2015 showed that self-efficacy, and the perception of barriers predicted the intention and behavior of using condoms consistently among FSW [20].

There are two factors underlying the behavior of using condoms as HIV/AIDS prevention behavior according to PMT theory, namely:

- 1) Extrinsic factors, namely an assessment of peer support or participation in using condoms.
- 2) Intrinsic factors, namely an assessment of a person's personal perceptions which include: (1) psychological or physical perceptions of not using condoms, (2) perceptions of vulnerability to infection with STIs and HIV, (3) perceptions of the severity of HIV infection, (4) perceptions of effectiveness or the benefits of using condoms, (5) self-efficacy of condom use, and (6) perceptions of barriers or negative consequences of condom use



## 4 Conclusion

The practice of using condoms in sexual activities carried out by FSW with their customers is still low, namely only 30.1%. Most of the FSW did not comply with the HIV test, which should be done regularly every three months.

Factors that significantly influence the practice of using condoms consistently in every sexual activity performed by FSW and their clients are: perceived vulnerability to HIV transmission, perceptions of HIV/AIDS severity, perceptions of condom benefits, perceived barriers to condom access, customer support and self efficacy.

Factors that significantly influence the practice of HIV testing among FSW are: perceived vulnerability to HIV transmission, perceptions of HIV/AIDS severity, perceived benefits of HIV testing, perceived barriers to condom access, knowledge about HIV/AIDS, pimp support and self-efficacy.

Based on the results of the study, the most influencing practice of consistent condom use and routine HIV testing were intrinsic factors (factors in individuals). Therefore, efforts to increase HIV/AIDS transmission prevention behavior in risk groups must be carried out through intensive behavior change communication interventions.

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# Rice Bran Based Vitabran Sports Vitality Booster

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**Abstract.** The local food ingredients also function as a functional food. They are rich in nutrients and have a low GI, such as rice bran and sweet potato flour. The research objective was to analyze the benefits of Vitabran, a mixture of rice bran and sweet potato, for health. The process begins with rice bran flour manufacture, followed by making Vitabran selected from 3 formulas, organoleptic test, hedonic test, and proximate test. The selected formula was then tested for GI, with a bran composition of 20%, 40% yellow sweet potato, 14% cornstarch, 10% soy milk, 10% margarine, 5% honey, one egg, 1% baking powder, oats to taste. The selected Vitabran formula contains 63.214% carbohydrates, 10.756% protein, 6.26% fat, 0.09% water, 17.44% ash, and 2.232% crude fiber. One piece of Vitabran measuring 12x3x2 cm, weighing 75 grams contains 264 calories, a moderate GI category (65), and usable as a Sports Vitality Booster.

**Keywords:** Glycemic Index, Local Food Ingredients, Functional Food, Sports Vitality Booster.

## 1 Introduction

Nutritional needs that come from food consumption to generate energy in sports activities are urgent and need attention. The primary energy source obtained from carbohydrates will harm health if fulfilled from the wrong food selection. It will have an impact on exacerbating the increase in cases of degenerative diseases, including diabetes mellitus. According to WHO, DM cases have experienced an alarming increase as WHO predicted that by 2040 the number of DM sufferers would reach 642 million. Around 366 million adults will be diabetes in 2030, where 75% of sufferers locate or live in developing countries. Some research show food sources existing in one area (local) can be used as a functional food. They have a low GI value. So they can reduce or suppress the excessive consumption of wrong foods and their long-term effects.

These foods include bran flour, yellow sweet potato (*Ipomoea batatas*): [1,2,3,4,5]. Bran flour is a byproduct of rice processing that contains many nutrients such as fiber, minerals, vitamin B complex, vitamin E, essential fatty acids, and amino acids, as well as antioxidants: [6,7,8]. The composition of the bran flour contains 34% -62% carbohydrates, 15% -20% lipids, 11% -15% protein, 7% -11% fiber, and minerals, such as phosphorus 1.5% -1.7%, potassium 1.4% -1.5%, Magnesium 0.78%, Calcium 0.02%, and contains strong antioxidants. The magnesium content in bran flour can improve glycemic control, prevent insulin resistance, and strong antioxidant content. They can help manage diseases associated with oxidative stress, such as diabetes mellitus: [4,5].

The nutritional content of yellow sweet potato (*Ipomoea batatas*) per 100 grams is: 20.12 grams of carbohydrates, 1.57 grams of protein, 3 grams of fiber, 0.05 grams of lipids,

vitamins such as Thiamin, Riboflavin, Niacin, B6, B9, vitamin C, vitamin K and most is vitamin A 14187 IU, mineral content such as Calcium 30.78 mg, Iron 0.61 mg, Magnesium 25.70 mg, Phosphor 47.81 mg, Potassium 337 mg, Sodium 55 mg. The effect of lowering blood glucose in sweet potatoes is associated with increased adiponectin levels. It is an adiposity hormone that functions as a process of insulin metabolism: [2].

The research problems are: 1) How is the acceptance of target consumers for products related to the organoleptic test and hedonic test at bran levels of 20% and 30% with yellow sweet potato substitution. 2) What are the proximate product test results at bran content of 20% and 30% with yellow sweet potato substitution. 3) Which product formula to recommend as Vitabran. 4) What is the value of IG Vitabran.

## 2 Methods

The staple ingredients are rice bran with a mixture of yellow sweet potatoes, cornstarch, soy milk and wheat flour, eggs, honey, baking powder, margarine, and oats. The equipment used consists of a microwave oven, Otoclaf, sieve, oven, gas stove, cake toaster. We test the VITABRAN formula with two kinds of bran content, namely 20% and 30%.

The making bran flour process by 1) selected fresh and clean bran, sieved with a diameter of 80 Mesh 2) sterilized by autoclave at 121 C for 3 minutes, dried in 105 C oven, for 1 hour. VITABRAN production process by mixing the formula into a formable dough. Then formed a bar with a 12x3x2 cm size and sprinkled with oats, then baked in the oven.

**Table 1.** VITABRAN Formula

No	Ingredients	Formula 1	Formula 2
1.	Rice bran	20 %	30%
2.	Yellow potatoes mix	40 %	30 %
3.	Cornstarch	14 %	14 %
4.	Soy milk	10 %	10 %
5.	Baking powder	1 %	1 %
6.	Margarine	10 %	10 %
7.	Honey	5 %	5 %
8.	Oats	Sown to taste	Sown to taste

The researcher carried out the bran flour processing, VITABRAN products, and GI measurements at the UNNES Nutrition Laboratory. For proximate analysis at the UNNES Biology Laboratory. It consists of checking moisture and ash content (oven method): [9], protein content (Kjeldahl Micro method): [9], fat content (Soxhlet method): [9], carbohydrate by difference: [9], Analysis of dietary fiber content: [10]. Sensory analysis with trained panelists aged 25-40 years, a total of 10 panelists (5 males and females), the quality scales consisting of 9 points (very low to very very good), and following standard procedures: [11]. The aspects assessed were color, texture, sweetness, aroma, and overall quality. Sensory

analysis was assessed for three repetitions, with a time lag of 30 minutes. The product preference rating was determined by 80 panelists, with the acceptability test (preference scale 1 - 9): [11,12].

A panel of 10 adult volunteers (5 men and women) performed the GI analysis. The analysis by t-test using SPSS 16.0. to compare the GI of the reference food with the GI of the treated food

### 3 Result and Discussion

Based on the data obtained, the results of the sensory quality assessment, overall formula two biscuits with a higher value (53), as well as the total (309), while the highest value was in the aroma aspect (55) according to Table 2.

**Table 2.** Result of Sensory Quality Assessment (Organoleptic Test)

Product Assesment	Overall	Color	Aroma	Texture/ crispness	Sweetness	Yellow Potatoe Taste	Total
	1	2	3	4	5	6	7
<b>Biscuit bar 1</b>	49	46	48	44	45	45	277
<b>Biscuit bar 2</b>	53	49	55	52	47	53	309

The favor value or the hedonic test results as a whole were the highest in the biscuit formula 2 (503). The overall aspect value was found in the biscuit formula 2 (2962), while the highest value was in the aroma aspect (515), according to Table 3.

**Table 3.** Result of Hedonic Test Assesment

Product Assesment	Overall	Color	Aroma	Texture/ crispness	Sweetness	Yellow Potatoe Taste	Total
	1	2	3	4	5	6	7
<b>Biscuit bar 1</b>	488	484	438	429	447	475	2761
<b>Biscuit bar 2</b>	503	495	515	509	458	482	2962

In the proximate test results, the carbohydrate, protein, and fat content was higher in formula 2 biscuits while the water, ash and crude fiber content was higher in formula 1 biscuits (Table 4).

**Table 4.** Proximate Test Results

No	Sample Code (%)	Carbohydrate (%)	Protein (%)	Fat (%)	Water (%)	Ash (%)	Crude Fiber (%)
<b>1</b>	1	63.214	10.756	6.26	0.09	17.44	2.232
<b>2</b>	2	68.569	11.273	6.62	0.08	13.02	0.446

The Vitabran biscuit selected for the IG test is the formula two biscuits, considering that they are acceptable to target consumers. The resulting Vitabran contains 63.214%

carbohydrates, 10.756% protein, 6.26% fat, 0.09% water, 17.44% ash and 2,232% crude fiber. One slice of Vitabran produced (bar-shaped with a 12x3x2 cm size) weighing 75 grams contains 264 calories. The Glycemic Index obtained is in the medium category or 65.

The biscuit formula chosen for the GI test on panelists is the most acceptable formula for consumers, namely biscuit formula 2. The glycemic index is the speed at which blood sugar levels rise after consuming food. It is equivalent to 50 g of carbohydrates: [13,14]. The increase in blood sugar rate is different for each food-stuff. It is classified into low GI <55, medium GI 55-70, and high GI > 70. Fast-processed carbohydrates during digestion have a high GI, whereas slow-processed carbohydrates release glucose into the bloodstream slowly so that a low GI: [15].

The results of GI examination in volunteers were obtained in the moderate category or as large as 65. It is possible because of the synergistic effect of the overall composition of Vitabran: [16], such as the results of a study which stated that rice bran contains 34% -62% carbohydrates, 15% -20% fat, protein 11% -15%, fiber 7% -11%, minerals, such as Phosphorus, Potassium, Magnesium, Calcium, and strong anti-oxidants: [3, 4]. The results of other studies suggest that bran prolongs the period of glucose release and shows the potential to increase satiety: [17,18]. Meanwhile, the addition of the yellow potatoes mixture is referred to the results of similar research. It states that the nutritional content of sweet potatoes per 100 grams includes calories (86kcal), carbohydrates (20.1g), fat (0.1 g), protein (1.6g), fiber (1.7g), high in vitamin A (709µg), high in the mineral potassium (337mg). Or other proximate analysis results of yellow sweet potato per 100 grams are: 20.12 g carbohydrates, 1.57 g protein, 3 g fiber, 0.05 g lipids, various kinds of vitamins such as Thiamin, Riboflavin, Niacin, B6, B9, vitamin C, vitamin K and most is vitamin A 14187 IU, various minerals such as Calcium 30.78 mg, Iron 0.61 mg, Magnesium 25.70 mg, Phosphor 47.81 mg, Potassium 337 mg, Sodium 55 mg. Vitabran has the main ingredients of rice bran, and yellow sweet potato contains strong natural anti-oxidants. It helps treat and manage diseases associated with oxidative stress such as hypertension, atherosclerosis, diabetes, heart failure, and stroke: [3].

The content of the product from this research is called Vitabran. It contains high carbohydrates but with a Low Glycemic Index (LGI 51) value. It is a type of carbohydrate which, if consumed, will not increase blood sugar levels drastically. Based on the content obtained, Vitabran can be used as a Vitality Booster. Vitabran can be consumed as a snack or as a complementary food that can meet energy and protein needs, with the effect of preventing diabetes and other degenerative diseases in athletes in the future.

Vitabran is suitable for athletes, especially for physical fitness/physical fitness and health improvement. The usage of Vitabran can be a complementary food for athletes to build muscle mass and in sports achievements. The use of Vitabran is like eating regular snacks when needed or when feeling hungry before exercising or after exercising. As a snack, it is eaten several times a day and is taken along with activities (anytime) or an efficient substitute for large meals currently trending by the community. The requirement depends on the calorie needs of each individual. Based on age, gender, physical activity is undertaken and considering the diet that is carried out.

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## Factors Associated with Stunted Children

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**Abstract.** Stunting is the high-priority problem of child malnutrition in Indonesia. The purpose of this study was to determine the relationship between maternal posture and exclusive breastfeeding and stunting. This research will be conducted with a quantitative approach. This study was designed with a cross-sectional study design. The population is parents of stunted children aged 3-5 years in Demak district, Central Java. The sampling technique used in this study was purposive sampling and the sample was 36 parents of stunted children aged 3-5 years in Demak district, Central Java. The research instrument was a questionnaire and test. Data analysis used the chi-square test to measure the association between maternal posture and exclusive breastfeeding and stunting. The results showed there was no relationship between stunting and maternal education (OR.0,7;95% CI, 0,132-4,022;P=1.000), level of income (OR.0,7;95% CI, 0,132-4,022;P=1.000), maternal posture (OR, 1.0;95% CI, 0,320-3,123;P=1.000), and exclusive breastfeeding (OR, 1,5;95%CI,0,469-4,797;P=0,660).

**Keywords:** stunting, maternal education, level of income, maternal posture, exclusive breastfeeding.

### 1 Introduction

Stunting is a condition of children under five who have deficit height-for-age. It is measured by length or height with a z-score of less than -2SD / standard deviation (stunted) and less than -3SD (severely stunted) [1]. In 2014, 159 million children under 5 years of age in the world were stunted. More than half of early childhood in Asia are stunted (57%) and in Africa 37% [2].

This condition has a long impact both individually and socially. These include poor thinking skills and achievement in later childhood and adulthood due to weaknesses in cognitive abilities, language skills, motor-sensory abilities, low productivity, slow physical development. Broadly, stunting has an impact on the country's economic growth constraints, increasing poverty and wealth inequality[3].

Indonesia is the 5th biggest stunting problem in the world. The prevalence of stunting of children under five in 2017 was 29.9% [4]. The findings also state that stunting occurs in households/families with various levels of social and economic welfare in Indonesia[5] Central Java is the 17th province in Indonesia with stunting cases with a prevalence of 28% [4]. Demak is the 5th region with high stunting cases in Central Java with a total of 50,782 cases. The data found the proper parenting and good nutritional intake are still not optimally implemented in these areas [6].



Several factors can cause stunting, including maternal posture (short), and exclusive breastfeeding during birth [7], and demographic factors such as maternal education and income level [8][9][10][11]. Research results have shown that someone who is born shortly posture is inherited by his mother [12]. Besides, other experts argue that the development of the baby is not optimal because the baby does not get exclusive breastfeeding for 24 months [9][13][14][15].

This study aims to determine a relationship between maternal education, income level, maternal posture, and exclusive breastfeeding for stunted children.

## **2 Method**

This study used a quantitative approach with independent variables, namely maternal education, income level, maternal posture, and exclusive breastfeeding and the dependent variable was stunting in children under five.

The population was parents with stunted children aged 3-5 years in Demak district, Central Java, Indonesia. The sampling technique used in this study was purposive sampling, in which the sample was taken based on the need to achieve the objectives of this study. The sample of this research is 36 parents with stunted children aged 3-5 years who live in Donorejo village and Tlogoboyo village, Demak district. These areas high population in stunting.

The inclusion criteria in this study were mothers with stunted children aged 3 to 5 years who lived in these areas. The exclusion criteria in this study were mothers with stunted children aged 3 to 5 years who lived in these areas but were not willing to be involved in all study procedures. Enumerators measured stunted children based on standardized calculation formulas of actual measurement data of weight and height. Understanding personal feelings of fear and insecurity of the sample during the Covid-19 pandemic, there is a lack of numerous participants in this research.

The instrument used in this study was a validated questionnaire regarding exclusive breastfeeding, maternal education, and income level as well as a test with a calibrated weighing scale to measure the child's weight according to his age and a stature meter for height that has been calibrated to measure length or height. the child's body according to his age. Besides, these two tools are used to measure the maternal Body Mass Index based on the mother's weight and height. In this study, an in-house survey was conducted, in which the enumerators visited the respondents at home to obtain data.

This research used a cross-sectional study design. The data analysis in this study used a quantitative method. Data analysis used the chi-square test to examine the relationship between maternal education, income level, maternal posture, and exclusive breastfeeding for stunted children.

## **3 Result and Discussion**

The study showed that children who were stunted were divided into two categories: 75% stunted and 25% severely stunted. The number of stunted boys was greater (53%) than girls (47%).

**Table 1.** Children demography status

	<b>Status</b>	<b>n</b>
Stunting :		
-	Stunting	27 (75%)
-	Severe Stunting	9 (25%)
Sex :		
-	Boys	19 (53%)
-	Girls	17 (47%)

The results also found that there was no relationship between stunting and maternal education (OR.0,7;95% CI, 0,132-4,022;P=1.000), level of income (OR.0,7;95% CI, 0,132-4,022;P=1.000), maternal posture (OR, 1.0;95% CI, 0,320-3,123;P=1.000), and exclusive breastfeeding (OR, 1,5;95%CI,0,469-4,797;P=0,660).

**Table 2.** Statistical test results on the relationship between maternal education, income level, maternal posture, exclusive breastfeeding, and stunting

<b>Variable</b>	<b>Stunting Status</b>		<b>p</b>	<b>OR</b>
	<b>Severe Stunting</b>	<b>Stunting</b>		
<b>Maternal education</b>				
Low	7	23	1.000	0,7 (0,132 to 4,022)
Middle	2	4		
<b>Income level</b>				
Low	8	25	1.000	0,7 (0,132to 4,022)
Middle	1	2		
<b>Maternal posture</b>				
Abnormal	5	15	1.000	1.0 (0,320 to 3,123)
Normal	4	12		
<b>Exclusive breastfeeding</b>				
Never breastfed	3	6	0.660	1,5 (0,469 to 4,797)
Any breastfeeding > 6 months	6	21		

Note Low education: Junior High School and below. Middle to High: Senior High School and above. Income level based on Regional Minimum Wages at Demak. Middle Low: Less than IDR 2.432.000. Middle High: More than IDR 2.432.000. The data was analyzed by Chi-Square Statistical Package for The Social Sciences (SPSS). Statistically significant  $p \leq 0.05$  and CI 95%.

This study showed that sociodemographic factors, namely maternal education, and income level, were not associated with stunting. Based on the OR value, it can be said that low maternal education may result in severe stunting 0,7 times greater than the middle of maternal education, but it is not significant when seen from the 95% CI value. The result was the same with the income level. In line with the results of a study conducted in Senegal which proves that there was no relationship between maternal education and income level with stunting. It

may be explained by the fact that the country's weak health system and health programs contribute to child stunting[12].

The results of the study prove that maternal posture was not related to stunting. Based on the OR value, it can be said that abnormal maternal posture may result in severe stunting 1.0 times greater than normal posture, but it is not significant when seen from the 95% CI value. This result is different than a study in Mexico which states that short maternal posture is a risk factor for stunted children [13]. Other experts argue that the maternal posture inherits genetically the posture of the child[15].

The results of this study also indicate that stunting was no relationship with exclusive breastfeeding. Based on the OR value, it can be said that non-exclusive breastfeeding may result in severe stunting 1.5 times greater than exclusive breastfeeding, but it is not significant when seen from the 95% CI value. This result is different than a study in Mexico which states that exclusive breastfeeding is a factor to protect children's health from stunting [13]. The results of other studies in South Sulawesi also stated that there was a link between exclusive breastfeeding and stunting [14]. Experts also suggest that breastfeeding is not optimal during the first month of life can affect the occurrence of stunting [16].

This result is different from previous research. Almost every stunted children in Demak was receiving any breastfeeding for > 6 months than Mexico and South Sulawesi. Therefore stunting may be caused by several other factors that influence the incidence of stunting in the region. These factors include an unhealthy physical environment such as not available hygiene water and poor sanitation[17][18], which have an impact on the risk of diarrheal diseases and other infectious diseases, causing children to have difficulty eating [13][19], children who are picky eaters [20][21][22] and a less supportive social environment has an impact on the diet of stunted children under five [9][23][24] such as parental diet models[25], maternal knowledge [26][27], unsafe food for consumption [28].

The results of this study indicate that most children under five are stunted rather than severely stunted. In line with the results of a study in India which stated that the prevalence of stunted infants aged 6-8 months in 2015 was 22% and infants with severe stunting were 10% [29]. Several studies also showed most stunted children under five were boys than girls[8][15][18][19][28][29]. Another study in Africa also proved that 58% of boys were stunted and 36% of girls were stunted (17). This difference is caused by the provision of complementary foods to breastfeeding that is given earlier to boys than girls [29][30] even though the baby's intestines have not been able to digest foods other than breast milk. Besides, the difference in energy needs of boys and girls so that boys need a greater consumption of food. However, in stunted boys, the consumption of these foods is not by the required energy balance. This inhibits the growth and development of the children in the future[29].

## 4 Conclusion

The result of this study showed there was no relationship between stunting and maternal education, income level, maternal posture, exclusive breastfeeding in stunted children in Demak. We recommend to modify the social and physical environment for encouraging healthy life in stunted children.

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# Community Groups Cares for Aids for Optimization of High-Risk Population Outreach in Regions Pried io HIV/AIDS Transmission

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**Abstract.** Based on preliminary observations and the results of a situation analysis in Tanjung Mas, Semarang city, the problems are: 1) the last 6 years the highest HIV/AIDS cases in Semarang, 2) the population at high risk is increasing 3) public knowledge is still low, 4) outreach and information services have not been optimal for high-risk populations. AIDS Concern Community Groups really need to be formed at the village level. This research is a type of pre-experiment research with one group pretest posttest design with a quantitative approach. The research subjects were first given a pretest, then the implementation of outreach and education for 4 months and then a posttest. Data were analyzed by Mc Nemar test. Training for community groups concerned with AIDS has succeeded in increasing the knowledge and participation of the AIDS Concerned Community Group in outreach to at-risk populations and in an effort to prevent HIV/AIDS transmission in the community.

**Keywords:** people care about AIDS, education, high-risk population.

## 1 Introduction

The number of HIV/AIDS cases in Indonesia from year to year is always increasing. In the last three years, HIV cases have continued to increase significantly. New HIV cases in 2015 were 30,935 cases. This case increased in 2016 to 41,250 cases, and in 2017 HIV cases reached 48,300 cases. Likewise new AIDS cases, in the last three years in general has also increased. In 2015 AIDS cases totaled 9,215 cases, in 2016 increased to 10,146 cases, and in 2017 it decreased to 9,280 cases (1).

HIV/AIDS cases in Central Java Province have also increased from year to year. Cumulatively from 1993 to June 2018 in Central Java there have been 23,603 cases, 1,672 of whom died from this disease. This fact has made Central Java province ranked fifth with the highest number of HIV / AIDS cases nationally (1).

The highest number of HIV/AIDS cases in Central Java occurred in the city of Semarang. Tanjung Mas Village, North Semarang District in the last 6 years was recorded as the region with the highest HIV/AIDS cases in the city of Semarang, namely 24 cases (2). The high number of HIV/AIDS cases in these areas is indicated because the area is a port area which is prone to transmission of the HIV virus through risky sexual behavior. The large number of nightly entertainment venues such as karaoke, dim stalls, and the presence of sexual workers peddling themselves on the streets around the port are factors that cause risky

sexual behavior. This fact is what makes this region one of the HIV/AIDS red zone areas in the city of Semarang.

Most cases of HIV in this region occurred in the male group, but other facts also show that in this region, HIV cases were also found in a group of housewives who were likely infected by their husbands who had risky behaviors. The impact of an HIV positive mother is that it can transmit to her child (3). Housewives who have never had a risky relationship, do not know anything because they only do activities at home, but they are infected with HIV. It is possible that this happened because of infection from her husband who had engaged in risky sexual behavior.

Husbands with HIV can infect their wives through unprotected sex. The sexual behavior of men who alternate partners with risk groups such as female sex workers (FSW) will be able to infect their wives. This will worsen the condition of women, especially when they are infected with HIV/AIDS. This condition is very worrying because in an HIV positive family there is a very high risk of transmitting to their partners and transmitting to their children (4).

The results of preliminary observations by the service team show that in the area of Tanjung Mas village as one of the areas at risk of spreading HIV, there are no sources and information services for HIV/AIDS that are easily accessible to the public. People only get information about HIV/AIDS from Puskesmas officers when there is a referral of suspected HIV cases through VCT services at the Puskesmas. Based on these facts, it is necessary to continue to make preventive efforts by increasing public understanding through educational models and intensive persuasion communication based on community empowerment.

Therefore, the formation of AIDS Concerned Community Groups (KMPA) at the village level is needed, especially in areas prone to HIV/AIDS transmission. KMPA will increase outreach, communication, information and education about HIV/AIDS in high-risk populations, especially in areas prone to HIV/AIDS transmission. The provision of information and education can increase the knowledge and awareness of people who are vulnerable to HIV/AIDS transmission. KMPA will be a facilitator and peer educator in the community to increase the knowledge and attitudes of the community towards HIV/AIDS prevention.

## **2 Method**

This research is a type of pre-experiment research with one group pretest posttest design with a quantitative approach. The data was collected by filling out a pre-test and post-test questionnaires. This research intervention began with the formation of a community group concerned with AIDS totaling 9 people, who were then given training in HIV/AIDS outreach and education. The educational materials provided were facts about STDs and HIV/AIDS and their prevention and control in high-risk populations, awareness and motivation of the importance of preventing HIV/AIDS transmission.

Furthermore, the community group concerned with AIDS carried out outreach and education practices to the surrounding community and conducted education about HIV/AIDS for 4 months. The results of education carried out by community groups concerned with AIDS to the surrounding community for 4 months were analyzed by comparing initial knowledge and final knowledge after the intervention by Mc Nemar test.

### 3 Result and Discussion

The assessment of the results of the intervention in this study was assessed from knowledge of AIDS Concerned Community Groups and public knowledge of HIV/AIDS. The training conducted for AIDS Concerned Community Groups has been able to increase the knowledge of these groups. Based on the evaluation of the results of the pre-test and post-test, the knowledge of the AIDS Concerned Community Group has increased. This is indicated by the difference in knowledge scores between before and after training.

**Table 1.** Differences in Pre and Post Test Results for AIDS Concerned Community Groups

Number	Participants	Sex	Pre-Test Score	Post-Test Score	Difference
1	P1	Female	47.5	67.5	20.0
2	P2	Male	40.0	70.0	30.0
3	P3	Male	40.0	82.5	42.5
4	P4	Female	67.5	82.5	15.0
5	P5	Female	57.5	87.5	30.0
6	P6	Female	62.5	82.5	20.0
7	P7	Male	72.5	95.0	22.5
8	P8	Female	50.0	77.5	27.5
9	P9	Female	65.0	80.0	15.0
	Mean		55.83	80.55	17.11
		P value		0.044	

These results indicate that there is a significant difference between the knowledge before and after the training. After training the knowledge score increased significantly (p value 0.044). The mean score before training was 55.83 and increased to 80.55 after being given training.

Meanwhile, based on the results of outreach and assessment carried out by the AIDS Concerned Community Group, it is generally known that the risk factors for HIV/AIDS in the area of Tanjungmas Village are risky behavior, especially from male groups, namely, among others, sexual behavior with multiple partners, tattoos, piercing and drug abuse. Jobs as truck drivers and crew, inter-island fishermen who often leave their families for a relatively long time are one of the determinants of risky behavior in men.

Through education that has been carried out by the AIDS Concern Community Group, the knowledge of some people about HIV/AIDS will be better. This is indicated by an increase in community knowledge reached between the beginning of program implementation and the end of program implementation. At the start of this program, through home visits conducted by the AIDS Concerned Community Groups, it was found that of the 40 houses visited, only 10 houses (25.00%) had good knowledge of HIV/AIDS. After re-education by the AIDS Concerned Community Group, the number of houses whose respondents began to know a lot about HIV/AIDS, the number increased to 31 houses (77.5%).

The following is an illustration of the comparison of public knowledge regarding HIV/AIDS between before and after outreach by AIDS Concerned Community Groups.



**Table 2.** Comparison of public knowledge about HIV/AIDS between before and after outreach by AIDS Concerned Community Groups

Knowledge	After			<i>p value</i>	
	Not good	Good	amount		
<b>Before</b>	Not good	8 (20,0%)	22 (55,0)	30 (75,0%)	< 0,05
	Good	1 (2,5%)	9 (22,5%)	10 (25,0%)	
	amount	9 (22,5%)	31 (77,5%)	40 (100,0)	

Based on the Mc Nemar test, it is known that the  $p < 0.05$ . This shows that there is a significant increase in knowledge about HIV/AIDS in the community between before and after outreach by AIDS Concerned Community Groups. These results prove that the outreach and education about HIV/AIDS that has been carried out by the AIDS Concern Community Group in the Tanjungmas Village area has had an impact on increasing public knowledge about HIV/AIDS.

This increase in knowledge occurs because of the provision of information and in it there is a learning process. The learning process according is defined as a process to increase knowledge, understanding, and skills that can be obtained through experience or conducting studies. This study is in line with the results of research which states that the health education provided to the community has an effect on increasing knowledge and attitudes (6). Other research also states that there is an effect of health education on increasing knowledge and attitudes in controlling HIV/AIDS (5).

Other studies suggest that there is an effect of health education on increasing knowledge and attitudes in controlling HIV/AIDS (5). Mutual support or mutual support to realize the importance of efforts to prevent HIV/AIDS transmission between fellow FSW groups has influenced the better awareness of FSW in preventing HIV/AIDS transmission, namely by increasing condom use, increasing FSW participation in STI screening and participation in VCT. This result is also consistent who stated that group support can increase the perception of the benefits of prevention and the impact of sustainable HIV transmission (6). Prevention and peer-based care markedly reduced the incidence of HIV among young FSW in Burkina Faso, through a reduction in risky behavior (7).

Health education and promotion has an effect on increasing knowledge about HIV/AIDS (8). Health education can increase knowledge and attitudes in HIV/AIDS prevention (9). Educational programs on HIV/AIDS could increase public knowledge about HIV/AIDS (10).

Other research, which states that HIV/AIDS health education can have a significant effect on knowledge about the practice of disease-risk sexual behavior. Effective sexual health education becomes the responsibility of individuals to achieve sexual health. Therefore, everyone must have a correct understanding of sexual health including knowledge of HIV/AIDS, so that each individual can make ethical sexual health decisions (11). Health education has a positive influence on awareness of HIV/AIDS and increased knowledge of modes of transmission and prevention of HIV/AIDS (12). Knowledge is an important determinant for changing health behavior (13).

## 4 Conclusion

The program to strengthen the role of community groups concerned with AIDS in the Tanjungmas sub-district, Semarang city, was carried out by forming a community group concerned with AIDS and training community groups concerned with AIDS as peer educators. Training for community groups concerned with AIDS has succeeded in increasing the knowledge and participation of AIDS Concerned Community Groups in outreach to at-risk populations as well as in efforts to prevent HIV/AIDS transmission in the community.

The community group concerned about AIDS is an active role of the community in the prevention and control of HIV/AIDS in the community. Therefore, this program can be adopted and implemented in all regions, especially in areas prone to HIV/AIDS transmission.

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# Non-Communicable Diseases in Indonesia: Prevalence and Risk Factor

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**Abstract.** Non-Communicable Diseases (NCDs) were the leading causes of death in Indonesia. According to the 2018 data from WHO – NCD Country Profile, the proportional mortality in Indonesia were cardiovascular diseases (35%), cancers (12%), chronic respiratory diseases (6%), diabetes mellitus (DM) (6%), injuries (6%), other NCDs (15%), and communicable maternal, perinatal, and nutritional conditions (21%). The aim of this study was to find out the prevalence of NCDs of each province in Indonesia and physical inactivity as a risk factor of NCDs. It was descriptive study based on Basic Health Research 2013 and 2018. Data 2018 revealed that most of NCDs such as stroke, cancer, and DM increased from 2013. The proportion of physical inactivity in Indonesia increased from 26.1% in 2013 to 33.5% in 2018. Perhaps there was association between physical inactivity and the incidence of NCDs. Further study was needed to analyze the risk factors associated with NCDs.

**Keywords:** Non-Communicable Diseases, Prevalence, Risk Factor, Physical Activity, Basic Health Research.

## 1 Introduction

Non-Communicable Disease (NCD) was a chronic disease, not human to human transmitted, had long duration and normally grows slowly. NCDs had become the leading cause of death globally at this time [1–3]. According to the 2018 data from WHO – NCD Country Profile, the proportional mortality in Indonesia were cardiovascular diseases (35%), cancers (12%), chronic respiratory diseases (6%), diabetes mellitus (DM) (6%), injuries (6%), other NCDs (15%), and communicable maternal, perinatal, and nutritional conditions (21%) [4]. Based on data from Basic Health Research 2018, most of NCDs such as stroke, cancer, and DM, showed an increasing trend compared to the previous report in 2013.

Cancer was the growth of uncontrollable cells/tissues [5,6]. They continually grow, immortal. Cancer cells can penetrate to the surrounding tissues and can form subset [4,7,8]. The incidence rate of cancer in Indonesia (136.2 / 100,000 population) ranks 8th in Southeast Asia, while in Asia it is 23rd. The highest incidence rate in Indonesia for men was lung cancer, which is 19.4 per 100,000 population with an average mortality was 10.9 per 100,000 population, followed by liver cancer at 12.4 per 100,000 population with an average death rate of 7.6 per 100,000 population. While the highest incidence rate for women was breast cancer, which is 42.1 per 100,000 population with an average death rate of 17 per 100,000 population followed by cervical cancer at 23.4 per 100,000 population with an average death rate of 13.9 per 100,000 population [9].

Stroke was disease to the brain causing local and/or global nerve malfunction, attacking unexpected, progressive and fast [10–12]. This disturbed nerve function was due to disruption to non-traumatic brain blood circulation [13,14]. It caused symptoms of: numbness of face or limbs, trouble speaking, unclear speaking, trouble understanding, blurred vision, etc [4]. The highest rates of stroke were observed in Mongolia (222.6/100,000 person-years) and Indonesia (193.3/100,000 person-years), followed by Myanmar and North Korea [15].

DM was a metabolic disease constituting a group of symptoms suffered by someone as a result of high blood sugar above normal rate [16–18]. This disease was due to disturbed sugar metabolism resulting from lack of insulin in terms of absolute and relative [19–21]. There were 2 types of DM, to wit: Type I/Juvenile Diabetes, which normally attacks since juvenile period and Type II, i.e. diabetes attacking at adult ages [4].

The rise in NCD was mainly driven by four main risk factors: tobacco use, physical activity, harmful alcohol use and unhealthy diet [22]. Strenuous physical activity was physical activity carried out for > 3 days per week and MET minutes per week > 1500 (MET minute value for strenuous physical activity = 8). MET was a unit of energy expenditure and was used to measure physical activity in minutes [23]. MET minute was a unit used to measure the volume of an individual's physical activity. Moderate physical activity was moderate physical activity carried out for > 5 days a week with an average length of activity > 150 minutes a week (or > 30 minutes per day) [23].

Basic Health Research, showed the proportion of physical inactivity in Indonesia is 26.1% in 2013 and 33.5% in 2018. In 2013, there were 22 provinces whose population's physical activity was classified as less active with a proportion above the national average, including in Lampung Province which is 33.9% and 21 provinces in 2018 [4]. Based on the data above, the aim of this study was to find out the prevalence and risk factor of NCDs.

## 2 Methods

This study was descriptive study based on Basic Health Research 2013 and 2018. We analyzed the prevalence of cancer, stroke, and diabetes as well physical inactivity in 2018 compared to 2013. We used prevalence (‰ and %) to describe the magnitude of NCDs and physical inactivity in Indonesia and each province from Basic Health Research 2013 and 2018.

## 3 Result and Discussion

### 3.1 Prevalence of Cancer by Province (‰)

Based on Basic Health Research data, the prevalence of cancer in Indonesia showed an increase from (1.4‰) in 2013 to (1.79‰) in 2018. The highest cancer prevalence in 2018 was in DI Yogyakarta province with (4.86‰), followed by West Sumatra with (2.47‰) and Gorontalo with (2.44‰). The lowest cancer prevalence was West Nusa Tenggara Province with (0.85‰) in 2018 [23].

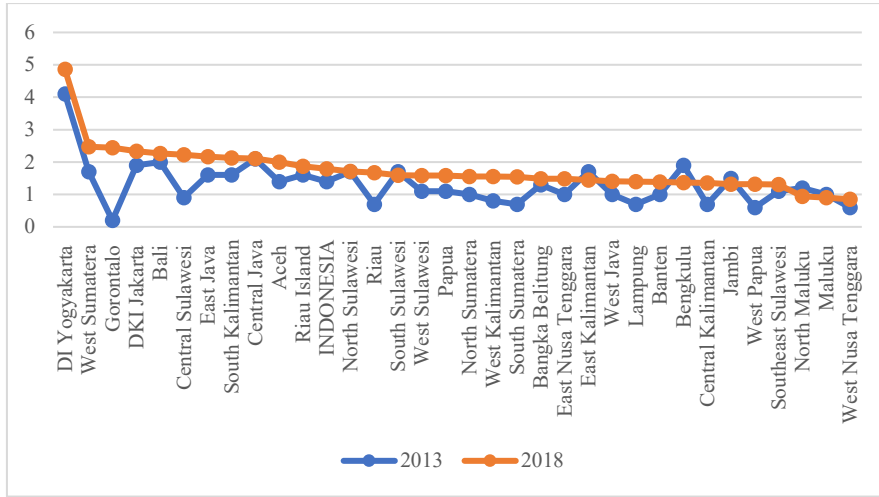


Fig 1. Prevalence of Cancer by Province (%)

3.2 Prevalence of Stroke by Province (%)

Based on Basic Health Research data, the prevalence of stroke in Indonesia showed an increase from (4.5%) in 2013 to (10.9%) in 2018. The highest stroke prevalence in 2018 was in East Kalimantan province with (14.7%), followed by DI Yogyakarta (14.6%) and North Sulawesi (14.2%) in 2018. The lowest stroke prevalence in 2018 was Papua with (4.1%) in 2018 [23].

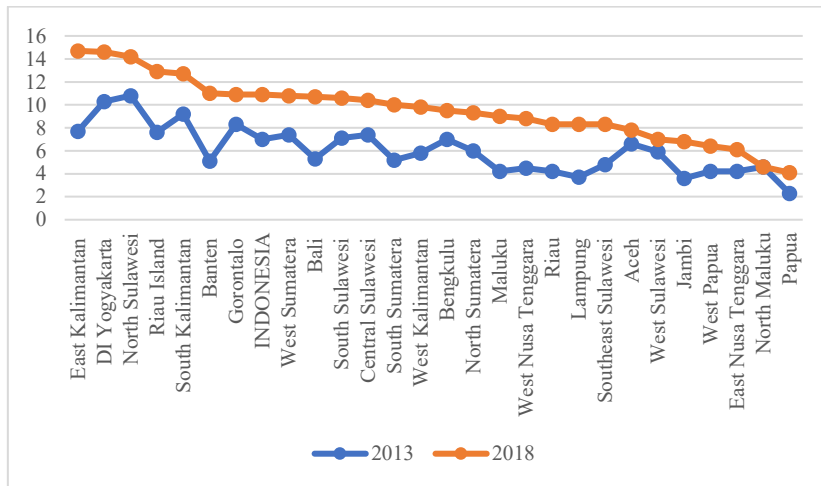


Fig. 2. Prevalence of Stroke by Province (%)

### 3.3 Prevalence of DM by Province (%)

Based on Basic Health Research data, the prevalence of DM in Indonesia showed an increase from (1.5%) in 2013 to (2%) in 2018. The highest DM prevalence in 2018 was in DKI Jakarta province with (3.4%), followed by DI Yogyakarta with (3.1%) and North Sulawesi province with (3%) in 2018. The lowest DM prevalence was East Nusa Tenggara province with (0.9%) in 2018 [23].

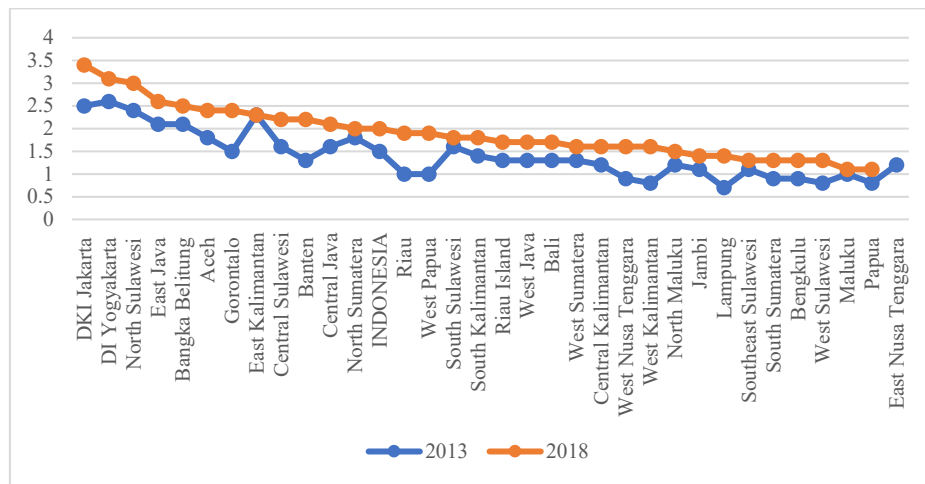


Fig. 3. Prevalence of DM by Province (Per %)

### 3.4 Proportion of Physical Inactivity by Province (Population > 10 years old)

Based on Basic Health Research data, the proportion of physical inactivity in Indonesia showed an increase from 26.1% in 2013 to 33.5% in 2018. The highest proportion of physical inactivity was in DKI Jakarta province with 47.8%, followed by Maluku province 42.5% and Jambi province 42.4% in 2018. The lowest proportion of physical inactivity was East Nusa Tenggara province with 25.2% in 2018 [23].

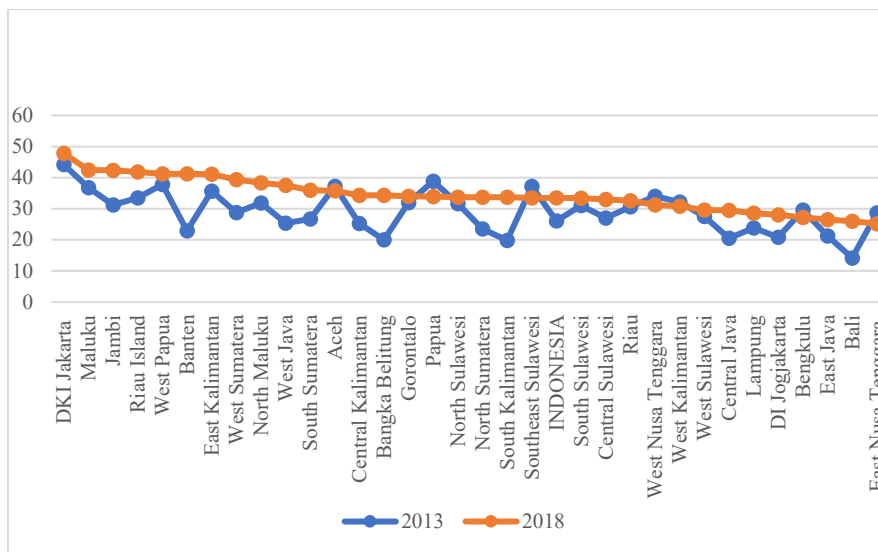


Fig. 4. Proportion of Physical Inactivity by Province (Population>10 years old)

## 4 Conclusion

The prevalence of NCDs (cancer, diabetes, and stroke) in Indonesia in 2018 has increased from 2013. DKI Jakarta is the province with the highest prevalence of NCDs, i.e. cancer (2.33%), stroke (12.2%), DM (3.4%), as well as the highest of physical inactivity (47.8%) in 2018 in Indonesia. East Nusa Tenggara is the province with the lowest prevalence of NCDs, i.e. cancer (1.49%), stroke (6.1%), and DM (0.9%), as well as with the lowest proportion of physical inactivity (25.2%) in 2018 in Indonesia. Perhaps there is association between physical inactivity and the incidence of NCDs.

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# An Overview of Nutritional Knowledge about Anemia Among Students of Universitas Negeri Semarang

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**Abstract.** This study was aimed to provide an overview of nutritional knowledge about anemia among students of Universitas Negeri Semarang. Anemia is a condition of red blood cells deficiency. Anemia characterized by low hemoglobin levels, less than 12 g / dl in women and 13 g / dl in men. The prevalence of anemia in Indonesia in 2013 in women aged 15-24 years was 18.4%, then increased to 32% in 2018. One of the factors that influence the prevalence of anemia is the level of knowledge of each individual. Knowledge will affect behavior, selection of foodstuffs and even life patterns. This study is a cross sectional study with the selection of respondents using the convenient sampling method through distributing questionnaires.

**Keywords:** Anemia, Teenagers, Knowledge.

## 1 Introduction

Anemia is still a nutritional problem in Indonesia. Anemia is a condition of red blood cells deficiency characterized by a hemoglobin level of less than 12 g / dl in women and 13 g / dl in men. Basic Health Research Data (Riskesdas) in 2013 for the incidence of anemia in women aged 15-24 years of 18.4% then increased to 32% in 2018 [1].

Young women are reported to have a 10 times higher potential for developing anemia than young men [2]. The type of anemia that many young women experience is iron deficiency anemia. The risk of anemia in young women can be influenced by diet and physiological functions such as the menstrual cycle experienced by young women [3]. Menstruation experienced by young women causes a decrease in iron stores in the body. This decreasing iron store is further exacerbated if young women restrict food consumption on the pretext of maintaining body shape [4].

Iron is a mineral that plays a role in the formation of hemoglobin. Hemoglobin is a part of red blood cells that functions to transport oxygen and nutrients to all parts of the body's cells. If the hemoglobin content in the body is low, it will result in an inadequate supply of oxygen and nutrients so that which will have an impact such as lethargy, weakness, fatigue and ultimately disrupting activity [5].

Students as a form of representation from youth groups are educated and very easily get various information related to health and nutrition. Based on the results of research conducted by Dewi [6] with the title "Diet and Incidence of Anemia in Students Living in Boarding Schools", it was found that the incidence of anemia in female students showed that most of the respondents did not experience anemia, as many as 61% and 39% had anemia. Respondents

who experience anemia are due to lack of protein consumption, like to consume fast food and junk food, and often consume packaged tea drinks. Knowledge is the result of a person sensing an object. Knowledge is obtained through observation with the five senses, both the senses of sight, hearing, smell, taste, and touch. Knowledge of cognitive is very dominant and very important in the formation of one's actions [7]. Knowledge will affect behavior, selection of foodstuffs, and even life patterns.

## 2 Methods

This research is a cross-sectional study that was conducted in March 2021 at Universitas Negeri Semarang. The selection of respondents using the convenient sampling method through distributing questionnaires. The questionnaire contains closed questions regarding nutritional knowledge on the incidence of anemia, a Likert scale, and is distributed online using the google form. The number of respondents in this study was calculated using a sample size formula for a single correlation coefficient to obtain a sample of 137 people.

Statistical analysis used nominal and categorical data to determine the descriptive description of Universitas Negeri Semarang students.

## 3 Result and Discussion

**Table 1.** Descriptive description of respondents

Variable (n = 137 people)	mean $\pm$ SD
Age (years)	19.46 $\pm$ 1.08
Weight (kg)	55 $\pm$ 19.22
Height (cm)	159.07 $\pm$ 11.69
Nutritional Status (kg / m <sup>2</sup> )	24.83 $\pm$ 44.29

Table 1 shows a description of the respondents in this study. The respondents of this study were 137 students of Universitas Negeri Semarang with an average age of 19.46  $\pm$  1.08 years. The mean body weight and height of the respondents were 55  $\pm$  19.22 kg and 159.07  $\pm$  11.69 cm, respectively. The average nutritional status of respondents was at 24.83  $\pm$  44.29 kg / m<sup>2</sup> and was included in the obesity category.

Obesity is the result of an imbalance in the amount of calorie intake that is put into the body with energy output, resulting in excessive fat accumulation. Obesity in adolescents can increase the risk of cardiovascular disease in adulthood because of its association with metabolic syndromes consisting of insulin resistance and hyperinsulinemia, glucose intolerance and diabetes mellitus, dyslipidemia, hyperuricemia, fibrinolytic disorders, and hypertension [8].

**Table 2.** Results of respondents' nutritional knowledge

Variable (n=137)	Distribution Frequency (%)
<b>Gender</b>	
Male	26 (18.6%)
Women	111 (79.3%)

<b>Frequency of eating</b>	
1 x / day	4 (2.9%)
2-3 times / day	28 (91.4%)
> 3 times / day	5 (3.6%)
<b>Number of servings of vegetables / fruit</b>	
Never	21 (15.3%)
1 serving / week	1 (0.7%)
2-5 servings / week	24 (18%)
7 servings / week	91 (66%)
<b>Consume according to the contents of "Piringku"</b>	
Not	48 (34.3%)
Maybe	59 (42.1%)
Yes	30 (21.4%)
<b>Tea / coffee frequency</b>	
Never	24 (17.1%)
1x / week	39 (27.9%)
2-5x / week	50 (35.7%)
7x / week	24 (17.1%)
<b>Exercise frequency</b>	
Never	43 (30.7%)
1-2x / week	69 (49.3%)
3-5x / week	21 (15%)
7x / week	4 (2.9%)
<b>Sleep duration</b>	
1-2 hours / day	5 (3.6%)
3-5 hours / day	1 (0.7%)
8 hours / day	67 (47.9%)
> 8 hours / day	64 (45.8%)
<b>Screentime</b>	
<2 hours / day	58 (41.4%)
2-4 hours / day	1 (0.7%)
5-6 hours / day	19 (13.6%)
> 8 hours / day	59 (42.1%)
<b>Education about anemia</b>	
Not yet	76 (54.3%)
I did	61 (43.7%)
<b>Importance of Fe tablets</b>	
Disagree	5 (3.6%)
Less agree	42 (30%)
Agree	90 (64.3%)

Table 2. shows a description of the respondents who filled out the knowledge questionnaire about anemia. The majority of respondents in this study were women with a total of 111 people (79.4%). The incidence of anemia is reported to occur mostly in young women Research conducted by Simanungkalit [1] with the title "Knowledge and Consumption Behavior of Young Women Associated with Anemia Status" which was carried out on Depok high school students aged 12-16 years in the early adolescent category as many as 142 students (82.6%) and 17-25 years old or in the category 30 female students (17.4%) showed that there were 120 students (69.8%) with less Fe intake, while 52 students (30.2%) had good Fe intake. The results of the level of knowledge regarding blood added tablets (signed) were found that 86 students (50%) had less knowledge of TTD (Blood Added Tablets), while

respondents who had good knowledge of blood-booster tablets (Tablets Add Blood) were 86 students (50%). From the results of the research that has been done, the researchers concluded that the knowledge of anemia is the main factor of anemia in adolescent girls.

The frequency of eating shows how much the respondent eats in a period of one day. The majority of respondents said that within one day they have a habit of eating 2-3 times/day. However, the frequency of eating habits also needs to be balanced by paying attention to the diversity of consumption and energy adequacy. Research on "Food Consumption of Indonesian Citizens in terms of Balanced Nutrition Norms (Food Consumption In Term Of The Norm Of Balanced Nutrition)" was conducted by Safitri [9]. The conclusion is that the food consumption of the Indonesian population in general still does not fulfill the first pillar of the message of balanced nutrition. This can be seen from the quality and quantity of food consumption of the population from the age of 6 years and over, with diversity, proportion and adequacy obtained only 1.43 percent. Although the diversity is good, in terms of proportion and adequacy the percentage is still small.

In Indonesia, there is the term "the contents of my plate", which is a balanced nutrition guide aimed at the Indonesian people to provide an understanding of the importance of balanced nutritional intake. The portion composition in my one-meal plate includes staple foods as much as 2/3 of a 1/2 plate, side dishes 1/3 of a 1/2 plate, fruits 1/3 of a plate, and vegetables 2/3 of a 1/2 plate Table 2 shows that As many as 59 people (42.3%) thought that their meal arrangement was by my plate and even 66% said that every day they consume fruits/vegetables. Green vegetables are a source of iron and consumption of vegetables and fruit is one strategy in increasing iron intake. Non-heme iron itself is widely available in plant-based food sources. Non-heme iron is generally found in foods derived from plants such as vegetables, seeds, nuts, fruits, cereal, chocolate, and wheat flour [10]. As many as 107 students (76.6%) could name the exact source of iron, either from vegetable or animal sources.

The nutritional status of respondents in this study indicated obesity. This possible link with obesity is in line with the description of exercise habits. Table 2 shows that the majority of respondents exercise 1-2x / week and the majority have a sleep duration of 8 hours/day. Sports and physical activity are different. Physical activity is all body movements that increase energy or energy expenditure and burn calories [11]. Physical activity can be in the form of light activities or daily activities. While the sport itself is a form of effort to encourage, awaken, develop, and build physical strength. The sport itself comes from the Javanese language, namely through which means olah and rogo which means the body [12]. Sleep is a state where someone is in the subconscious, but can still be awakened by giving a stimulation. Sleep is an important factor in maintaining physical and mental health. The duration of sleep or the length of time a person sleeps greatly affects their health condition. Each age group has a different recommendation for sleep duration as needed. For adolescents aged 14-17 years, the recommended sleep duration is 8-10 hours per day, while for adolescents aged 18-25 years, the ideal sleep duration is 7-9 hours per day [13]. The majority of respondents admitted that they had never received education about anemia but they thought that Fe tablets were one of the strategic steps in fighting anemia. Foods containing heme iron have a high bioavailability of 20-30% or more. This is because heme iron is available in the form of iron Fe<sup>2+</sup> (ferrous) which can be absorbed directly and is not affected by its absorption by other substances [14]. On the other hand, the bioavailability of non-heme iron is lower than the bioavailability of heme iron. The bioavailability of non-heme iron is influenced by the presence or absence of inhibitor compounds such as phytates, tannins, etc. [15].

Fe tablet is a blood booster tablet. The provision of Fe tablets is one way to maintain hemoglobin levels in the body, especially for young women and pregnant women. This is due

to the high level of iron requirements for both of them. Fe tablets are recommended to be consumed regularly to reduce the chance of anemia. The consumption of Fe tablets is very important, especially during menstruation and during pregnancy. The absorption of iron in the body will be optimal if it is accompanied by the consumption of organic acids such as vitamin C [16].

#### 4 Conclusion

This research is a descriptive study on the description of anemia knowledge among students of Universitas Negeri Semarang. Recommendations that can be made are the importance of continuous education on anemia so that students take part in protecting themselves and the environment.

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# Child Marriage: the Unspoken Consequence of COVID-19

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**Abstract.** Covid-19 has had a major negative impact on the lives. One of them is an additional 10 million child marriages this decade. An increase in the number of child marriages has also occurred in Indonesia. This study used the 2017 IDHS data. To strengthen the study, references from relevant journal articles were also added. In Indonesia, the provinces with the highest percentage of teenage marriage aged 10-14 years were Central Java (52.1%), South Kalimantan (9%), West Java (7.5%), while the provinces with the highest percentage of cases of teenage marriage aged 15-19 years were Central Kalimantan (52.1%), West Java (50.2%), and South Kalimantan (48.4%). Child marriage has jumped up to 300 percent during the COVID-19 pandemic. Child marriage were due to differences in knowledge, education, economy and culture factors in various regions in Indonesia.

**Keywords:** Indonesia, teenage marriage, culture, Covid-19.

## 1 Introduction

Child marriage is nothing new. Over the next decade, according to Unicef, there will be more than 10 million new girls who have the potential to become brides at a very young age. Before the pandemic rolled around, estimated that around 100 million children were undergoing forced marriages over the next 10 years.

Article 7 paragraph [1] of Law Number 1 Year 1974 states that marriage is only permitted if the male party reaches the age of 19 (nineteen) years and the woman has reached the age of 16 (sixteen) years, this provision allows for child marriage in female children because in Article 1 point 1 of the Law on Amendments to Law Number 23 of 2002 concerning Child Protection it is defined that a child is someone who has not reached the age of 18 (eighteen) years, including children who are still in the womb.

Indonesia is the 37th country with a high rate of young marriages, according to the United Nations Development Economic and Social Affairs, and the second highest in ASEAN after Cambodia. Basic Health Research Data (RISKESDAS) in 2013 shows that, the growth process is still ongoing until the age of 18 years, the age of the youngest menarche, especially those aged 6-12 years, needs special attention not to get married. The age at first marriage at the age of 10-14 years in Indonesia is quite high, namely 4.8% and at the age of 15-19 years is 41.9%. Even births in the last five years before this observation were carried out, had occurred in 0.3

per 1000 women aged 10-14 years, and 53.9 per 1000 women aged 15-19 years. The age at first marriage at a very young age (10-14 years) tends to be higher in rural areas (6.2%), and among women who do not attend school (9.5%), farmers/ fishermen / laborers (6.3%), as well as the lowest economic status (6.0%) [1].

In Indonesia, the provinces with the highest percentage of early marriage aged 10-14 years are Central Java (52.1%), South Kalimantan (9%), West Java (7.5%), East Kalimantan and Central Kalimantan respectively (7 %), and Banten (6.5%) while the provinces with the highest percentage of early marriage cases aged 15-19 years were Central Kalimantan (52.1%), West Java (50.2%), South Kalimantan (48.4% ), Bangka Belitung (47.9%), and Central Sulawesi (46.3%) [1].

According to the BKKBN child marriage has reached 20% [2]. In addition, the Covid-19 pandemic has brought new problems with the increasing number of early marriages in Indonesia. In January-June 2020, 34,000 applications for early marriage dispensation (under 19 years) were submitted, 97% of which were granted. Even though throughout 2019, there were only 23,700 requests.

This study aimed to describe the distribution of the number of child marriage partners and the determinant factors based on the analysis of the 2017 IDHS data. This study also provides an overview of trends in child marriage during the Covid-19 pandemic.

## 2 Methods

This study uses data from the 2017 Indonesian Demographic and Health Survey (IDHS)2. The 2017 IDHS is a survey conducted jointly by the Central Statistics Agency (BPS), the National Population and Family Planning Agency (BKKBN), and the Ministry of Health (MoH). Data collection took place from 24 July to 30 September 2017. Funding for the survey was provided by the Government of Indonesia. In technical implementation, the Indonesian Government is assisted by ICF through the Demographic and Health Surveys (DHS) Program, namely the United States Agency for International Development (USAID) program that provides funding and technical assistance in the implementation of population and health surveys in many countries. The main objective of the 2017 IDHS is to provide updated estimates of basic demographic and health indicators. The 2017 IDHS provides a comprehensive picture of the population and health of mothers and children in Indonesia [2].

The 2017 IDHS sampling design is designed to be able to present national and provincial level estimates. The 2017 IDHS sample includes 1,970 census blocks covering urban and rural areas. It is hoped that the number of census blocks will be able to obtain a total sample of 49,250 households. From the entire household sample, it is expected that around 59,100 female respondents of childbearing age aged 15-49, 24,625 male respondents aged 15-24, and 14,193 married male respondents aged 15-54 can be obtained. The sample frame for the 2017 IDHS uses the Census Block Master Sample from the 2010 Population Census (SP2010). Meanwhile, the sample frame for selecting households uses the regular household list as a result of updating the households from the selected census block. This list of ordinary households does not include special households such as orphanages, police / military barracks, prisons, and boarding houses where there are at least 10 people boarding a boarding house with meals.

The 2017 IDHS employed a stratified two-stage sample approach, with Stage 1 picking a number of census blocks using a systematic probability proportional to size (PPS) with the number of households listed in SP2010. In this scenario, an implicit stratification procedure



based on urban and rural areas was used, as well as sorting census blocks based on the Wealth Index category from the SP2010 findings. Stage 2 involves carefully picking 25 ordinary households in each census block from the results of updating the households in each census block. The sample of married males (PK) will be chosen systematically from the 25 families by 8 houses. The women of childbearing age couples who were married between the ages of 15 and 24 were the subjects of this study, with a total of 13401 respondents. The research findings are described using descriptive data analysis. The information is presented in the form of graphs and tables.

This study also uses various journal article references to provide an overview of the trend of child marriage during the Covid-19 pandemic.

### 3 Results

In recent years, the world has been working to reduce the rate of child marriage<sup>11,12</sup>. However, it turns out that with the Covid-19 pandemic there will be an increase in the number of child marriages. Prior to the Covid-19 pandemic, it was estimated that around 100 million children were undergoing forced marriages for the next 10 years. This figure is now estimated to increase to 10%. Over the next decade, there will be more than 10 million new girls who have the potential to become brides at a very young age. Closing schools, declining economic conditions and hampering assistance for affected families increase the potential for girls to become wives before they reach adulthood in 2030.

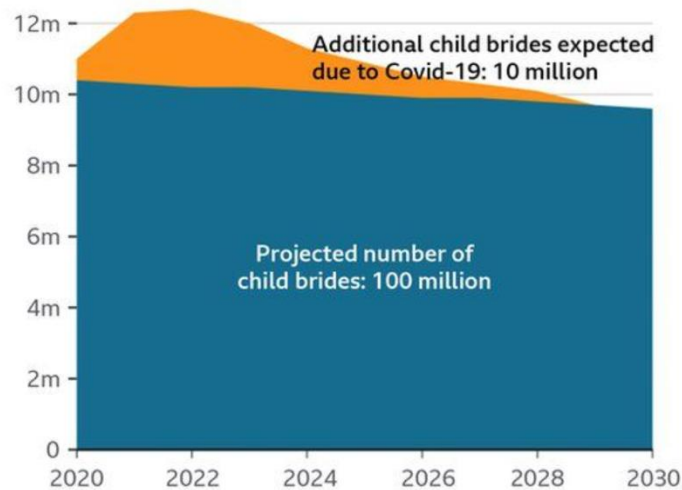
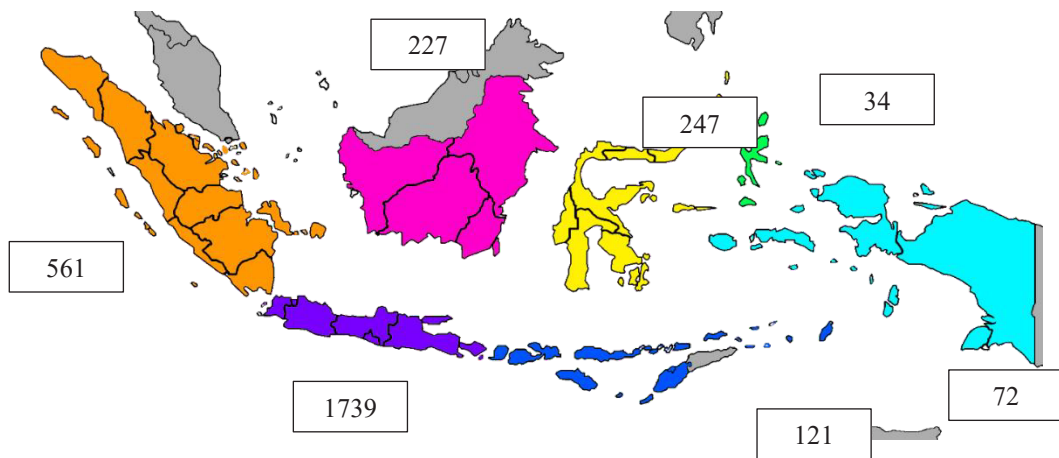


Fig. 1. Prediction of an increase in the number of child marriage in the world during a pandemic

Legally, child marriage is legalized by Law Number 1 in 1974 of Republic Indonesia concerning Marriage. The law allows girls aged 16 to marry, as stated in article 7 paragraph 1, "Marriage is only permitted if the male has reached 19 (nineteen) years, and the woman has reached 16 (sixteen) years." Meanwhile, Article 26 of Law No. 23/2002 on Child Protection,

states that parents are required to protect children from early marriage. However, this article, as with the Marriage Law, is without the existence of a criminal sanction provision so that this provision is almost meaningless in protecting children from the threat of early marriage. Weak supervision and law enforcement in Indonesia, provides an opening for anyone, including parents, government officials, certain groups and communities to falsify population documents, especially age-related, so that marriage can be prohibited. It is not surprising that it is often found that many girls are married off at the age of under 16. Based on the analysis of research data, it is found that early marriage rates in Indonesia are shown in Figure 1:



**Fig. 1.** Distribution of the number of respondents who engaged in child marriage

Early marriage in Indonesia is motivated by many factors, such as the low economic level of the family, low education, and pregnancy outside of marriage. Developed cultural and religious values are also a driving factor for early marriage.

**Table 1.** Description table

	Sumatera		Java-Bali		Nusa Tenggara		Kalimantan		Sulawesi		Maluku		Papua	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
<b>Teenage Marriage</b>														
1. Yes	561	18,7	1739	57,9	121	4,0	227	7,6	247	8,2	34	1,1	72	2,4
2. No	2484	22,2	6578	58,7	449	4,0	588	5,2	816	7,3	141	1,3	158	1,4
<b>Socio Economic Status</b>														
1. Lowest	633	26,3	752	31,3	274	11,4	204	8,5	310	12,9	88	3,7	143	5,9
2. Middle to Low	719	25,4	1466	51,8	125	4,4	190	6,7	256	9,1	38	1,4	35	1,2
3. Middle	657	22,2	1832	62,0	64	2,2	177	6,0	180	6,1	23	0,8	20	0,7
4. Middle to high	584	19,4	2000	67,8	53	1,8	131	4,4	151	5,1	16	0,5	16	0,5
5. Highest	453	14,7	2266	73,6	53	1,7	114	3,7	166	5,4	9	0,3	18	0,6
<b>Education</b>														
1. No School	9	15,5	10	17,1	3	5,4	4	6,7	6	10,9	1	0,8	26	43,5
2. Elementary School	246	20,8	664	56,1	46	3,9	111	9,4	76	6,4	11	0,9	30	2,5
3. High School	2192	21,3	6171	59,9	406	3,9	566	5,5	707	6,9	116	1,1	143	1,4
4. College	599	22,4	1472	55,0	114	4,3	135	5,1	275	10,3	48	1,8	32	1,2
<b>Working Status</b>														
1. Work	1102	22,1	3002	60,2	152	3,0	293	5,9	310	6,2	41	0,8	85	1,7
2. Doesn't work	1944	21,1	5315	57,6	418	4,5	522	5,7	753	8,2	133	1,4	146	1,6
<b>Residence</b>														
1. Urban	1255	16,5	5279	69,3	201	2,6	349	4,6	411	5,4	74	1,0	49	0,6
2. Rural	1791	27,1	3038	46,0	369	5,6	467	7,1	652	9,9	101	1,5	181	2,8

## 4 Discussion

There are a number of factors that have led to cases of child marriage during the Corona Virus pandemic (Covid-19). Challenges and driving factors for child marriage, especially during the Covid-19 pandemic, that we need to tackle together, namely, one, socio-cultural factors, the

view that marriage can prevent adultery and to maintain the good name of the family. The next factor, is the economic problem as a result of the pandemic. Parents who have lost their livelihoods see their children as an economic burden, so marrying them off can be a solution. Third, social restrictions and a learning system from home reduce children's activities and limited reproductive health services for adolescents. Fourth, face-to-face counseling services are limited, on the other hand, online or online counseling is not optimal [5]. The next factor is that the use of the internet for learning from home can increase the risk of cyber violence and children's exposure to pornographic content. The six factors are influencers who marry young and the seventh, there is no agreement between sectors in providing recommendations on applications for marriage dispensation.

Risky Sex Behavior and lack of understanding of adolescent reproductive health education. Adolescents who experimented with sexual behavior while dating their partners was discovered to be the cause. Adolescents are locked in a circle that is difficult to escape due to the lack of openness in reproductive health education, which is still considered a taboo topic [3].

One of the causes of child marriage, which was discovered in eight research areas, is economic motives motivated by poverty. In most cases, this element arises as a result of matching or students dropping out of school due to financial constraints. Another problem of poverty is parents who seek work outside their area and leave their children without sufficient knowledge and education so that their children seek knowledge and understanding in other places [4].

Cultural elements, such as traditions, practices, and religion, are another factor that leads to child marriage. Information about reproductive health is considered taboo, obscene, and evil. It was found that the assumption of child marriage is one of the right solutions for unwanted pregnancies and avoiding sins, as well as the "talk" of society regarding the status of children born later. There were several cases where they were mated since they were young, and when it was considered final, they were married off. Usually the role of parents is very dominant, and they are afraid to refuse the application because it will make it difficult for the child to mate later, so it becomes an excuse to marry off the child at a young age [5].

The factors have done a biological relationship. Namely adolescents who have had a biological relationship like husband and wife. With this condition, the parents of girls tend to immediately marry off their children, because according to the parents of this girl, because they are no longer virgins, this is a disgrace [5], [6].

Education a person who marries, especially at a young age, will certainly have various impacts, especially in the world of education which is vulnerable to economic sustainability, someone who gets married when he just graduated from junior high school or high school, of course his desire to continue school again or take a more education. Girls who marry before the age of 18 are four times less likely to complete secondary education or equivalent (UNICEF).

Child marriage has an impact on the likelihood of divorce and adultery among newly married young couples from a social standpoint [5]. This is due to the fact that emotions are still unstable, making it easier to fight even in the face of minor issues. Because of an unequal relationship, quarrels can sometimes develop to domestic violence/sexual violence, which is particularly common among women [7], [8].

Health consequences (Reproductive and Sexual) Married young people run the risk of not being ready to give birth and care for children, and if they do have an abortion, it could be an unsafe one, putting the baby's safety and the mother's life in jeopardy. Child marriage also increases the risk of partner abuse, and if an undesired pregnancy happens, it is more likely to be concealed, resulting in inadequate pregnancy care and health services [9], [10].

Psychological effects were also discovered in all research areas where partners were not psychologically prepared to take on new duties and deal with household issues, which frequently resulted in regret for missing school and adolescence. Domestic violence, especially among young females in marriage, has the potential to produce trauma to the point of death [11].

Maternal mortality, according to research by Abdi, women aged less than 20 years can be at risk for death 3 times. Apart from being too young, maternal mortality can also occur due to a lack of use of contraceptives. When someone is lacking in knowledge of contraception and economic conditions, there will be unmet need for family planning in couples of childbearing ages [12].

Early Childhood Pregnancy with Premature Labor. The biological mechanism of the increase in the incidence of preterm labor in adolescent mothers is explained as follows, namely that blood circulation to the cervix and uterus in adolescents is generally imperfect and this results in reduced nutrition for pregnant adolescent fetuses. Likewise, less blood circulation in the genital tract causes an increase in infection which will cause preterm labor to increase [13], [14].

Cervical cancer is a malignant tumor most often found in the female reproductive system. Most cases are squamous epithelial carcinoma, local growth tumors, generally invade the parametrium tissue and pelvic organs and spread to the lymph nodes of the pelvic cavity. Cervical cancer is four times more likely in 20-year-old marriages than in 20-year-old marriages [15].

## 5 Conclusion

In Indonesia, the provinces with the highest percentage of teenage marriage aged 10-14 years were Central Java (52.1%), South Kalimantan (9%), West Java (7.5%), East Kalimantan and Central Kalimantan respectively (7 %), and Banten (6.5%) while the provinces with the highest percentage of cases of teenage marriage aged 15-19 years were Central Kalimantan (52.1%), West Java (50.2%), South Kalimantan (48.4%), Bangka Belitung (47.9%), and Central Sulawesi. This was due to differences in knowledge, education, economy and culture factors in various regions in Indonesia.

Prior to the Covid-19 pandemic, it was estimated that around 100 million children were undergoing forced marriages for the next 10 years. Over the next decade, there will be more than 10 million new girls who have the potential to become brides at a very young age. Closing schools, declining economic conditions and hampering assistance for affected families increase the potential for girls to become wives before they reach adulthood in 2030.

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# Animal Distribution Patterns as a Potential Possible Origin of Covid-19 in Semarang City

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**Abstract.** SARS-CoV-2 coronavirus can be found in humans&animals. Some strains of CoV are classified as zoonotic. Semarang city is an area with red zone status. There have been cases of Covid-19 in animals infected by humans. But no research conducted on animals infected Covid-19 able to transmit back to humans. Variety of species&distribution of animals that potential infected with Covid-19 must to know. This study aims to determine the distribution of animal species that can be the possible origin of zoonotic Covid-19. A descriptive study with a survey method conducted in Semarang city. Samples are families that have pets/livestock(dogs,cats,birds,cows) or wild animals around shelter, taken cluster random technique sampling. Questionnaire to collect data. Collected data was analyze using SPSS&Arc.GIS. The most common animal species found:cat (39%). 10% of animal owners live close to people under Covid-19 surveillance. 79% of respondents do not have pets&far from Covid-19 cases. 65% cats has without owners radius 10m Covid-19 cases had found, then poultry(9%)&bats(6%).

**Keywords:** Mapping, Emerging Zoonotic Disease, Personal Hygine, Distance Limitation

## 1 Introduction

Betacoronavirus is a genus of the SARS-CoV-2 or Covid-19 virus and belongs to the SS-RNA virus group. The city of Wuhan in China is where Covid-19 was first discovered. Covid-19 has become a pandemic and more than 70 countries have been infected with Covid-19. Semarang City is one of the areas in Central Java province with the status of a Covid-19 red zone. Corona virus found in various countries, based on information from WHO (2020) comes from natural evolution. Reverse transmission of Co-V that occurs to humans, it is important to know and be aware of, can trigger the emergence of a new pandemic because it has the potential to become an emerging zoonotic disease. Knowing the distribution and presence of animals that have the potential to be a transmission source or reservoir for Covid-19 is important. Transmission control efforts can be carried out through identified transmission mechanisms and information regarding the source of virus transmission, can help determine the right steps for preventing transmission to be achieved.

Indonesian citizens infected with Covid-19 as of April 2020 have reached 9,096 cases. Since this case was first announced on March 2, 2020. As many as 214 positive Covid-19 patients have been found within 24 hours, this is due to the relatively fast transmission of cases. The Covid-19 cases has occur Indonesia and infected residents in various provinces also has been

designated a red zone. Central Java province is known to have high Covid-19 cases with red zones spread over 20 regions, including the city of Semarang. as many as 28,826 cases with the category of people in monitoring of Covid-19 based on data from [corona.jatengprov.go.id](http://corona.jatengprov.go.id). As many as 704 positive cases have been found, while the cases of patients under supervision are 1,307 cases.

Coronavirus (CoV) can be found in humans and animals, and some strains of CoV are classified as zoonotic. CoV that infects humans is different from CoV in animals. In humans it can cause MERS-CoV and SARS-CoV. In animals, CoV can infect pigs, dogs, cats, cows and chickens. The virus that causes COVID-19 is declared not to be made in a laboratory or intentionally made, this is evident from the genome sequence analysis on SARS-CoV-2 or other similar viruses. The results showed that bats act as a reservoir for CoV. In the body of CoV bats are able to mutate and recombine, can continue to form new strains and spread [1],[2],[3].

Corona virus infection has become a pandemic and more than 70 countries have contracted this virus. The corona virus that has become an epidemic is known as Covid-19. Covid-19 or SARS-CoV-2 is a betavirus that easily infects mammals. These viruses have evolved and recombined in reservoirs. Bats were originally referred to as the reservoir of this virus. Although it is also possible that there is an intermediate host between bats and humans. Viruses can evolve naturally possible through evolutionary pathways. Although it is difficult to know the original evolutionary pathway for CoV. If the current pathogenic SARS-CoV-2 or Covid-19 infecting humans comes from animals, this could increase the possibility of future outbreaks [4],[5],[6],[7].

citizens' compliance in carrying out health protocols to prevent transmission between humans, as well as preventing transmission from humans to their pet source of data regarding animals potentially infected with Covid-19 or sources of CoV zoonotic strains, especially regarding the diversity of species and distribution of animals, compliance and management of residents in carrying out health protocols during pandemic for themselves and their pets/livestock. Information on data on various species, distribution, management of individual health protocols and their pets can be used as a reference source to prevent the spread of pandemic agents, especially viral agents that have the potential for emerging zoonotic diseases.

Because cases of Covid-19 have been found in animals infected by humans. Although there has been no research on animals infected with Covid-19 being able to transmit back to humans. Research on transmission between animals is still being carried out. This condition still needs to be aware of the potential for pandemic emerging zoonotic disease. Knowledge about the source of CoV that can become animals that have the potential to be infected with Covid-19, namely data on the distribution and diversity of animal species. So, it is necessary to be aware of the potential for pandemic emerging zoonotic disease, because the type of virus that causes Covid-19 can still circulate in animal populations, and it is possible to jump to humans as host. There have also been cases of pets (dogs and cats) contracting Covid-19 from owners and tigers in zoos.

Although it is not yet known whether there is a cycle of transmission back to humans, It is important to know and be aware of the possibility of a reverse infection transmission cycle



from animals to human [5],[7],[8],[9]. The research objective was to identify viral pandemic agents that have potential as emerging zoonotic diseases, through species data and distribution of animals that are potential sources of transmission of CoV.

## 2 Method

This research is a descriptive study with a survey method. The survey conducted is a predictive survey. It aims to determine the potential for emerging zoonotic disease in viral-zoonotic (CoV), when viewed from the species-status-distribution-number of animals (domesticated / livestock / wild) around the respondent's residence. The focus of the research in this study was to determine the description of the types, species, status, distribution, number of animals (domesticated / livestock / wild) that could become possible origins of the coronavirus.

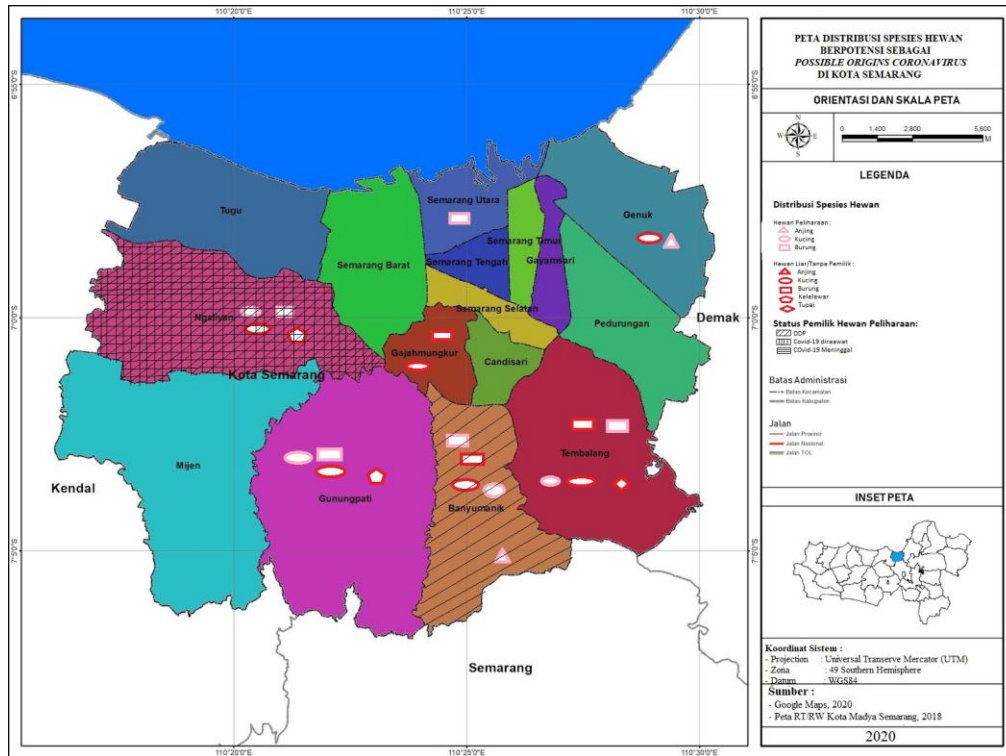
The population of this research is all residents who live in 46 sub-districts of the red zone in the city of Semarang. The sample was selected by residents with the status of People Under Monitoring, Patient Under Supervisions, Covid-treated / recovered / deceased with the criteria of having pets / livestock, and wild animals living around the respondent.

The sampling technique in this study used simple random sampling for a sample of each sub-district in the city of Semarang. Primary data collection is done by conducting interviews and filling out questionnaires. Research instruments: interview guides and questionnaires. Secondary data in the form of data on the number of viral-zoonotic cases obtained from the Agriculture and Livestock Service Office of Semarang City, Semarang City Health Office. The instruments or tools used in this study were interview guides and questionnaires. The data collection phase begins with conducting a survey recording: types, species, status, distribution, number of animals (domesticated / livestock / wild) that can be the possible origins of coronavirus, information on how to keep animals (domesticated / livestock) owned, management of wild animals in around the residence. The data obtained were analyzed statistically univariate-bivariate with SPSS and ArcGis, then presented in the form a possible origin CoV zoning maps to determine the potential for emerging zoonotic disease pathogen viruses

## 3. Result and Discussion

Corona virus can change hosts from animals to humans. The potential for a pandemic to occur if CoV can infect from human to human. Although it is difficult to determine the transmission route of CoV transmission, it is important to know the evolutionary cycle of the virus. It is important to know the possible origin of CoV because it is related to the mechanism of transmission of CoV, so that proper prevention can be done immediately [7],[10],[11]. Semarang City area is divided into 16 districts. In this study, a survey was conducted on residents who live in 46 red zone sub-districts in the city of Semarang. From a total of 16 sub-districts in Semarang City, there are 3 sub-districts that have health centers (Animal Health Center located in Mijen, Gayamsari, and Gunungpati).

Characteristics of Animal Potential Possible Origins Coronavirus in Semarang City. The distribution of animals that have the potential as Potential Possible Origins Coronavirus in Semarang City and which are included in the pet group can be seen in **Figure 1**.



**Fig. 1.** Distribution Map of Potential Animal Species as Possible Coronavirus in Semarang City

Within a radius of 10 meters, it is known that there are various wild animals that have the potential as possible origins of CoV. The highest number of wild animals found were cats (65%), 6% were found bats, 9% chickens, 16% birds, and 4% other types of animals. cats with the highest number of wild animals found, are high-risk animals that are easily infected with CoV and can change their status as hosts or reservoirs of CoV. This condition is supported by the ability of CoV to last a long time in the environment, even several hours or days. Even the deployment of Covid-19 can occur through droplets which can contaminate the environment. Animals that have the potential as possible origins of coronavirus, such as dogs, cats, birds, if infected with Covid-19, then transmit Covid-19 to other groups of animals. Can trigger New Emerging Disease (NEDs) in animal groups. Furthermore, if there is transmission back to humans and a cycle occurs, it is estimated that in the future there will be Emerging Zoonotic Disease (EzD) and the potential for a pandemic [11],[12],[13],[14]

In this study, it was found that around 10% of pets belonged to people who were included in the Covid-19 People Under Monitoring category. Although only a small proportion of animal

ownership is based on the results of interviews with respondents. The condition is still a concern because of the possibility that pets can contract co-19 from their owners. Especially if pet owners have a history of traveling to the red zone and ignoring the Covid-19 preventive health protocol, when interacting with their pets. Droplets that come from people infected with Covid-19, can survive in the environment for hours or even days. Droplets in the environment and contaminating various equipment and free air, have different time variation ranges [4],[14],[15],[16].

Pet health checks are also important. Sick pets should be examined by a veterinarian. Based on case reports and the results of research conducted by Eric et al. in early 2020 about the symptoms that indicated infected animals corona virus. The specific symptoms that can be found in infected animal Covid of its owner. Showing respiratory symptoms as well as several other symptoms such as diarrhea. With veterinary health checks to vet, a pet can be known possibility of contracting the disease non-CoV or CoV by performing rapid test / PCR [4],[9], [17].

Based on the results of the study, there is a possibility that pets contracted Covid-19 from their owners. Transmission from owner to pets, it is very possible. Especially for pets and their owners who live in areas with the red zone category. The latest research and based on a statement from WHO that there is a possibility that the corona virus can be transmitted by air. In this study, only 12% of animal owners who directly interacted with their pets, after traveling from the red zone, directly interacted with pets without carrying out a health protocol to prevent Covid-19, this made the animals at high risk of contracting Covid-19. Laboratory tests on animals to detect SARS-CoV-2 can be done using a rapid test and Real-Time Polymerase Chain Reaction (RT-PCR). This test is to confirm the possibility of owner-to-animal transmission. Specifically in this study, it was found that only 15% of pet owners routinely perform pet health checks and 19% of owners vaccinate their pets. This figure indicates that more than 50% of the pet population has not been vaccinated. Pets that have not been vaccinated, make pets susceptible to infection. Vaccination in pets, especially vaccines aimed at the prevention of disease transmission with viral agents [10],[12],[13],[17].

Selengkapnya tentang Berdasarkan hasil penelitian, ada kemungkinan hewan peliharaan tertulBased on the survey results, 71% of the presence of wild / ownerless animals within a 10m radius in the People Under Monitoring / Patient Under Supervisions / Covid-treated / Covid-Cured / Covid-died residences was obtained.. There are various frequencies of wild / ownerless animals roaming around the respondent's yard / house. The results showed that 66% of wild / ownerless animals roam around the respondent's house almost every day, as many as 13 every 5-6 days, while in the range of 1-2 days and 3-4 days there are 3%, and 16 respondents. stated that no wild / ownerless animal has ever entered the house yard. As many as 25 respondents stated that they interacted directly with wild / ownerless animals and 75% said they did not. When respondents interacted directly with wild animals / without owners, 6% of respondents said they used masks and gloves, 10% used masks but did not wear gloves, 6% of respondents did not use masks or gloves, 29% stated that they washed their hands before or after interacting with these animals, 35% of respondents did wash their hands after interacting with these animals, while as many as 13% answered other than the procedures that have been mentioned. In this study, bats (6%) were also found in the red zone category. Some strains of CoV, which are classified as zoonotic, can infect humans and animals. Pathogenic

Alphacoronavirus and Bethacoronavirus in mammals. In animals, CoV can infect dogs and cats. CoV that infects humans and animals, although different, but the results of the study found that bats act as a reservoir of CoV. The CoV in bats is able to mutate and recombine into new strains, which are able to spread throughout the species. CoV mutated from a reservoir, if it has infected humans, is highly spread and has the potential to become a pandemic [7],[15],[17]. Some researchers claim that the SARS-CoV-2 reservoir is a bat, because it is almost like the corona virus that infects bats. Bats can play a role as an intermediate host of CoV to humans. In another possible evolutionary pathway, non-pathogenic viruses can pass from animals to humans. Then in the human body this virus develops into a pathogenic virus, and then transmission occurs between humans. Rambaut (2020) warns, although it is difficult to know the initial path of the evolution of CoV. If the SARS-CoV-2 pathogen currently infecting humans comes from animals, this could increase the likelihood of future outbreaks. This is because the type of virus that causes Covid-19 can still circulate in animal populations, and it is possible to jump / move host to humans [14], [15], [16].

#### 4. Conclusion

The conclusion of this study is that domesticated animals can potentially become hosts for coronavirus, especially when bats are found in residential areas in the red zone.

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# The Effectiveness of Ice Massage Therapy for Low Back Pain Patients

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**Abstract.** Low back pain was suffered by almost 90% of human during their lives, especially in people who have risk factors for low back pain. Low back pain is one of the musculoskeletal causes due to poor activity and the emergence of aches, rheumatic pain. One of the non-pharmacological therapies that can be used to reduce low back pain is cold therapy, namely cold therapy. Cold therapy (cold therapy) is a physiotherapy that is widely used in sports injuries. Physiological effects of cold therapy include vasoconstriction of arterioles and venules, decreased sensitivity of free nerve endings and decreased metabolic rate of cells, resulting in decreased demand for cell oxygen. This whole process can reduce the swelling process, reduce pain, reduce muscle spasm and the risk of cell death. Cold therapy that is widely used in the form of ice massages, ice packs, cold baths / water immersion and vapocoolant sprays. The use of cold therapy must be carried out with a proper procedure considering there are several therapeutic risks such as irritation, hypothermia, frost bite. This therapy is contraindicated in several clinical disorders, including Raynaud's syndrome, cyroglobunemia, paroxoxymal hemaglobinuria, vasculitis and sensory neurological disorders such as diabetes mellitus. The purpose of this article is to determine the effect of giving ice massage on changes in pain intensity in people with low back pain.

**Keywords:** low back pain, ice massage, cold therapy.

## 1 Introduction

In the United States, more than 80% of complaints are in the second position after headache, namely Low back pain. Pain that is most often felt in the back area, especially the lower part, is called Low Back Pain. Low back pain can be local pain or radicular pain or both (Mahadewa & Maliawan, 2009). This pain is felt between the angle of the lower ribs and the fold of the lower buttocks, namely in the lumbar or lumbar-sacral region and is often accompanied by radiating pain to the legs and feet. According to Sigamani (2007) pain is an unpleasant sensory and emotional experience that can be accompanied by acute or potential tissue damage.

In fact Low Back Pain is the third common cause of disability in the United States (MacCann, 2003). LBP is the second cause of lost work time, the fifth reason for hospitalization, and the third reason for surgical procedures. Losses due to loss of productivity due to low back pain are around 28 million US dollars per year in the United States (Wheeler, 2009). According to Bull and Archard (2007) in England, low back pain is the most frequent medical complaint after the common cold.

Epidemiological data regarding low back pain in Indonesia does not yet exist. However, it is estimated that 40% of Central Java population aged 65 years have suffered from Low Back Pain and the prevalence in men is 18.2% and 13.6% in women (Mahadewa & Maliawan, 2009). From the results of a national study conducted in 14 cities in Indonesia by the Pain group of the Indonesian Neurologist Association / PERDOSSI in Purba and Susilawaty (2008) found 18.13% of low back pain sufferers with an average VAS value (Visual Analog Scale) of  $5.46 \pm 2.56$ , which means moderate to severe pain.

Low back pain that is felt can certainly be a problem if it interferes with daily activities. For workers this pain will certainly interfere with their work and reduce their productivity. As a result of the impact that can be felt by sufferers of Low Back Pain, it is necessary to make efforts to reduce pain. Reducing pain can be done using pharmacological therapy or using non-pharmacological therapy, that is, without using drugs. One form of non-pharmacological therapy is physiotherapy in the form of cold therapy (cryotherapy), which is a simple and effective procedure to reduce muscle spasm so as to reduce pain (Sigamani, 2007). The cold therapy method that can be used is ice massage. Ice massage is the act of massaging using ice on the affected area. This action is a simple thing that can be done to relieve pain. Giving ice massage is carried out for 5 to 10 minutes. The purpose of this article was to determine the effect of ice massage cold therapy on changes in pain intensity in people with low back pain.

## **2 Method**

A total of 11 articles were used as data in this review article. The data used in this article are secondary data. Secondary data were obtained from articles published in the last 20 years with the topic of the effect of ice massage on people with low back pain. These articles were obtained from various library sources such as Google Scholar, Springerlink, Researchgate, Emerald and so on. The analysis used in this literature review includes four steps that must be carried out sequentially to provide acceptable answers to the research question. 1) The stages of searching and collecting material about the effect of ice massage on people with low back pain; 2) Stage of reduction and coding, screening and classification of material according to the topic of discussion; 3) The analysis and synthesis stage, examining and digging up detailed information about the material obtained; 4) The conclusions presentation stage is the final stage of the article review process and to state the novelty of the research. The review process can be seen in Figure 1.

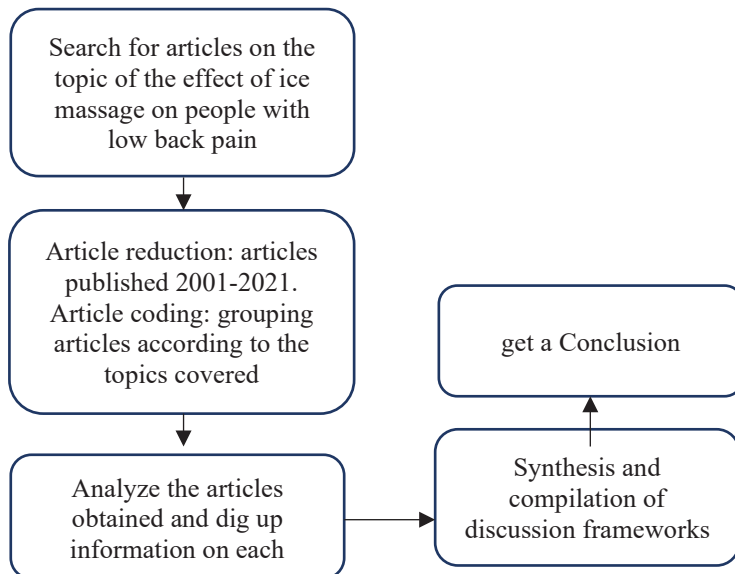


Fig. 1. Article review process.

### 3 Result and Discussion

The review process carried out to select articles according to the criteria resulted in several articles that became references to the main topic, namely the effect of ice massage on sufferers of low back pain. Below is a tabulation of data based on the results of the data reduction that has been done by the researcher.

Table 1. Data tabulation of articles with the theme of ice massage and low back pain.

No	Title	Year of Publication	Source
1	Pengaruh Back Exercise pada Nyeri Punggung Bawah.	2009	Tesis Magister Kedokteran Keluarga Program Studi Pendidikan Profesi Kesehatan pada Universitas Sebelas Maret Surakarta.
2	Pengaruh terapi dingin ice massage terhadap perubahan intensitas nyeri pada penderita Low back pain.	2012	Jurnal Ners Indonesia, Vol. 2, No. 2
3	<i>Latihan pada penderita nyeri punggung bawah.</i>	2005	Medika jwalita edisi III, 8-9.
4	Simple guide nyeri punggung	2007	Jakarta: Erlangga.
5	Efektifitas Terapi Ice Massage dan Back Massage Terhadap Perubahan Intensitas Nyeri pada Pasien Low Back Pain di Rumah Sakit Grandmed Lubuk Pakam Tahun 2020.	2020	Jurnal Keperawatan dan Fisioterapi (JKF)
6	Low back pain : definition and classification.	2003	America pharmacist association.
7.	Relieving labor pain by ice massage of the hand.	2008	Journal



8.	Penambahan Ice Massage pada Intervensi Back Exercise Mckenzie Lebih Baik Meningkatkan Fungsional Low Back Pain pada Pengerajin Batik Di Kecamatan Pandak.	2015	Program Studi Fisioterapi Sekolah Tinggi Ilmu Kesehatan 'Aisyah Yogyakarta
9.	Ice massage for reduction of labor pain.	2003	Journal of midwifery & women's health
10.	Pengaruh William's Flexion Exercise Terhadap Mobilitas Lumbal Dan Aktivitas Fungsional Pada Pasien-Pasien Dengan Nyeri Punggung Bawah (NPB) Mekanik Subakut Dan Kronis, Pengaruh Terapi Panas, Dingin, dan Panas-Dingin Terhadap Intensitas Nyeri pada Pasien	2004	Program Studi Rehabilitasi Medik Fakultas Kedokteran Universitas Diponegoro. Semarang
11.	Low Back Pain (LBP) di Rumah Sakit Umum Daerah Dr. Pirngadi Medan.	2014	Journal

Studies on the effect of ice massage on people with low back pain have been discussed in various scientific papers such as books and articles in scientific journals. Along with the development of the era, ice massage is studied more deeply to be able to provide benefits to sports players in the field of sports recovery.

### 3.1 Low Back Pain

Low Back Pain (LBP) is a common complaint. LBP, then, is pain that is felt in the lower back area, it can be local pain or radicular pain or both (Mahadewa & Maliawan, 2009). This pain is felt between the angle of the lower ribs and the fold of the lower buttocks, namely in the lumbar or lumbar-sacral region and is often accompanied by radiating pain to the legs and feet. According to Sigamani (2007) pain is an unpleasant sensory and emotional experience that can be accompanied by acute or potential tissue damage.

Signs and symptoms of LBP are the discovery of muscle pain known as myogenic pain, which is pain that is not appropriate with the distribution of nerves and dermatomes with frequent exaggerated reactions. The pain is characterized by tenderness in the area (trigger point), loss of range of motion (loss of range motion), low back muscle spasm. The presence of muscle spasm in the lumbosacral region, imbalance of the stabilizer and trunk fixators, limited lumbosacral mobility, resulting in decreased functional activity. complaints will disappear when the lumbosacral muscle group is stretched (Pramita, 2014).

The incidence of Low Back Pain (LBP) is almost the same in all populations in both developed and developing countries (Shocker, 2018). The incidence of LBP in the United States is approximately 5% in adults. Approximately 60% -80% of individuals have experienced back pain in their life. The peak age of LBP sufferers is at the age of 45-60 years. In adult patients, LBP can interfere with daily activities in 40% of patients, and sleep disturbances in 20% of patients. Most of the 75% of sufferers will seek medical help, and 25% of them need to be hospitalized for further evaluation (Widiyaningsih, 2015).

According to Porth (2005) low back pain attacks women and men as much and attacks usually occur at the age of 30-50 years. Low back pain can also occur in the elderly, intervebral discs will change in character as they get older. The intervebral disc will become dense and regular fibrocartilage. Disc degeneration is a common cause of back pain (Smeltzer & Bare, 2001). The lower lumbar disc suffers from the most severe mechanical stress and the heaviest degenerative changes.

One of the factors causing mechanical low back pain is physical factors related to work such as sitting and driving, sitting or standing for hours (static work body position), vibration, lifting, carrying loads, bending and rotating the body (Mahadeva & Maliawan, 2009). It is suspected that the cause of housewives experiencing low back pain is due to doing housework such as washing, sweeping, cooking and ironing regularly and usually requires body movements such as lifting objects, bending or turning the body so that it has the potential to experience low back pain. Many housewives do the habit of washing clothes with a bending motion, or picking up objects with a bending motion. This method can put stress or mechanical stress on the lumbar which can eventually lead to lower back pain. Based on the results of this study, it can be concluded that not only workers such as drivers, farmers or construction workers can experience low back pain but housewives are also at risk of experiencing low back pain.

Based on several theories and research on the effects of low back pain, it is necessary to make efforts to reduce pain. Reducing pain can be done using pharmacological therapy or using non-pharmacological therapy. The cryotherapy method that can be used is ice massage. Handling using ice massage is seen from the process of trauma or injury to the soft tissue. Application using ice massage can provide changes to the skin, subcutaneous tissue, intramuscular and temperature in the joints (Cheung et al, 2013).

### **3.2 Ice Massage**

Physiotherapy in the case of Low Back Pain plays an important role in reducing pain complaints and improving functionality so that patients can return to their activities. To overcome the problem of Low Back Pain, physiotherapy modalities can be used such as: Heat therapy, including Hot packs, Short Wave Diathermy (SWD), Micro Wave Diathermy (MWD), Infra Red (IR). Cold therapy includes cold compresses and ice massages. Electrical therapy includes Transcutaneous Electrical Nerve Stimulation (TENS), interference (IF), dyadinamis. Manipulation therapy, stretching, massage.

The physiotherapy modality used in this study was ice massage. Ice massage is the act of massaging using ice on the affected area. This action is a simple thing that can be done to relieve pain. Giving ice massage is carried out for 5 to 10 minutes (Erika, et al 2012). (Dachlan, 2009).

Ice massage is a method that can be used to help reduce tissue damage and prevent inflammation of the muscles, tendons and ligaments. Ice massage is very good for reducing pain and discomfort caused by strains, odes. The cold sensation you feel from ice will reduce the occurrence of inflammatory processes in the tissue and reduce the risk of odeme. The effect of ice massage can provide a relaxing effect that has a sedative effect on muscle tissue. Physiotherapy helps accelerate the healing process, when metabolism decreases when given ice massage, and the blood will return to bring nutrition and will accelerate the healing process. Ice massage will reduce the occurrence of swelling and maintain blood circulation (Rakasiwi, 2013)

In several studies, the addition of ice massage is better at increasing functional ability in Low Back Pain because ice massage has physiological effects caused by this cold therapy, including vasoconstriction, relaxing muscles that experience spasm, reducing pain, slowing pain impulse travel and increasing the pain threshold. , and provide a local anesthetic effect. It is estimated that 90% of Low Back Pain is based on mechanical factors and about 60% -70% of the causes are strains. This strain is the tension in the muscles as a result of wrong posture and muscle strength. Pain that is felt is local without spreading. The provision of cold therapy

in the form of ice massage can relax the muscles in spasm and provide a local anesthetic effect so that it can be used as an alternative therapy to reduce pain. In accordance with the complaints felt by respondents with Low Back Pain, respondents felt local pain and sore muscles around the lower back (Someren, 2005).

The effect of ice massage is also stated by Hajiamini, et al (2012) in their research entitled "Comparing the effects of ice massage and acupressure on labor pain reduction". It is concluded that Ice massage is more effective than acupressure in reducing pain, Ice massage has the advantage of having no side effects, does not require further training and can be done in remote areas where access to medical and professional methods is limited.

### 3.3 The effectiveness of ice massage therapy in low backpain patients

The results of the study on the average pain scale in Low Back Pain patients before cold therapy (Ice Massage) found that there was an effectiveness of providing ice massage therapy on pain intensity in Low Back Pain patients. The results of the study are in accordance with research by Eva Nurlis (2012) that there is an effect of cold therapy (ice massage) on changes in pain intensity in people with low back pain. Cold compress can reduce pain in patients. Cold compresses have several advantages, including local analgesic effects, reducing inflammation, increasing the threshold for pain receptors and then reducing pain. The cold compress used to reduce pain is applied for approximately 20 minutes, because prolonged exposure to cold will cause injury to the tissue (Bimariotejo, 2015).

## 4 Conclusion

Based on the above discussion, it can be concluded that there is an effectiveness of Ice Massage therapy on changes in pain intensity in Low Back Pain sufferers.

The results of this study are expected to be used as information on ice massage therapy scientifically and can apply ice massage therapy as a safe, effective non-pharmacological therapy and to reduce pain scales.

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# Effect Differences of Fermented and Non-Fermented Red Dragon Fruit Peel on Blood Glucose Levels of Hypercholesterolemic Wistar Rats

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**Abstract.** Hypercholesterolemia is associated with oxidative stress. Antioxidant activity can be found in red dragon fruit peel. This study aims to analyse the effect of fermented and non-fermented red dragon fruit peel on blood glucose levels of hypercholesterolemic Wistar rats. Twenty plasma Wistar rats were divided into four groups: P1 (negative); P2 (hypercholesterolemic group, not received any treatment); P3 (red dragon fruit peel yogurt 1.8g/200g BW); P4 (red dragon fruit peel marmalade 0.94g/200g BW). Hypercholesterolemic condition was induced using cholesterol and cholic acid powder. Blood glucose levels were measured using GOD-PAP. The paired t-test and One-Way ANOVA was used to determine the mean differences in blood glucose level before and after intervention. The reduction in blood glucose levels in P1; P2; P3 and P4 were  $0.28 \pm 0.55$  mg/dL;  $2.66 \pm 1.92$  mg/dL;  $-24.60 \pm 5.77$  mg/dL;  $-18.66 \pm 2.23$  mg/dL, respectively. We concluded that red dragon fruit peel yogurt lowers blood glucose more than dragon fruit peel marmalade.

**Keywords:** Blood glucose level, marmalade, red dragon fruit peel, wistar, yogurt.

## 1 Introduction

Metabolic syndrome is a group of conditions consisting of more than three different cardiovascular risk factors including abdominal obesity, pathological conditions in blood pressure concentrations, blood glucose levels, triglycerides and serum HDL. Metabolic syndrome is associated with type 2 diabetes mellitus and heart disease [1]. The aetiology of metabolic syndrome is unknown although modifiable risk factors such as physical activity, smoking habits, alcohol consumption accompanied by dietary habits including dairy foods, western diet and food based dietary guidelines also influence the occurrence of metabolic syndrome. Metabolic syndrome can advance to cardiovascular disorders [2].

Intake of vegetables, fruit, lentils, herbs is a source of flavonoids which represent the polyphenols group. Previous studies indicate that several classes of flavonoids are important in supporting heart health and preventing type 2 diabetes mellitus. The sub-classification of flavonoids is divided into flavonols, flavones, flavanones, 3-ols flavan, isoflavones and anthocyanins [3]. Red dragon fruit is gaining attention worldwide because it has economic and even health benefits. Red dragon fruit is a source of phytochemicals such as flavonoids, anthocyanins and terpenoids. A study by Song et al. shows that the phytochemicals act as free-radical scavengers because they have antioxidant properties that are related to protective actions

in overcoming inflammation, atherosclerosis and hyperlipidaemia [4]. Red dragon fruit peel is the part that is used in our study. The selection of dragon fruit peel as the main ingredient is due to its higher antioxidant content compared to the flesh, and the use of red dragon fruit peel has not been massively explored [5]. The antioxidant capacity of red dragon fruit peel is highly related to the total phenols content.

This study used two kinds of red dragon fruit peel: fermented and non-fermented. The fermented fruit peel was made into yoghurt, while the non-fermented was in the form of marmalade.

Yogurt is a source of probiotics. Probiotics are substances or organisms that maintain the balance of the intestinal microbiota. Red dragon fruit peel yogurt in this study used lactic acid bacteria *Lactobacillus bulgaricus* and *Streptococcus thermophilus*. The mechanism of action of probiotics includes triggering mucin secretion, immunomodulators in the intestine related to lymphoid tissue and increasing immunosuppressive and decreasing proinflammatory mediators [6]. A study conducted by Mardiana using processed red dragon fruit peel into yogurt showed that the flavonoid content in red dragon fruit peel yogurt could be further developed into a functional drink [7]. Another processed form used in this study is red dragon fruit peel marmalade. The red dragon fruit peel marmalade in this study was produced by mixing red dragon fruit peel with sucrose which had a gel-like texture. The definition of marmalade based on SNI (Indonesian National Standard) is a semi-wet food product made from a mixture of orange juice, chopped orange peel and sugar with or without permitted food additives [8].

Our study used marmalade and yogurt derived from red dragon fruit peel which are also low-glycaemic food sources to control blood glucose levels.

## 2 Methods

This study used stored hypercholesterolemic Wistar rat plasma. Hypercholesterolemic conditioning in Wistar rats using 1% cholesterol powder and 0.5% cholate acid manufactured by Sigma Aldrich, Japan. This study received a recommendation from the Health Ethics Committee, Universitas Negeri Semarang (permission number: 140 / KEPK / EC / 2019).

The chosen dosages were according to a study conducted by Putriningtyas [9] and Mardiana [7]. Red dragon fruit peel yogurt is a fermented product derived from full cream milk, red dragon fruit peel, sucrose and lactic acid bacteria with a ratio of 1: 25%: 10%: 10%. The lactic acid bacteria used in the process of making red dragon fruit peel yogurt were *Lactobacillus bulgaricus* and *Streptococcus thermophilus* with a ratio of 5% each.

The red dragon fruit peel marmalade began by crushing some of the red dragon fruit peel using a blender, then in the cooking process, some pieces of dragon fruit peel and sucrose were added. Red dragon fruit peel marmalade has a ratio of 1 : 30% : 10% for the soft peel : red dragon fruit peel : sucrose.

The sample size was calculated using the WHO formula in pre-clinical research; based on the calculation, we needed 20 samples. This study consisted of 4 groups (n = 5). The stored Wistar rat plasma in this study was grouped into the negative/ not hypercholesterolemic rats and did not receive treatment (P1); hypercholesterolemic group and did not receive treatment (P2); hypercholesterolemic; receiving yogurt 1.8g/kg BW/d (P3); hypercholesterolemic; receiving marmalade 0.94 g/kg BW/d (P4).

The Glucose Oxidase Phenol 4-Aminophenazone (GOD-PAP) was used to measure blood glucose levels. Blood glucose levels was measured at the Laboratory of the Centre for Food and Nutrition Studies, Universitas Gadjah Mada, Yogyakarta.

Statistical analysis used the means  $\pm$  standard deviation (SD) in each group. The data was normally distributed so the differences in body weight and blood glucose levels before and after treatment were determined using the paired t-test. The differences between groups used one-way analysis of variance (ANOVA). The level of significance used was  $p < 0.05$ .

### 3. Results and discussion

Red dragon fruit is known as Red pitaya (*Hylocereus polyrhizus*). Dragon fruit is a group of fruit plants that come from the *Cactacea* family. Red dragon fruit has an attractive shape with a purple-red peel colour with delicate, juicy flesh with black seeds scattered on the flesh. Dragon fruit cultivation is almost spread throughout Asia even though it originally came from the American continent. The popularity of red dragon fruit is increasing because it is believed to have health benefits such as reducing the incidence of dyslipidaemia and hyperglycaemia [10]. Red dragon fruit is not only consumed directly but also through preparations such as drinks, jams and even candy. As the results of processing red dragon fruit flesh, a lot of waste products are produced in the form of red dragon fruit peel. The weight of the peel reaches 22% of the total weight of the red dragon fruit. The soft part of the red dragon fruit peel reaches 92.7% and is composed of total soluble solids, protein, ash, fat and carbohydrate groups. The carbohydrates in this fruit are pectin, glucose, maltose and fructose [11].

The different structures of flavonoids have an effect on their bioavailability and bioactivity. During the digestion process, flavonoids are further metabolized in the ileum and duodenum before ending up in the colon. Flavonoids are fermented by the intestinal microbiota in the colon. The intestinal microbiota plays a role as the metabolic reactor. This metabolic reactor plays a key role in the catabolism of flavonoids that are not absorbed to break them into simple molecules such as phenolics and aromatic acids.

The intake of carbohydrates as an energy-producing substrate greatly influences blood glucose levels. Other influencing factors may include the type of carbohydrates consumed, the amount of fibre consumed, the method of food preparation, and the level of doneness including the distribution of macronutrients in the entire meal portion. Glycaemic index also contributes to an increase in blood glucose levels. The term is useful when comparing blood glucose levels after consuming carbohydrates in certain amount [12]. Consumption of high-fibre foods also provides a general overview about the glycaemic index. The concept will be different when compared to the use of non-caloric sweeteners in the context of a hypocaloric diet. The recommendation for daily sugar intake is less than 50 grams. The American Heart Association even recommends sugar consumption to be  $< 100$  kcal per day for women and  $< 150$  kcal per day for men; and WHO in 2011 provides a clear limit for sugar intake of  $< 10\%$  of the total energy [13].

Our study used two preparations: yogurt and marmalade. Based on Table 1, the group given red dragon fruit peel yogurt (P3) had the lowest weight gain compared to the hypercholesterolemia group (P2) and the group given red dragon fruit peel marmalade (P4). Weight gains in group P2; P3; P4 are  $5.40 \pm 1.14$  grams;  $26.00 \pm 2.94$  grams; and  $32.20 \pm 5.76$  grams, respectively. The protein contained in yogurt will be degraded by proteolytic bacteria when the yogurt enters the digestive system. The whey protein complex in red dragon fruit peel

yogurt is able to provide a feeling of fullness, therefore it may play a role in weight management. Dairy products such as yogurt contain branched-chain amino acids such as leucine, isoleucine and valine) and lysine which increase their biological value when consumed with whole grains and legumes [14].

Table 1 shows that in the group given yogurt and red dragon fruit peel marmalade, the blood glucose levels decreased by  $24.60 \pm 5.77$  mg / dL and  $18.66 \pm 2.23$  mg / dL, respectively. Flavonoid content in red dragon fruit peel yogurt plays an important role in the process of reducing blood glucose levels. Flavonoids can increase insulin secretion by facilitating glucose transport into cells exposed to free radicals. Glucose will be transferred from the blood to the cells by increasing the permeability of the cell membranes to glucose. The glucose that has entered the cells will be used to produce energy while the remaining glucose will be stored in the liver and muscles as glycogen. Glycogen will act as an energy reserve and can slowly lower blood glucose levels [15]. Anthocyanins in red dragon fruit peel yogurt can reduce blood glucose levels by increasing the sensitivity of insulin receptors and improving antioxidant status by suppressing malondialdehyde (MDA) and increasing levels of superoxide dismutase (SOD) and catalase.

Our study is in line with previous study using red dragon fruit peel filtrate by Laxmi that showed a reduction in blood glucose levels. Pancreatic tissue has a body defence system in the form of endogenous antioxidant enzymes, superoxide dismutase (SOD). The enzymes prevent damage to pancreatic beta cells by catalysing superoxide anions into hydrogen peroxide, which later produce water and oxygen. Triterpenoid content in the peel of red dragon fruit is also able to increase insulin secretion that leads to reduction in blood glucose levels. The mechanism of action of triterpenoids in lowering blood glucose levels is through the activation of GLUT-4. GLUT-4 stimulates translocation to the muscle cell membrane through increased protein kinase (AMPK) activity which allows increased uptake and use of glucose by muscles.

Red dragon fruit peel yogurt is a dairy product that undergoes a fermentation process. The fermentation process in yogurt involves lactic acid bacteria that are commonly known as probiotics. Probiotics are live microorganisms that provide health benefits to the host if consumed sufficiently. The probiotic content in red dragon fruit peel yogurt will play a role in the metabolism of bile salts and produce free peptides. Bile acids are the ingredients needed in the process of absorption of cholesterol molecules from the intestinal lumen. Cholesterol has hydrophobic properties so that bile acids will trigger a form of cholesterol micelle which will then be inhibited through deconjugation in the process of cholesterol absorption. This inhibitory process is crucial in managing hypercholesterolemic conditions. The fermentation process involving lactic acid bacteria such as *Lactobacillus bulgaricus* and *Streptococcus thermophilus* will produce short chain fatty acids [15].

Milk fat will undergo biochemical changes during the fermentation process that produces free fatty acids and conjugated linoleic acid (CLA). CLA isomers have a positive effect on hepatic function and glucose metabolism. The isomers also overcome free radicals and are not associated with obesity [14].



**Table 1.** The parameters of experimental rats during the study

Parameters tested	P1 <sup>a</sup> mean±SD	P2 <sup>b</sup> mean±SD	P3 <sup>c</sup> mean±SD	P4 <sup>d</sup> mean±SD
Body weight (g)				
pre	204.40 ±4.67	197.60 ±5.27	199.80 ±4.92	204.00 ±5.43
post	228.60 ±5.41	233.00 ±4.53	225.80 ±7.86	236.20 ±2.17
Δ	24.20 ±1.30 <sup>b,d</sup>	35.40 ±1.14 <sup>a</sup>	26.00 ±2.94 <sup>b</sup>	32.20 ±5.76 <sup>a</sup>
p*	0.001*	0.001	0.001*	0.001*
Glucose (mg/dL)				
pre	60.72 ±1.43	150.04 ±5.10	150.83 ±5.81	159.95 ±3.00
post	60.99 ±1.47	152.70 ±5.29	126.23 ±3.92	141.29 ±1.69
Δ	0.28 ±0.55 <sup>c,d</sup>	2.66 ±1.92 <sup>c,d</sup>	-24.60 ±5.77 <sup>a,b,d</sup>	-18.66 ±2.23 <sup>a,b,c</sup>
p*	0.326*	0.036	0.001*	0.001*

\*Sampling was done 14 days after induction of hypercholesterolemia and 28 days after the start of treatment; mean±SD for observation mode on five rats in each group

P1: Negative group; P2: Hypercholesterolemic group; P3: Hypercholesterolemic, yogurt 1.8 g/kg b.wt./day ; P4: Hypercholesterolemic, marmalade 0.94 g/kg b.wt./day.

Δ: post intervention-pre intervention

p\*; paired t-test, a significant difference (p<0.05); One-Way ANOVA, where significant, post hoc testing (least significant difference) was done for intergroup comparisons.

<sup>a</sup>Statistically significant difference (p<0.05) when compared with P1.

<sup>b</sup>Statistically significant difference (p<0.05) when compared with P2.

<sup>c</sup>Statistically significant difference (p<0.05) when compared with P3.

<sup>d</sup>Statistically significant difference (p<0.05) when compared with P4.

Marmalade is a mixed product in gel-texture composed of water, sugar, fruit peel, fruit puree or fruit juice. The fruits are mainly from the citrus group. For every 1000 grams of the mixture will produce 200 grams of marmalade and 75 grams come from fruit endocarp [16]. The ingredients used in the process of making dragon fruit peel marmalade is sucrose and red dragon fruit peel. The high pectin content in the red dragon fruit peel accounts for the marmalade texture (gel-like, non-flowing and soft). The sucrose added will acts both as a sweeteners and a preservative because it suppresses the growth of pathogenic bacteria and maximises the role of pectin, as well as makes the marmalade sparkly [17].

Our finding is also in line with a study conducted by Putriningtyas [9]. Blood glucose levels decreased after marmalade administration due to the flavonoid. The blood glucose levels will reduce by increasing the permeability of the membrane of pancreatic beta cells that triggers insulin secretion. The flavonoid play this role. Insulin is a hormone that regulates blood glucose levels both during fasting and after eating [18]; therefore, insulin can lower blood glucose levels and has an opposite mechanism of action with glucagon.

#### 4. Conclusion

Red dragon fruit peel yogurt reduces blood glucose levels more than red dragon fruit peel marmalade. The management of diabetes is to achieve regulation of blood glucose. The total amount of carbohydrate especially carbohydrate complex and glycemic response must be considered for diabetic.

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# Improvement of The Competency of Physical Education Teachers at Elementary School in Assessing Student Learning Outcomes in Mijen District, Semarang City

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**Abstract.** The 2013 curriculum emphasizes two important things: 1) scientific approach and 2) authentic assessment. Teachers of physical education, health, and sports at elementary school in Mijen District, Semarang City have difficulties and obstacles in evaluating student learning outcomes with authentic assessments. It is important to improve their competence in assessing student learning outcomes. This is an action research involving 35 teachers. The results of the training showed that from the pre-test data, an average score of 70 was obtained and the post-test results obtained an average score of 85 in the competency of assessing student learning outcomes. There was an increase in competence 15%. Thus, the training and classroom action activities have exceeded 75. With the improvement in the post test results, teachers in Mijen District could apply variations in the assessment of student learning outcomes well in the learning process.

**Keywords:** improvement, competence, assessment, learning outcomes, physical education, health, and sports teacher.

## 1 Introduction

Professional teachers are professions that require expertise in carrying out their duties such as educating, teaching, guiding, training, training and studying students at the primary, and secondary education levels [1]. This happens by the Government Regulation of the Republic of Indonesia Number 19 of 2017 which states that teachers are professional educators with the main task of educating, teaching, guiding, training, training, assessing, and assessing students in early childhood education through formal education, basic education, and secondary education.

Physical education teachers in Elementary school according to Government Regulation Number 19 of 2005 concerning National Education Standards, should have competencies: pedagogical, personal competence, professional competence, and social competence. Pedagogic competence is the ability that teachers have in managing the teaching and learning process from the planning process to the learning outcome evaluation process which consists of teachers' understanding of 1) educational foundations, 2) characteristics of students, 3) curriculum development, 4) lesson plans, 5) implementation of educational learning, 6) utilization of informatics technology, 7) evaluation of learning outcomes, 9) evaluating the

potential of students [1]. Meanwhile, [2] and [3] state that pedagogical competence is the ability of a teacher to manage the learning process, including student understanding, learning design and implementation, evaluation of student learning outcomes, and student development to actualize their potential.

Physical education teachers are human resources in the implementation of the 2013 Curriculum. The human resources used will determine the implementation and success of policies. This is in line with the opinion of Van Meter and Van Horn cited by [4] formulate six variables that influence the implementation process and appearance, namely: (1) standards and objectives; (2) resources, (3) communication between organizations; (4) the characteristics of the implementing agency; (5) social, economic and political conditions; and (6) the disposition of the executor.

In the 2013 Curriculum, the assessment is more assertive and comprehensive than the implementation of the assessment in the 2006 Curriculum. The implementation of the assessment in the 2013 Curriculum explicitly asks that teachers in schools be balanced in conducting assessments in three domains, namely cognitive, affective and psychomotor following the objectives to be measured. The emphasis on a comprehensive assessment of the three aspects provides a big change compared to the previous curriculum. Assessment has a big role in determining the success of education. A good assessment has an impact on the learning process [5] and becomes a reference for further policies [6]. The appropriateness of selecting the assessment method will greatly affect the objectivity and validity of the assessment results, which in the end is objective and valid information on the quality of education. Conversely, errors in choosing and applying assessment methods also result in invalid information regarding learning outcomes and education. Assessment in the 2013 Curriculum is considered to have more complexity than the assessment system in the previous curriculum. Although the government has prepared teachers through various training, there are still many complaints that have arisen in the field regarding assessments. The most complex in learning is the integration of learning from various domains, namely cognitive, behavior, and feelings [7].

One of the aspects that hindered the implementation of the 2013 curriculum was the complex assessment system that took a long time to compile reports. The assessment technique for the achievement of knowledge and skills is relatively not an obstacle. What is completely new is the attitude assessment, in which the majority of teachers complain about being difficult [8]. She states that one of the biggest obstacles in assessment is attitude assessment. The teacher's insight in choosing the right method and developing the assessment instrument is still lacking. Given the importance of the implementation of a good assessment in supporting the implementation of the curriculum, there is a need for a study on how to implement the assessment in the 2013 Curriculum in the field.

Assessment is an important aspect of the educational process. Assessment is a step to collect various information used for determining learning process policies [9], [10] on either a class scale or a national scale. Mardapi argues that assessment is an aspect of determining the quality of education. He suggests that the assessment should include a process of tracing, checking, searching, and concluding [6]. According to Permendiknas No. 20 of 2007, for the assessment process to run well, the assessment must be valid, objective, fair, integrated, open, comprehensive and continuous, systematic, based on criteria, and accountable. The assessment domains in the 2013 Curriculum include spiritual domains, social attitudes, knowledge, and skills. More generally, it can be categorized into three domains, namely cognitive (knowledge), affective (social and spiritual attitudes), and psychomotor (skills).

The assessment techniques used in the learning process are (1) assessment of attitude competence through observation, self-assessment, peer assessment, and journals; (2) knowledge competency assessment through written tests, oral tests, and mastery; (3) skills competency assessment through practical tests, projects, and portfolios. The use of assessment techniques is tailored to the needs that can support the teaching program such as the basic competencies to be achieved. Careful planning, such as making instrument lattices, is expected to provide accurate information about student competencies that need to be measured, encourage students to learn to be more active in increasing their competition, motivate teaching staff to improve student competence, improve institutional performance and improve quality. education. In other words, assessment can be used to encourage improvement in the quality of learning, following what is mandated in Law Number 20 of 2003 concerning the National Education System.

Therefore, the evaluation of the implementation of educational assessments is an integral part of the Education of Standards Assessment. These minimum standards could always be improved from time to time to keep up with developments in science and technology. The implementation of the 2013 Curriculum calls for the competence of teachers in all aspects of learning, especially the competence of Physical Education teachers in assessing student learning outcomes. Almost all of the Physical Education teachers in elementary schools in Mijen District experience problems or obstacles in authentic assessment. The assessment of student learning outcomes which includes affective, cognitive, and psychomotor aspects in physical education lessons is considered by the teacher to be too complicated, making it confusing, as well as the difficulty of teachers in making assessment rubrics and processing data on assessment results for student learning outcomes reports. The problem is "How can physical education teachers in elementary schools have the understanding and skills in assessing student learning outcomes?". Thus, this Community Service focuses on training to improve the competence of physical education teachers in assessing student learning outcomes in Mijen District, Semarang City. Thus, this Community Service focuses on training to improve the competence of physical education teachers in assessing student learning outcomes in Mijen District, Semarang City.

## **2 Method**

This training was an effort to improve the competence of elementary school Physical Education teachers in Mijen District, Semarang City, attended by 35 teachers. The material provided includes: 1) Definition of evaluation, tests and assessments in Physical Education, 2) Various kinds of evaluation of learning outcomes in Physical Education, 2) Assessment of alternatives in Physical Education, 3) Types/forms of tests on cognitive, affective and psychomotor aspects of tests, 4) Techniques in making assessment rubrics for the cognitive, affective and psychomotor domains. The material is presented in the form of speeches, discussions, questions, and answers, and exercises for 16 hours of meeting over 3 days. The implementation of the service program is carried out using action research steps consisting of 4 (four) stages, namely: planning, action, observation and evaluation, and reflection. Action in training is carried out with training and mentoring. The data analysis for the success of the training was carried out by comparing the data from the pre-test and post-test results, with the percentage technique, supported by qualitative data from the results of observation (observation) and evaluation.

### 3 Results and Discussion

Competency improvement training activities for primary school physical education teachers in the assessment of student learning outcomes in Mijen District can show the suitability between the results and objectives of Community Service, namely Physical Education teachers in Mijen District have increased their ability (competence) in the assessment of student learning outcomes. This can be seen from the pre-test and post-test data, in the pre-test the average competency of physical teachers was 70% and after training/service had increased to 85%, there was an increase of 15%.

**Table 1.** Data on pre-test and post-test results

<b>NO</b>	<b>Calculation</b>	<b>Score</b>	<b>percentage</b>
<b>1</b>	Pre-tes	70	70 %
<b>2</b>	Post-tes	85	85 %
	Enhancement	15	15 %

This improvement is mainly in understanding the meaning of evaluation, testing, and assessment of student learning outcomes; Alternative assessment in student learning outcomes, Physical education teacher mastery in assessment techniques on cognitive, affective, psychomotor, and physical fitness aspects of students in learning, and being able to make assessment rubrics with the correct technique.

The success of this community service activity based on observation and evaluation is caused by several things as follows: 1) Physical education teachers of the elementary school in Mijen Subdistrict seriously participate in training activities, proactively in training even though during the Covid-19 Pandemic period they were still present by implementing health protocols, this can be seen in the attendance and photos of activities (attached ), teacher activities in responding to the delivery of material by the resource person; 2) This service activity is seriously monitored by the Mijen District Unit of National Education by sending the head of a working group consisting of the Principal of the SD school, to watch over the activities of the teacher in community service activities. 3) Dedication to Increase the Competence of Physical Education Teachers of Elementary School in Assessment of Learning Outcomes This student is carried out by a lecturer from the Health and Recreation Physical Education Study Program, the Faculty of Sport Sciences, Semarang State University, who has experience in evaluating, testing and assessing student learning outcomes, as well as teaching Physical Education Learning Strategies and Evaluation, Tests and Measurement of Physical Education Learning. Sports and Health. The material facilitator also delivered workshop materials for the Professional Improvement of Physical Education, Sport, Health and Recreation Study Programs both pre-service and in-service, especially in Central Java; 4) The participants of this service activity receive good guidance and assistance from the material coaches during the exercise. And the participants also received certificates that were useful for teachers in credit points for promotion, thereby increasing teacher motivation in participating in this activity.

Although this Community Service has increased the competence of elementary school physical education teachers, its competence in assessing student learning outcomes, however, there are still weaknesses or deficiencies that need to be corrected in future activities, these

deficiencies include: 1) The participants felt that the implementation time was only 3 days with a total of 16 hours, so it needs to be added to the upcoming implementation. guidance in assessing student learning outcomes with more complete assessment examples.

#### 4 Conclusion

Community service/training activities "Improvement of The Competency of Physical Education Teachers at Elementary School in Assessing Student Learning Outcomes in Mijen District" provide benefits to Physical Education Teachers, namely by increasing the ability of Physical Education teachers in assessing student learning outcomes. Besides, Physical Education teachers become more active and enthusiastic in the assessment process in learning. Training to improve competency in assessing student learning outcomes provides various assessment techniques for Physical Education teachers about the forms/techniques of assessing student learning outcomes. Through this service activity, it is hoped that it can become a reference for Physical Education teachers in the implementation of further assessment techniques.

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# Development of Learning Media Android-Based for Physical Education with the Topic of Illicit Drugs in Facing the New Normal Era

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**Abstract.** Teaching material about drugs, data showed that student score were lower. Passive students in the learning process tend to exhibit idleness in school duties and reluctant to pay much attention to learning. There is a plethora of factors that plague the ineffective of material delivery to the beneficial. The lack of supporting media in teaching, the disparity in teaching material in schools, inequality in the distribution of facilities, scarcity of professional teachers. The present study wants to intervene and help the learning process to overcome such shortcomings by introducing a certain learning application known as Smart Application Creator 3 (SAC 3). Based on the validation results, construct validation by material experts is 75%, content validation by material experts is 79.41%, validation by media experts is 90.63%. This media is stated to be very interesting, seen from the results of the trial questionnaire, it is found that a percentage of 81.11%.

**Keywords:** Android, learning media, smart application creator 3, drugs.

## 1 Introduction

Online learning in the new normal era of the COVID-19 pandemic especially in physical education has changed drastically and has a different learning environment than the previous learning approach as conventional learning [1]. For instance, before the inception of the pandemic in the year 2020 and previously, in physical education, learning allowed for direct and face-to-face communication/interaction and also facilitate the freedom to learn individually or in groups [2]. Online learning is a new trending learning approach performed at a distance/virtual environment using technology together with an internet connection [3]. One of the technologies mostly used is the integration of Android devices. According to the online Cambridge dictionary, android is an operating system (= a set of control programs) used mainly for mobile devices (= phones and small computers) that uses control by touching the screen. The success of the android devices is inseparable from their open-source nature, that is, can provide free software source code so that developers can develop, distribute, and duplicate it without having to pay for any license [4]. Additionally, Android has provided both paid and free apps by Android developers to make it easier for users [5]. Then, together with the rapid pace of development of science and technology, it is believed that every human being specifically students to be able to react quickly and consciously to all these developments and to keep up with them. This technological development had a positive

impact on the achievement and implementation of learning during the contemporary COVID-19 pandemic [6].

Based on the results of the needs analysis yielded from a survey carried out on 25 physical education instructors in Belitung, seems like these individuals already have an operating Android smartphone. However, some of them lack skills in how to incorporate and use them optimally in education. As result, the learning with the conventional system applied in physical education in terms of immersing and use of learning media is still ineffective [7]. To this end, it can be developed again in the wake of making the learning more variant and dynamic and subsequently learner can learn independently.

Based on the researcher's experience while teaching at SMA Negeri 1 Gantung as a permanent teacher in the lesson of physical education on Narkoba (narkotika, psikotropika, dan obat terlarang) or teaching material about illegal drugs, the researcher came to realized that in such lesson, data showed that student scores were lower. To that said, teaching-learning needs to be improved for the sake of all of us. Despite unsatisfied achievement in the lesson, the lack of interest and motivation to actively engage in taking physical education learning material on drugs was reported [8]. According to [9], motivation is acting to do something. Those who want to participate vigorously and actively are called motivated, conversely, they described those who do not have a motive or inspiration to take any action as amotivated learners [10]. Passive students in the learning process tend to exhibit idleness in school duties and reluctant to pay much attention to learning [11]. As for drawbacks, this has negative impacts on students learning outcomes in general and in illegal drug material in particular. Such paucity in learning motivation is merely due to the ineffectiveness of teachers' delivery material approach since it is limited to dealing with the student worksheet. Meaning that intervention in form of variation in the learning system is of paramount importance. The integration of illegal drug material is a salient asset for students' knowledge acquisition as fortifying themselves from illegal drugs effects on their life and the. There are a plethora of factors that plague the ineffective of material delivery to the beneficial, some of which among others is the lack of supporting media in teaching, the disparity in teaching material in schools, inequality in the distribution of facilities, scarcity of professional teachers, and so forth [12]. In tandem, we notice here that, the presence of these factors latterly highlighted in schools largely contributes to attracting student's attention since the material about illegal drugs is taught in a broad scope. Understanding a certain theory for both these teachers and students is manifestly from consulting textbooks and mostly is not easy to relate or marry up students' needs [13].

The present study wants to intervene and help the learning process to overcome such shortcomings by introducing a certain learning application known as Smart Application Creator 3 (SAC 3). The type of research is a profile of innovation as teaching media in physical education attributed to the topic of illegal drugs in schools. As a reminder, for grade ten (X) high school students, especially in physical education, the content of this material has been designed and available in the curriculum [14]. The SAC 3 application has several advantages over other applications, including; 1) it can be installed or created without advanced programming knowledge, 2) can be utilized to export project html5, 3) display or interface is easy to understand, and 4) does not require a big size of RAM (Random Access Memory) [15] Apart from the advantages of SAC 3 audited above, the SAC 3 apps are also very easy to use especially for active teachers. By using this application, the teacher would be able to be creative effectively in making more innovative learning media. Based on these strengths, the researcher was interested in introducing and developing learning media using SAC 3 application.

Nowadays, students are getting learning resources from the projector screen, teacher explanations/material clarification, and synthesizing learning lessons in personal notes [16]. As a result, the level of student intuition in carrying out learning activities independently, maximize understanding and develop themselves the material administrated/received. In daily teaching occurrences, students are seen as passive and have a low interest in reading [17]. For this intervention or solutions are needed to overcome these problems. The development of Android-based application media is a solution to help students and teachers in learning activities that have the aim of improving students' abilities in understanding material, increasing activity in the classroom, and increasing reading interest [18]. With the SAC 3 android based application media, students are expected to be able to carry out learning activities independently with or without the presence of the teacher. Learning is expected to be easier and smoother without taking the teacher's time to explain the material.

In addition to providing learning about illegal drugs in school programs, the SAC 3 media that will be developed are also expected to be able to provide effective learning and as a useful tool for opening a little insight in developing meaningful learning media for teachers. The efficacy and portability of Android devices would be more practical to be used anywhere and anytime and save money indeed, then it can make life learning easier for students to engage actively in learning.

## 2 Method

The method used in this research is known as the Research and Development or (R&D) model. The development model in designing and making this Android-based for physical education learning media uses the ADDIE development model. By definition, the ADDIE model is an acronym for Analysis, Design, Development, Implementation, and Evaluation [19]. The research was conducted for 6 months starting from July 28 to December 20, 2020, which was conducted at public and private high schools throughout the island of Belitung, in Indonesia. The research subjects were Physical Education teachers along with selected students on the same Island. While the subject of field trials was carried out on high state school students of ten grade at Gantung school.

Shortly, for the ADDIE model, this approach is an abbreviation that stands for Analyze, Design, Develop, Implement and Evaluate. During the analysis stage, it consists of consulting and analyzing the content of the subject matter, analyzing student characteristics, without forgetting analyzing teaching supporting media. Also, the second state is known as design; meaning that making a research design is mandatory. The design stage consists of the learning achievement and media development strategy. The next stage after the research design is the development stage. Development in the ADDIE model is a process of realizing a design that has been designed into a real one. That said, during this process, everything needed or anything that can support the new product preparation process should be scrutinized and elucidated as a whole. In short, the development state consists of both the development process and the results [20]. As the implementation is concerned, is the stage for implementing the system or the program being developed. Normally, at this stage, the product being developed should undergo the tried-out process of the field, validate by material experts, media experts as well as teachers and students. The last stage in the ADDIE model in research and development is the evaluation. Broadly, evaluation is a process to determine whether the product that has been suggested and designed meets the eligibility standard requirements

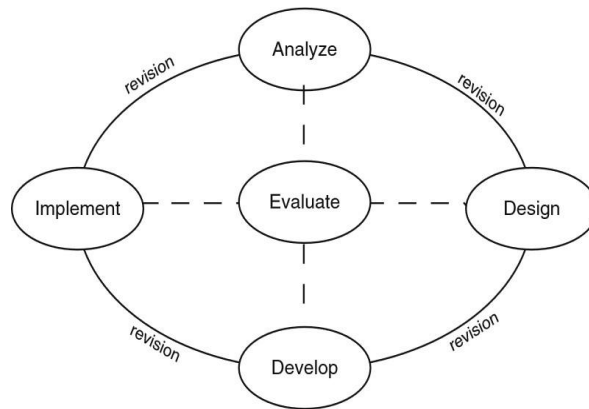
before being used/applied. The evaluation stage consists of data collection, media improvement, and finished products.

In this study, the trial design was carried out in 4 stages only, namely the material expert to determine the construct and content validation. Furthermore, the media expert to find out the feasibility level of the media then tested on respondents as many as 25 sports teachers from East Belitung in the wake of determining the level of face validity. Research subjects in this research and development study are high school sports teachers in the province of Bangka Belitung along with their students. While the objective of this research and development is learning media with application-based SAC 3 for Physical Education subjects with the topic of illegal drugs.

The type of product trial data used in the research and development of learning media based on Android applications for the topic of Narcotics is quantitative data. Quantitative data were obtained from distributing questionnaires to expert judges, a trial test administered to students as the research respondents. The data harvested will then be processed and used as a basis for assessing the feasibility of the application product being developed. The instruments used in data collection in this research and development was in form of a questionnaire on the topic of illegal drugs as one of school learning material for high school student. The purpose of using this questionnaire is to obtain quantitative data for the perfection and feasibility of the resulting application program. Data collection was carried out at the product trial stage. The type of questionnaire used in this study was a semi-closed questionnaire using a Likert scale [21].

For data analysis, the descriptive method was employed. This method of descriptive especially in the statistic is an analysis used to test quantitative variables thorough description of what is obtained from the field [22]. The descriptive method is a method in examining the status of a group of people, an object, a context, a system of thought, or a group of events in the present. The purpose of this descriptive study is to describe or describe systematically, factually, and accurately the facts, properties, and relationships between the phenomena being investigated. According to [23], descriptive analysis of data is descriptively used to describe the data that has been collected as is and is not used to retrieve statistics. Data processing techniques using Likert scale measurement.

Stevany Kii Londong et al., (2019) explained that the Likert scale is mostly used to measure the attitude, opinion, perceptions of individuals about a specific social phenomenon. This type of scale is believed to provide alternative answers to social instruments with gradations from very positive to very negative. The consideration of choosing this scale is because it makes it easier for respondents to choose answers. The answer criteria were administered to respondents using the Likert scale model. The research subjects were then asked to use entirely the application program and directly in class. Respondents are required to provide/choose one of the options from the alternative answers provided.



**Fig. 1.** ADDIE cycle model  
Source: [25] & Mulyatiningsih (2011)

### 3 Result and Discussion

The development result is presented in form of a short discussion of the results that have been carried out by the researcher based on the data and facts that have been obtained. This section compiles the results of needs analysis, design, development, expert validation results, implementation results, and evaluation results.

#### 3.1 Result of need analysis

The needs analysis was executed in order to find out whether the development of instructional media on the topic of illicit drugs was needed to support the learning process. After addressing all data at this stage, there are three results are obtained as results from analysis of drug topic subjects, results of analysis of student characteristics, and then results of analysis of supporting media (software and hardware). The results of the analysis of sports subjects on the topic of drugs were obtained based on the 2013 curriculum in the syllabus of Physical Education subjects including 1) Identifying types of drugs, 2) Analyzing the dangers of drugs and psychotropic use against oneself, family, and the community in general. 3) Presenting the results of the identification of the dangers of drug use.

The characteristic analysis stage is the initial stage to determine whether the development of instructional media for sports subjects on the topic of drugs is necessary. The needs analysis was carried out on 25 sports teachers at Belitung. The results of the needs analysis obtained by researchers include: 1) In point 1 about the ownership of an android smartphone for each individual. It can be seen from 25 respondents who chose yes with a percentage of 100%. This means that all respondents have an android smartphone. 2) In point 2 regarding the use of a laptop or Android smartphone for the maximum benefit of education. It can be seen that 18 out of 25 respondents chose yes with a percentage of 85% and 4 out of 25 respondents chose no with a percentage of 15%. This means that teachers have used laptops and Android smartphones for the maximum benefit of education. 3) In point 3 about the difficulties in delivering sports learning material on drug topics, it can be seen that 12 out of 25 respondents

chose yes with a percentage of 50%, and 13 out of 25 respondents chose no with a percentage of 50%. This means that some of the teachers still have difficulty delivering lessons on the topic of drugs. 4) In point 4 about the presence of media in the same topic, it can be seen that 2 out of 25 respondents chose yes with a percentage of 10%, and 20 out of 25 respondents chose no with a percentage of 90%. This means that in teaching lessons on the topic of drugs there is still no learning media with the SAC 3 application. 5) In point 5 about the effect of using learning media with the SAC 3 application during the teaching process, seems like 18 out of 25 respondents chose yes with a percentage of 85%, and the 4 remaining individuals chose no with a percentage of 15%. This means that the provision of learning with the SAC 3 application media on drug topics has a significant effect on learning. 6) In point 6 about the respondent's feelings if there is learning media in learning sports on the topic of drugs, it has been found that from 20 respondents all chose yes with a percentage of 100%. This means that all respondents will be happy if there is an Android application-based learning media with SAC 3 on the topic of drugs. 7) In point 7 about the appropriateness of using android applications as a learning medium in sports subjects with the topic of drugs, seems that 24 out of 25 respondents chose yes with a percentage of 96% and 1 in 25 respondents chose no with a percentage of 4%. This means that most respondents agree with the use of android applications as sports learning medium on the topic of drugs. 8) In point 8 about the experience of using similar learning media in learning activities, results showed that 6 out of 25 respondents chose yes with a percentage of 25%, and 19 out of 25 respondents chose no with a percentage of 74%. This means that most teachers seldom used similar learning media in learning activities. 9) In point 9 regarding the use of learning media based on Android applications, it is appropriate for use in Physical Education learning on the topic of Drugs. It is viewed that 18 out of 25 respondents chose yes with a percentage of 90% and 2 out of 25 respondents chose no with a percentage of 10%. This means that the Android application-based learning media is suitable for use in Physical Education learning on the topic of Narcotics.

### **3.2 The result on design stage**

Based on the ADDIE development model procedure used by the researcher, there is a design process that aims to determine the initial design of a product that is being developed. The development of learning media based on Android applications includes learning outcomes and development strategies. Learning outcomes contain the competencies that exist in each learning activity and the results of this development strategy are in the form of storyboards which will be used as a guide in the process of making the learning media application.

### **3.3 The result on development stage**

After carrying out the design stages by making learning media to determine the storyboard, the next step was the process of making the learning media application and an android application-based learning media that would be produced on the topic of illegal drugs. In development activities, there was a process in development and the results of this development. The development process includes the preparation of learning material on illegal drugs and Smart Apps Creator 3 software, the implementation of the media creation process according to the design previously made, and the product editing process, namely the process of adding or updating what is needed. For example, the material, display, or other components in the module application, while the results of media development are in the form of the main

menu display consisting of several buttons such as 1) Guide, containing instructions for using SAC 3 based on Android applications by teachers and students. 2) Competence, contains core competencies, basic competencies, indicators of competency achievement, and learning objectives. 3) The material consists of several menus, namely concept maps, dangers of drug abuse, psychiatric hazards, dangers to the community environment, tips on avoiding abuse, and a summary. 4) Practice questions/quizzes, assessments, answer keys. 5) Reference and reference list. 6) Profile, containing the identity of the developer and supervisor who has helped in the process of developing an android application-based module on the topic of illegal drugs. 7) Exit the application interface using the back button that is already available on the respective android.

### 3.4 Content validation by experts

Content validation through expert judgment is defined by [26] [27] as an informed opinion from individuals with a track record in the field who are regarded by others as qualified experts and who can provide information, evidence, judgments, and assessments. Thus, validation of printed modules by material experts, there are two validations carried out by material experts, namely validation of the content or module content and constructs validation. The variables which are aspects of the observation regarding the print module can be presented in table 1 and table 2 below.

**Table 1.** Result of instrument construct validation or Media Arrangements for SAC 3 application

No	Aspects to score	Percentage (%)	Classification
1	Instruction for using the proposed media.	75	Enough
2	Concept map of learning.	75	Enough
3	The student competency to achieve.	100	Valid
4	Systematic consistency of material in the learning activity.	100	Valid
5	Serving material using media	75	Enough
6	Summary	100	Valid
7	Student worksheet at the end of learning activity	75	Enough
8	Key answers/keywords for student's worksheet	100	Valid
9	Introduction	75	Enough
10	Referencing/References	75	Enough
	Mean score	75	Enough

Based on table 1 depicted above here regarding the product feasibility level, it has been found that the average percentage of all aspects obtained from construct validation by material experts was equal to 75%. With these data, it said that the description of the new product fulfills the eligibility level criteria, but revisions need to be made according to the advice of material experts.

**Table 2.** Results of instruments Content Validation or Media Contents for SAC 3 application

No	Aspects to score	Percentage (%)	Classification
1	The completeness of the material.	100	Valid
2	Material extension.	100	Valid
3	Depth of material	75	Enough
4	Consistency/accuracy of concept and definition.	75	Enough
5	Data and fact accuracy	75	Enough
6	Relevance of examples and cases	75	Enough
7	Relevance of image/figures, diagram, and illustration.	75	Enough
8	Terms Accuracy.	50	Less
9	Nurturing curiosity in learners	75	Enough
10	Creating an opportunity to generate questions	75	Enough
11	The accuracy of the sentence structure	100	Valid
12	The effectiveness of the sentence	75	Enough
13	The stickiness of the term/concept.	75	Enough
14	Understanding of messages and information.	75	Enough
15	The ability to motivate students	75	Enough
16	Grammatical accuracy.	75	Enough
17	Spelling accuracy	100	Valid
Cumulative mean		79,41	Valid

From the results depicted in table 2 regarding the product feasibility level, it was found that the average percentage of all aspects obtained from content validation by material experts is 79.41%, declared feasible on the description of the product eligibility level criteria, but revisions need to be made according to the advice of material experts.

### 3.5 Media expert validation results

Validation of the module application by media experts, the variables that become aspects of observations about the quality of learning media can be presented in table 3 below.

**Table 3.** Media Expert Validation Results

No	Aspects to score	Percentage (%)	Classification
<b>Introduction</b>			
1	The clarity of the new application.	100	Valid
2	Easiness of application title in providing an overview of the media.	100	Valid
3	Clarity of operation guide	100	Valid
4	Easy operation guide	100	Valid
<b>User control</b>			
5	Control sequence accuracy	100	Valid
6	Navigation button layout consistency	100	Valid
7	Ease of use of buttons.	75	Enough
<b>Application interface</b>			
8	Consistency of layout proportions (text and image layout)	100	Valid



9	The colors used on the layer page are comfortable to see.	75	Enough
10	The accuracy of the background selection	100	Valid
11	The colors used on the background page are comfortable to see	100	Valid
12	The accuracy of the background selection	100	Valid
13	The menu is easy to understand	100	Valid
14	Sound/audio quality	100	Valid
15	Video display quality	75	Enough
16	Ease of use of terms.	100	Valid
	<b>Application Help</b>		
17	Detailed and complete instructions for use	100	Valid
18	Easy access to assistance	75	Enough
20	Clarity of application instructions	100	Valid
	<b>Multimedia design principles</b>		
21	Presentation of material using more than one media	100	Valid
22	Presentation of material using words and pictures/videos is not separate	100	Valid
23	Presentation of material using video/animation and interesting narrative	75	Enough
	<b>Cumulative mean</b>	<b>90.63</b>	<b>Valid</b>

Based on table 4 about the product feasibility level, it was found that the cumulative means of all aspects obtained from media experts is 90.63%, which is stated to be very feasible in the description of the product eligibility level criteria.

### 3.6 Respondents' trial results (attractiveness)

In the trial phase, the module application was carried out to 25 sports teachers. The variables that become aspects of observations about the quality of learning media are recapped in table 4 below.

**Table 2.** Results of instruments Content Validation or Media Contents for SAC 3 application

No	Aspect to measure	Percentage (%)	Classification
1	I am happy to use this new application.	80	Strongly agree
2	This new media I use is unattractive.	29,17	Strongly disagree
3	The material presented in this new media is easy to understand.	78,33	Strongly agree
4	The size and shape of the letters on this new media can be read clearly.	46,67	Disagree
5	The image on this new media is interesting.	77,5	Strongly agree
6	I understand this medium easily.	83,33	Strongly agree
7	I find it helpful to study independently.	85	Strongly agree
8	I am interested in understanding this learning media.	79,17	Strongly agree
9	I find it more difficult to understand the material if using this learning application.	44,17	Disagree
10	I feel that learning objectives can be achieved more quickly using media.	83,33	Strongly agree
11	I am happy to learn drugs using this medium.	85,83	Strongly agree

12	My attention was increased when studying the topic of drugs using the media	90,83	Strongly agree
Cumulative mean score		81.11	Strongly agree

Based on table 5 of the Likert scale criteria, it is found that the average percentage of all aspects obtained from the attraction test by a large group (25 sports teachers) is 81.11%, which is stated to be very attractive so that the print module and android application-based module can be used as a learning medium independently.

### 3.6 Discussion

The SAC 3 application has several advantages over other applications, including; 1) it can be installed or created without advanced programming knowledge, 2) can be utilized to export project html5, 3) display or interface is easy to understand, and 4) does not require a big size of RAM (Random Access Memory) [15] Apart from the advantages of SAC 3 audited above, the SAC 3 apps are also very easy to use especially for active teachers. By using this application, the teacher would be able to be creative effectively in making more innovative learning media. Based on these strengths, the researcher was interested in introducing and developing learning media using SAC 3 application. The following are some suggestions that can be used to optimize the use of this learning media: 1) The material contained in the SAC 3 application media can be used as a reference in physical education learning. 2) Using an android smartphone device with an operating system of at least version 4.4 (KitKat) and above so that the SAC 3 application media can be operated smoothly. 3) At the onset of using this learning media, users are expected to read and understand the instructions for use in the "Guide" menu that has been provided. 4) Users are further expected to read books or other related learning references to increase their knowledge of the material being studied. 5) Further development of the next product is expected not only to be used offline but can be developed with an online system so that developers can update features and materials directly and users can make updates related to these features and materials.

## 3 Conclusion

Android application-based modules on sports subjects specifically on the topic of illegal drugs in high schools are practical media for teachers to use in class teaching. This new media combines different elements that make up the media, namely text, and images. The display of the SAC 3 application media application product which has become the final product of development consists of a cover page, the main menu page, a guide page for teachers and students about using the application, a learning activity page consisting of chapters, a page of chapters consisting of material, practice questions, assessments, answer keys and reference lists, information pages that contain personal data from developers and media advisors of SAC 3 application. Based on the objectives of research and development of modules based on Android applications for Physical Education subjects in drug topic for class X high school students, the following conclusions can be drawn: 1) The SAC 3 application that has been developed using the ADDIE development model (analysis, design, development, implementation, evaluation). 2) The SAC 3 application media developed has been carried out by construct validation by material experts. Based on the validation results, a percentage of

75% is obtained which has a fairly valid classification and is declared feasible by revision. 3) The developed has validated the content by material experts. Based on the results of the validation, it was obtained a percentage of 79.41% which had a fairly valid classification and was declared feasible by revision. 4) The media for the SAC 3 application developed has been validated by media experts. Based on the validation results obtained a percentage of 90.63% which has a valid classification and is declared fit for use. 5) The validated and revised SAC 3 application media were tested on 25 sports teachers from around the world. this new media application known as SAC 3 is stated to be very interesting seen from the attractiveness of the teacher's desire to use the application. 6) The attractiveness of the SAC 3 application media can be seen from the results of the trial questionnaire filled out by the teacher. The SAC 3 application media is stated to be very interesting, seen from the results of the trial questionnaire, it is found that a percentage of 81.11% has a very agreeable classification. Based on these results, the product is suitable for use as a medium to support the learning process and independent learning in the subject of Physical Education on the topic of illegal drugs in grade ten in high schools.

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# Digital Literacy of Doctoral Program Student in Sports Education, Semarang State University

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**Abstract.** E-learning in new normal era is a product of transformation from conventional to digital-based learning. Students' digital literacy will affect the success of achievement in learning system. The purpose of this research is to identify students' digital literacy in order to support the implementation of e-learning in Sports Education Doctoral Program at Semarang State University. The method used is descriptive with a quantitative approach. 56 pupils as subjects of the study, likewise sampling quota applied as the sampling technique. The data analysis used is descriptive analysis. The results shows that students mastery on various e-learning system platforms was in the "Medium" category, mastery of various social media as part of the "High" category of e-learning, mastery of video conference applications in the "Medium" category, and mastery of the supporting media for making assignment is "High" category either.

**Keywords:** digital literacy, e-learning, new normal era

## 1 Introduction

The new normal is a scenario to accelerate the handling of the COVID-19 pandemic in the health and socio-economic aspects of the community. The term new normal focuses more on cultural changes in the community to be accustomed to having a healthy lifestyle according to health protocols. Habits such as frequent hand washing with soap and running water, wearing masks when traveling, avoiding crowds, and also maintaining physical distance when interacting with other people (physical distancing).

The application of social distancing and physical distancing requires that the teaching and learning process cannot face each other or meet in the classroom. The effectiveness of this social distancing policy will be realized if the lecture process is carried out with a long-distance lecture system and uses an online platform [1]. This policy is implemented globally so that all educational activities are transformed using digital media with an online system. Online lectures with the full application of e-learning are options that must be taken in the midst of the current situation.

The readiness of various students is the focus of attention both from student resources and access to computers and where they are or where the students are located. The quality of learning success using the e-learning method has been carried out by several studies. Among these successes are the communication factor between lecturers and students, as well as feedback from lecturers [2]. The readiness of students in online learning can be assessed from aspects,

namely equipment capability, technology skills, independent learning, motivation, and perceived usefulness. The capability of the device is related to online learning readiness in terms of facilities, particularly computer equipment and internet access. Technology skills are related to the ability of students to access and use technology, particularly information and communication technology [3].

The e-learning system is a form of learning implementation using the internet in the form of various multimedia content and application platforms and social media. E-learning is a transformation from conventional learning to digital-based. Student resources in implementing e-learning greatly influence the success of achievement. Mastery and the use of technology to interact and communicate is a must to support the e-learning process.

The latest technology offers various kinds of digital media that can be used in communicating and socializing. Digital media now facilitates communication and virtual interactions as an alternative to face-to-face learning. Interaction in digital media requires not only technical skills to access technology but also content understanding, active and interactive functions in generating messages. Many digital media, both socialization media, interaction, communication and mass conferences can be accessed and downloaded for free and easy to use.

Digital literacy is a person's ability to use various digital media. Literally, digital literacy can be defined by deriving the definition of the words 'literacy' and 'digital'. Literacy is defined as the ability to read and write, while digital can be interpreted as a format for writing and reading on a computer. When assembled, digital literacy can be interpreted as the ability to operate a computer to read and write in a digital format [4]. Digital literacy is a basic need for people to live effectively and efficiently in the 21st century era [5]. The development of the digital world is used to improve the ability to find, use, summarize, evaluate, create and communicate information. In its development, digital literacy is the interest, attitude and ability of individuals to use digital technology and communication tools to access, manage, integrate, analyze and evaluate information, build new knowledge, create and communicate with others in order to participate effectively in society. Digital literacy activities have been synonymous with a person's ability to use and understand the use of information and communication technology, for example, in supporting the world of education and the economy [6].

High digital literacy skills can make it easier for students to follow every lecture process from preparation to evaluation. For example, the ability to connect hardware devices to the internet network and install various software for online lectures. Digital literacy is very supportive of student skills in the lecture process and in completing college assignments. In the lecture process, students must be able to use various platforms and applications according to those used by each lecturer. In addition, in completing assignments, students must also be skilled in utilizing all-digital tools to independently find learning resources and other information apart from those provided by the lecturer.

Mastery of the e-learning system platform is one of the supporting factors for the success of the online learning process and achievement. The platforms that are currently widely used in the delivery of material and lectures include Google Form, Google Class, Moodle, Edmodo and so on. The platform used is one that provides practical features, is easy, does not cost money to use. The completeness of the application menu is also a consideration for choosing an online learning platform. Many institutions that already have an online lecture portal which is specially designed for the benefit of the campus. Like Semarang State University, it has an online learning portal, namely Elena. Distribution of materials, submission of assignments and evaluation can be done on the portal.

Social media, which is generally the main alternative in communication in delivering lecture schedules, includes Whatsapp, Twitter, Instagram, Facebook, Telegram and so on. This

social media is a communication bridge and indirect interaction between students and lecturers and education staff. Communication can be done personally between individuals and in groups in groups.

The video conference application used in the material delivery process is very important to master as a substitute for face-to-face learning. Lectures will virtually present interaction and communication between one student and another student and student and lecturer. Here the role of students as individuals and groups can be created in various learning models so that feedback, discussion and questions and answers emerge in the forum. This is done so that students do not get bored of following lectures in front of a laptop. Some of the video conference platforms that are often used are Zoom meeting, Jitsi, Google Meet, Teams, Cisco Webex and others. Ease and practicality as well as complete features are considered in choosing the conference video platform.

Supporting media for online assignments is no less important in order to support the achievement of learning outcomes. Student skills in finding information and assignment references, then processing and presenting assignments and collecting are a series that require mastery of digital media. Some of the supporting media for online assignments are email, scanner, file converter, file compressor, video/picture editor and so on. The editing process is carried out as part of the lecturers' efforts to make students think creatively and innovatively.

## **2 Methods**

This research is a quantitative descriptive study, namely analyzing, describing, and summarizing various conditions, situations from various data collected using a Likert scale. The population in this study were students of the Semarang State University Sports Education Doctoral Program class of 2017-2020. The sampling technique was quota sampling, namely 56 students with an error tolerance of 10% based on determining the minimum sample size in the Isaac & Michael table. The instrument used in this study was a packaged questionnaire using a Google form with several question indicators. Researchers ask closed questions with a response that has been determined by the researcher to avoid widespread data results. After the data collection is complete, it is followed by data reduction. The data are analyzed statistically to show trends in the responses given by the target sample to the phenomena being discussed. The instrument has been consulted with digital media expert validators and has been tested on a small scale to obtain the validity and reliability of the instrument. In this study, the data analysis technique in this study is descriptive analysis. Descriptive data analysis technique is an analysis technique used to analyze data by describing or describing the data that has been collected improperly without any intention of making generalizations from the research results. Included in descriptive statistical data analysis techniques such as presenting data in the form of graphs, tables, percentages, frequencies, diagrams or graphs. The data processing technique was carried out through several stages, namely editing, coding and tabulation using SPSS 22. This study used a frequency table and a score table at the digital literacy level. There are three levels of categories in this study, namely "High", "Medium" and "Low". The determination of this category is based on the assumption that the subject population scores are normally distributed. The category levels are as follows:

**Table 1.** Score category

Category	Score
High	$\geq 205,3$
Medium	130,7 – 205,2
Low	$\leq 130,6$

Source: Researcher

### 3 Result

#### 3.1 Mastery of the e-learning system platform

Mastery of the e-learning platform is one of the supporting factors for the success of the online learning process and achievement. The e-learning platform presents a variety of features that can be used as a medium for sharing material, assignments, accommodating assignments by students and assessing student assignments by lecturers. The following is student digital literacy data on mastery of the e-learning system platform:

**Table 2.** Mastery of digital literacy in e-learning system platform

Platform	Score	Category
Google form	192	Medium
Google classroom	193	Medium
Elena	159	Medium
Moodle	110	Low
Edmodo	124	Low
Average	156	Medium

Source: Research Data

The table above shows that the average student mastery of the e-learning platform is in the 'Medium' category.

**Table 3.** Percentage of digital literacy mastery for the E-Learning system platform

Aspect	Google form	Google classrom	Elena	Moodle	Edmodo
Mastering editing, collecting data, creating and filling content	21,43%	19,64%	17,86%	3,57%	5,36%
Mastering content creation and filling	19,64%	23,21%	23,21%	3,57%	1,79%
Mastering content filling	39,29%	41,07%	5,36%	19,64%	23,21%
Just knowing	19,64%	14,29%	32,14%	32,14%	48,21%
Do not know	0,00%	1,79%	21,43%	41,07%	21,43%
Amount	100%	100%	100%	100%	100%

Source: Research Data



The table above shows that on the Google Form platform the majority of students have mastered editing, collecting data, creating and filling in content. On the Google Classroom platform, the majority of students master content filling. On the Elena platform, the majority of students only know about Elena. On the Moodle platform, the majority of students do not know about Moodle. On the Edmodo platform, the majority of students only know about Edmodo.

### 3.2 Mastery of social media

Mastery of social media as part of e-learning cannot be separated from supporting the successful preparation, process and learning achievement. This social media is a bridge for students and lecturers in communication and interaction in preparation for conducting lecture activities such as sharing lecture schedule information, virtual convergence links, and other important information that lecturers and students want to convey. The following is student digital literacy data on social media mastery:

**Table 4.** Mastery of digital literacy in social media

Platform	Score	Category
Whatsapp	258	High
Twitter	204	High
Instagram	242	High
Facebook	236	High
Telegram	228	High
Average	234	High

Source: Research Data

The table above shows that the students' average social media mastery is in the "High" category.

**Table 5.** Percentage of digital literacy for social media mastery

Aspect	Whatsapp	Twitter	Instagram	Facebook	Telegram
Mastering how to send files, images, videos and editing	76,79%	39,29%	58,93%	55,36%	48,21%
Mastering the use & creation of personal & group accounts	7,14%	17,86%	25,00%	23,21%	23,21%
Mastering receiving & sending messages or calls	16,07%	12,50%	5,36%	8,93%	16,07%
Just knowing	0,00%	28,57%	10,71%	12,50%	12,50%
Do not know	0,00%	1,79%	0,00%	0,00%	0,00%
Amount	100%	100%	100%	100%	100%

Source: Research Data

The table above shows that in the Whatsapp, Twitter, Instagram, Facebook and Telegram applications the majority of students have mastered how to send files, images, videos and editing.

### 3.3 Mastery of video conferencing applications

Mastery of the video conference application used in the material delivery process is very important to master as a substitute for face-to-face learning. The following is student digital literacy data on mastery of the video conference application:

**Table 6.** Mastery of digital literacy in video conference application

Platform	Score	Category
Zoom Meeting	231	High
Jitsi	104	Low
Google Meet	212	High
Sisco Webex	119	Low
Average	167	Medium

Source: Research Data

The table above shows that the average student mastery of the video conference application falls into the "Medium" category.

**Table 7.** Percentage of digital literacy mastery in video conference application

Aspect	Zoom meeting	Jitsi	Google Meet	Cisco Webex
Mastering as a host and performing various existing features	42,86%	5,36%	33,93%	14,29%
Mastering as a host	26,79%	7,14%	21,43%	3,57%
Master as a participant	30,36%	7,14%	35,71%	10,71%
Just knowing	0,00%	28,57%	7,14%	23,21%
Do not know	0,00%	51,79%	1,79%	48,21%
Amount	100%	100%	100%	100%

Source: Research Data

The table above shows that in the Zoom meeting and Google Meet applications the majority of students master as hosts and perform various existing features. In Jitsi and Cisco Webex applications, the majority of students do not know about these applications.

### 3.4 Mastery of supporting media for online assignments

Mastery of supporting media for online assignments is no less important in order to support the achievement of learning outcomes. In the implementation of e-learning, the assignment given by the lecturer is one of the benchmarks for the success rate of learning. The following is digital literacy data on the mastery of media to support online task making:

**Table 8.** Mastery of digital literacy media to support online task creation

Platform	Score	Category
Email	262	High
Scanner	225	High
Converter file	216	High
Compress file	220	High
Video/picture editor	178	Medium
Amount	220	High

Source: Research Data

The table above shows that the average student mastery of supporting applications for online assignment is in the "High" category.

**Table 9.** Percentage of mastery of digital media literacy to support online task creation

Aspect	Email	Scanner	Converter file	Media Compress file	Video/picture editor
Master how some of the features and content both offline and online work	76,79%	46,43%	50,00%	50,00%	23,21%
Know how it works and have used it	16,07%	23,21%	8,93%	16,07%	14,29%
Know how to work	5,36%	19,64%	23,21%	16,07%	28,57%
Just knowing	1,79%	7,14%	12,50%	12,50%	25,00%
Do not know	0,00%	3,57%	5,36%	5,36%	8,93%
Amount	100%	100%	100%	100%	100%

Source: Research Data

The table above shows that the mostly of students have mastered the workings of several features and content both offline and online on email, scanner, converter files and compressed media files. Meanwhile, in the video / picture editor the mostly of students know how it works.

The graph of the research results on the four indicators examined in this study on the students of the Doctoral Program in Sports Education, State University of Semarang are as follows:

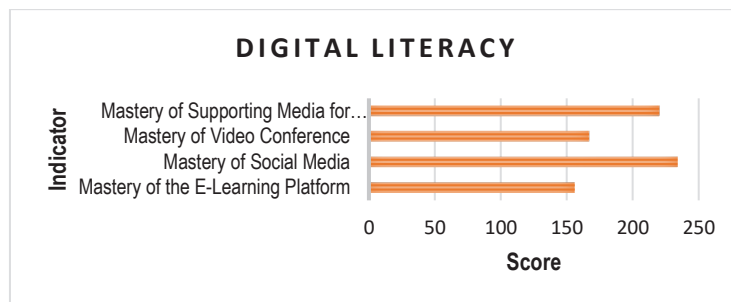


Fig. 1. Student digital literacy

## 4 Discussion

Mastery of social media ranks highest on the average percentage of several digital literacy indicators for students in this study. The use of social media as part of e-learning supports the success of the learning process and achievement. This social media is a communication bridge and indirect interaction between students and lecturers and education staff. Communication could be done personally between student and lecture in groups. Previous research states that digital literacy plays a role in making interaction and communication effective during the learning process [4]. Digital content must be communicated effectively for become a useful educational medium. Using social networking sites like Facebook, Twitter, and Instagram requires users to understand and manipulate information in various formats. Being able to communicate digital content using mobile devices such as cellphones and tablets provides convenience and immediacy in the communication process for lecturers and students [7]. The phenomenon of digital social networking in the last decade, mostly refers to internet-based services such as Facebook, Instagram and Twitter which are platforms that are often used by the public, this is interesting when studying the sub-variable relations related to existing social media. included in the concept of digital literacy extensively and its relationship to online learning academic performance. Beyond the primary purpose of bringing entertainment to the public from these social media platforms, active social media can influence learning in new ways that were never thought of before [8].

Mastery of supporting media for online assignment is the second highest in the average percentage of students' digital literacy. One of the assessments taken by lecturers is from evaluations in the form of assignments to students. The assignments collected by students are not necessarily written but can also be in the form of pictures, tables, graphics or videos. Editing of tasks becomes a necessity when on certain platforms there are restrictions on the type of file sent (JPG, PDF, Word, Excel, MP4, MP3), the size of the file sent and the format of it. From the assignments collected by students, it could be seen the level of aesthetics, creativity and innovation of each student. As stated in previous researchers, quality higher education is one of the prerequisites for the delivery of knowledge and skills development. The quality on education consists of both visible (material) and invisible elements. Developing and developed countries need to guarantee the quality on education to equip students to face a competitive world. Educational institutions do not only focus on education but also involve students in research, creativity, and innovation [9]. Digital literacy skills are one of the most important skills for our students today. Students need to express their ideas in digital media [10].

Video conference is very effective for use during the new normal period in class opening and even in conducting training, seminars and conferences to prevent COVID-19 infection and to follow quarantine protocols [11]. Mastery of the video conference application ranks third in the average percentage of students' digital literacy. This video conference application is the focus, especially in the virtual lecture process. Where this virtual lecture process is core of e-learning. In this virtual lecture, there is a complex online interaction, communication, discussion and question and answer between students and lecturers.

Mastery of the e-learning platform ranks fourth in the average percentage of students' digital literacy. The statement about the role of the e-learning platform in the learning process in earlier research, namely about the use of Google Classroom, is very useful in improving the abilities and skills of each student. Students can study on their own and through mentoring. While the role of supervisor is very vital for students to absorb the knowledge being taught, students can easily gain competence from their supervisor [12]. E-learning refers to the use of Internet technology to gift multiple solutions that increase knowledge and performance. E-learning could be used by medical educators to increase the efficiency and effectiveness of educational interventions in the face of social, scientific and pedagogical challenges [13]. Higher education should strengthen the main problems for the transformation of conventional learning into e-learning, especially communication, teaching and digital competencies.

Students feel that related to that the applications of e-learning is that e-learning requires proper technological skills [14]. E-learning refers to the use of information and communication technology to allow access to online learning / teaching resources [15]. Higher levels of digital literacy positively affect high learning outcomes on student academic performance [8]. Digital literacy is a means to shape students' abilities to think analytically, synthetically, critically, imaginatively and creatively. The applications of digital literacy in lectures is very important to achievement the awareness of all students in seeing literacy skills as a measure of the progress of a nation. Mastery of digital literacy could be a prerequisite in the online learning process for students using digital sources and devices.

## 5 Conclusion

The results showed that of the four indicators examined in this study that the students of the Doctoral Program in Sports Education, State University of Semarang on the indicators of mastery of the e-learning platform included in the "Medium", the indicators of mastery of social media included in the "High", the indicators of mastery the video conference application included in the "Medium", and the indicators of mastery of supporting media for online task creation included in the "High" category.

The average percentage score of fours digital literacy indicators of students from the highest score order is mastery of social media, mastery of supporting media for online assignment, mastery of video conference applications and mastery of the e-learning platform. The higher the level of digital literacy positively affects student learning outcomes and academic performance.

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# Assistance Of Students In The Framework Of Global Hinness Through Community Games And Traditional Sports

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**Abstract.** In the era children who spend most of their time in coffee shops and internet cafes, just to play online games. 2020 is a tough year, because the world is being hit by the Covid-19 pandemic, a healthy body is the main point to be able to carry out movement activities properly, a healthy body and good movement are obtained through one suitable activity, namely sports activities. One model of learning gross motoric movements through folk games and traditional sports because it can be conveyed to students more easily, fun, according to the stages of development, characteristics, and age. Implementation of character value mentoring through folk games and traditional sports, through direct practice in games, giving flascards of character and module values, the teacher serving as a facilitator, the result was that 79% of students showed increased understanding of folk games and the characters in them.

**Keywords:** Mentoring, character values, folk games, traditional sports.

## 1 Introduction

Character education has become a concern of the world of education in Indonesia in order to prepare a quality generation, not only for the benefit of individual citizens, but also for citizens of society as a whole. Character education can be interpreted as an effort made deliberately from all dimensions of school life to help build character optimally [1].

It is hoped that the development of character values will always exist in every educational context, be it formal, informal or non-formal education. The world of education is expected to be a driving force to facilitate character development, so that members of society have an awareness of a harmonious and democratic nation and state life while still paying attention to the norms in society that have become a collective agreement. Character development and character education are imperative because education not only makes students smart, but also has to have good manners and manners so that their existence as a member of society has good meaning for themselves.

Character education and culture have a very strong relationship. Character education cannot be separated from culture. Without the educational process it is impossible for that culture to continue and develop. The educational process is nothing more than a process of cultural transmission. In an anthropological perspective, education is a transformation of a socio-cultural system from one generation to another in a society. [2] explained that "Education is a cultural process". In other words, education and culture have an inseparable relationship. When talking about education, culture also participates in it. There is no culture without education and thus

educational praxis is always within the sphere of culture. The noble cultural values possessed by community groups in Indonesia already belong to the nation as an invaluable potential for the development and progress of the Indonesian nation. Indonesian society is a pluralistic society in terms of culture, religion, and language which has values. Cultural noble values are often referred to as local wisdom. [3], local wisdom is the human intelligence possessed by certain ethnic groups obtained through community experience. This means that local wisdom is the result of certain communities through their experiences and is not necessarily experienced by other communities. These values will be very strongly attached to certain societies and these values have been through a long period of time, as long as the existence of that society.

With advanced technology, children spend more of their time playing games either in internet cafes using personal computers or by using gadgets in coffee shops [4]. This raises several problems, where these habits can unconsciously make the child have a closed personality and are insensitive to the surrounding environment so that the child is an individualist. Such traits will tend to form a character that is not good and will have an impact on the family environment and educational environment, as well as interfere with children's motor development.

The 2015–2019 National Medium-Term Development Plan (RPJMN) has set nine priority agendas known as the Nawacita Program, in which the development of National education and culture is directed towards realizing the Nawacita namely improving the quality of Indonesian human life, increasing productivity and competitiveness, revolutionizing the character of the nation. , as well as reinforcing diversity and strengthening Indonesia's social restoration. To achieve that, the development and strengthening of character through mentoring activities is a comprehensive effort carried out through the development of an educational ecosystem, both within the family, school and community [5].

The development and strengthening of character through cultural advancement activities are one of the important elements in the progress of a country in living life in the era of globalization [3]. Furthermore, in Law number 5 of 2017, the objects of cultural advancement include folk games and traditional sports [4]. To improve the quality of life, competitiveness, development of national character, as well as to see the development of skills and competencies needed in the 21st century, stimulation of experience and enrichment of various motor skills at school age is needed through cultivating folk games and recreational sports. Individuals who in their childhood have various experiences of basic movement patterns and various activities, will find it easier to carry out various motor skills. The experience of motor skills of children in the past will be the basis for learning skills.

## **2 Methods**

The stages of the activities implemented in this mentoring activity are presented in the following Figure 1:



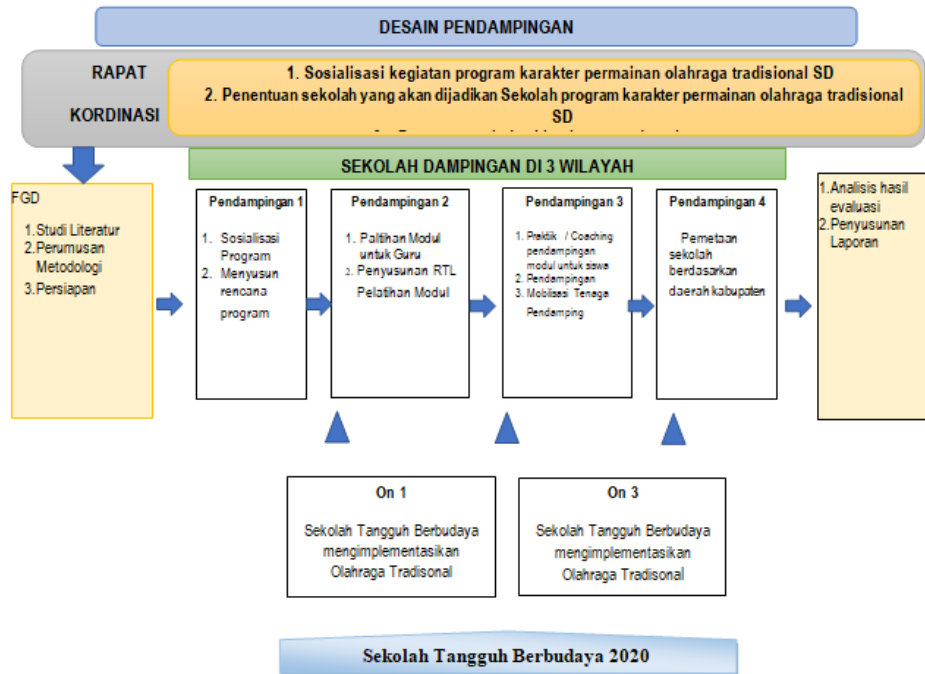


Fig. 1. Activities implemented

The first activity begins with the Socialization of Character Values Assistance through Folk Games and Traditional Sports in Schools. For schools that have been designated as partner schools, they are expected to be able to carry out socialization to stakeholders (parents of students, school committees, and other related institutions or communities). Socialization is carried out through zoom, due to adjusting conditions during the Covid 19 pandemic. The purpose of this socialization is to provide information, explanations, and expectations about matters related to Character Values Assistance activities through Folk Games and Traditional Sports in Schools. Some of the main things that were disseminated included: (a) basics / juridical foundations for the importance of key elements of global diversity (b) school programs to be planned / implemented as assistance for Character Values through Folk Games and Traditional Sports in Schools (c) targets or indicators of the success of schools as assisted schools in the short, medium and long term, (d) the participation of stakeholders in implementing the development of Character Values through Folk Games and Traditional Sports in Schools (e) other things deemed necessary by the school. The next activity is FGD in the context of equalizing perceptions in implementing the mentoring program, then the Formation of a Team for Assisting Character Values through Folk Games and Traditional Sports at Schools in an effort to facilitate the implementation of assistance for Character Values through Folk Games and Traditional Sports in Schools, then It is hoped that each school will form a development team or task force consisting of PE teachers in the school who are tasked with leading the sector. The aim is to accelerate the preparation of various aspects of character components that will be developed into work plans, and to help evaluate the implementation of character values mentoring programs through traditional sports games in schools.

It is endeavored that the members of the mentoring team consist of elements from PE teachers and classroom teachers. The team must be given a special time to carry out their duties. The organizational structure of the team will be made clearly so that the duties and responsibilities as well as the authorities will be detailed and clear as well. In principle, the existence of this team is responsible to the principal. The parties involved in this activity are the UNESA Learning Development and Quality Assurance Institute, PE Teachers and School Principals.

### 3 The results of study

#### 3.1 Assistance in Kediri Regency

Folk games and traditional sports in Kediri Regency are Patil catfish, Boy-Boyan, Patek, Dampar, Tulup / Dor-Doran, and Gejlek.

**Table 1.** Pre-test results for students in Kediri Regency

No	Experiment		Control	
	Student's Name	Score	Student's Name	Score
1	Student 1	32	Student 1	12
2	Student 2	16	Student 2	20
3	Student 3	28	Student 3	30
4	Student 4	40	Student 4	20
5	Student 5	19	Student 5	30
6	Student 6	18	Student 6	10
7	Student 7	8	Student 7	20
8	Student 8	24	Student 8	10
9	Student 9	36	Student 9	20
10	Student 10	20	Student 10	24
11	Student 11	32	Student 11	17
12	Student 12	22	Student 12	21
13	Student 13	32	Student 13	12
14	Student 14	40	Student 14	5
Sum		367		251
Mean		26,21		17,92

The results of tests conducted by students in elementary schools showed that the average data obtained from the pre-test students in the two sample classes was 26.21 in the experimental class and 20.71 in the control class. The results of the average data are tested using the t-test hypothesis. The results of the students' pre-t test can be seen the sig value. (2-tailed)  $0.01 < 0.05$ , it can be concluded that there is a significant difference between the pre-test experimental class and the control class.

**Table 2.** Post-test results for students in Kediri Regency

No	Experiment		Control	
	Student's Name	Score	Student's Name	Score
1	Student 1	61	Student 1	43
2	Student 2	75	Student 2	45
3	Student 3	70	Student 3	41
4	Student 4	59	Student 4	65
5	Student 5	69	Student 5	52
6	Student 6	67	Student 6	36
7	Student 7	81	Student 7	40
8	Student 8	88	Student 8	33
9	Student 9	72	Student 9	50
10	Student 10	56	Student 10	40
11	Student 11	77	Student 11	34
12	Student 12	61	Student 12	42
13	Student 13	56	Student 13	43
14	Student 14	78	Student 14	34
	Sum	970		598
	Mean	69,29		42,71

The average data obtained from post-test students in the two sample classes is 69.29 in the experimental class and 42.71 in the control class. The results of the average data will be tested for the hypothesis using the t-test, prior to the calculation of the homogeneity and normality test of the data as a prerequisite for t-test analysis. the result of the t-test post test shows the sig value. (2-tailed) of  $0.000 < 0.05$ , it can be concluded that there is a significant difference between the post-test of the experimental class and the control class. So, from the results of the pretest and posttest of students in Kediri Regency, there was an increase in the ability of students to understand the characters that exist in the traditional. After being given the treatment, the provision of flashcards and the practice of the post-test scores showed a significant increase.

### 3.2 Assistance in Makassar City

Folk games and traditional sports in Makassar are Santo, Enggo-enggo, Macukke, Mabenteng, Mallongga, Lambasane, Maggale, Bu'uh Rawe, and Makkaddaro.

Table 3. Pre-Test results for students in Makassar City

No	Experiment		Control	
	Student's Name	Score	Student's Name	Score
1	Student 1	8	Student 1	16
2	Student 2	24	Student 2	40
3	Student 3	36	Student 3	30
4	Student 4	20	Student 4	17
5	Student 5	32	Student 5	20
6	Student 6	22	Student 6	10
7	Student 7	32	Student 7	25
8	Student 8	40	Student 8	26
9	Student 9	48	Student 9	15
10	Student 10	31	Student 10	12
11	Student 11	23	Student 11	20
12	Student 12	31	Student 12	21
13	Student 13	20	Student 13	12
14	Student 14	18	Student 14	10
	Total	367		274
	average	27,50		19,57

The average data obtained from the pre-test students in the two sample classes is 27.50 in the experimental class and 19.57 in the control class. The results of the average data will be tested using the t-test hypothesis. The results of the students' pre-t test can be seen the sig value. (2-tailed) of 0.034 < 0.05, it can be concluded that there is a significant difference between the pre-test experimental class and the control class.

The average data obtained from post-test students in the two sample classes is 70.79 in the experimental class and 43.43 in the control class. The results of the average data will be tested for the hypothesis using the t-test, prior to the calculation of the homogeneity and normality test of the data as a prerequisite for t-test analysis. the results of the t-test post test showed the sig value. (2-tailed) of 0.000 < 0.05, it can be concluded that there is a significant difference between the post-test of the experimental class and the control class. So, from the results of the pretest and posttest students in Makassar City, there was an increase in students' abilities in understanding the characters that exist in the traditional. After being given the treatment, the provision of flashcards and the practice of the post-test scores showed a significant increase.

Activities carried out when playing folk games and traditional games are proven to stimulate the emergence of affective aspects in students. the attitudes and values that appear during the activity tend to be purely from the will of the children.

This program presents a variety of problems that are instrumented in folk games and traditional sports. Students are asked to solve problems quickly and responsively. Communication skills, solidarity, praying for each other and not dropping, respecting each other both opponents or friends, and honesty that is so clearly visible. Even with folk games and traditional sports, a space for interaction between children is also opened very clearly and is not fake.

## 4 Conclusion

The program for developing students in the context of global diversity through folk games and traditional sports provides inspiration and evidence that our children are basically born with good and noble character. Activities carried out when playing folk games and traditional games are proven to stimulate the emergence of affective aspects in students. The attitudes and values that appear during the activity tend to be purely from the will of the children. This program presents a variety of problems that are instrumented in folk games and traditional sports. Students are asked to solve problems quickly and responsively. Communication skills, solidarity, praying for each other and not dropping, respecting each other both opponents or friends, and honesty that is so clearly visible. Even with folk games and traditional sports, a space for interaction between children is also opened very clearly and is not fake. The hope is that this activity can be scheduled nationally and sustainably and become a routine. It does not need to be done on a festival scale which costs a fortune. But do it regularly and participate as a whole. (Just equate it like the skj gymnastics program on Friday morning). This activity is also useful as a means of recreation for students in their spare time when they are focused on undergoing full day school.

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# Profile Of Physical Activity, Physical Fitness, and BMI Students of Senior High School in Surabaya

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**Abstract.** Physical activity is related to healthy lifestyle and plays role in maintaining body shape and physical fitness. The participation rate in physical activity among school children in Indonesia in the last decade is decreasing. This research to measure physical activity and physical fitness as a diagnostic measure. The body composition needs to be measured through the Body Mass Index (BMI). This research is a type of survey. The physical activity questionnaire and MFT were used. The population are high school students in Surabaya and the sample using multistage random sampling. The results were: the nutritional status of students tended to be normal, gender did not affect nutritional status; the physical activity conditions of students tend to be active, lazy have higher physical activity than females; the physical fitness condition of students to be poor, males have a higher level of physical fitness than females; and there is an effect of nutritional status (BMI) and physical activity on physical fitness.

**Keywords:** Physical activity, physical fitness, nutritional status, student.

## 1 Introduction

The benefits of physical activity have been tested to bring a healthy life, maintain body shape, and physical fitness. The problem is, the participation rate in physical activity including sports among school-age children in Indonesia in the last decade has not shown a satisfactory number. However, there has never been a change in school programs that support increased student physical activity. It is as if they think that the students are in good school without having to provide treatment to increase physical activity. Even though the 2000-2010 survey created by Sport Development Index in Ministry of Sport (Menpora) on physical fitness, the level of physical fitness of school children in Indonesia tends to be in the low category. After that, there is no monitoring effort on physical activity and physical fitness. Indeed, high awareness is needed to be able to carry out regular physical activity in order to achieve a high degree of physical fitness. However, as if a sick person will never seek treatment before knowing that he is sick and a doctor will never give medication before diagnosing so that he knows the patient is sick, then the problem of physical activity and physical fitness needs to be measured so that students (patients) and teachers (doctors) can know the condition. to be able to immediately change the program to support increased physical activity and physical fitness. It is no secret that environmental conditions are getting worse, starting from pollution and ozone quality. Many think that pollution is a major factor in the occurrence of health problems in the form of problems in the respiratory tract. Asthma, is a problem that is considered to occur most often when someone is in high pollution air. However, based on the results of the

study, the asthma of several groups of people in different environments, the level of pollution and ozone quality did not differ significantly, meaning that the pollution conditions and ozone quality did not support the occurrence of asthma. However, in cases of asthma, it turns out that children who do more physical activity and exercise have a lower risk of developing asthma [1]. Seeing the air condition in the city of Surabaya which is already too influenced by the surrounding industry and motor vehicles, pollution and local ozone which can indirectly contribute to lower the physical fitness of a person are increasingly being questioned [2]. In addition, the risk of degenerative diseases such as high blood pressure is common and exercise is one solution. Research shows that, moderate to upward physical activity can help lower the risk of depression in adults [3]. To avoid this, efforts are needed to provide programs for children to get used to regular physical activity so that they carry on for a lifetime.

Physical activity habits and sports in childhood can be used as predictors in adulthood. Those who are accustomed to physical activities and sports at a young age tend to continue these activities in adolescence and even adulthood [4]. In other literature, the choice of food and physical activity is the choice of ways to maintain an ideal body shape. Apart from health benefits, physical activity also provides physical benefits. Sufficient and regular physical activity can keep the body in a fit condition. Talking about a fit body, it is necessary to discuss physical fitness as a measure of a fit body condition. SDI survey results in 2005 show that the fitness level of students in Indonesia is 5.66% in the good category and the rest are in the medium, poor, and even less category. Furthermore, in 2010 research conducted by the Center for Physical Quality of the Ministry of National Education stated that due to malnutrition and physical activity, the state of physical fitness of students nationally was 94% of students in a moderate, insufficient, and very deficient state, only 6% were in the good category. and very good [5]. In 2006, the SDI Team again measured the physical fitness of students in Indonesia, the results showed that the physical fitness of students in Indonesia was in the very good category, only 5.05%, good 5.15%, moderate 13.55%, less 43, 90% and less 37.40% [6]. Unfortunately, similar research is no longer carried out on a national scale. PJOK in schools is the only ideal way to provide education through physical means to form a healthy lifestyle. However, monitoring of this important variable is rarely done. Report cards still tend to bring up academic learning outcomes (psychomotor, cognitive, and affective) that do not reflect a healthy lifestyle through physical activity. For this reason, it is necessary to hold monitoring of the core variables in the efforts of PJOK according to their function. Evaluation system for treatment that is carried out to increase physical activity so that changes that occur due to treatment can be properly monitored and followed up immediately. similar research is no longer carried out on a national scale. PJOK in schools is the only ideal way to provide education through physical means to form a healthy lifestyle. However, monitoring of this important variable is rarely done. Report cards still tend to bring up academic learning outcomes (psychomotor, cognitive, and affective) that do not reflect a healthy lifestyle through physical activity. For this reason, it is necessary to hold monitoring of the core variables in the efforts of PJOK according to their function. Evaluation system for treatment that is carried out to increase physical activity so

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## **2 Literature review**

### **2.1 Physical activity through PJOK**

Physical activity is the key to achieving a healthy life through an active lifestyle. The results showed that physical activity can reduce the risk of all causes of death, including reducing the risk of being overweight, reducing depressive symptoms, and improving the quality of life associated with being overweight over a longer period of time [3], [7]. These results explain that, physical activity carried out regularly and sufficiently can reduce the impact of a person's poor health condition. In order to become a lifestyle, physical activity needs to be accustomed to from an early age. The results showed that activity habits at an early age can be a predictor of exercise habits and physical activity in adulthood [4]. Therefore, promotion of physical activity to school-age children is important so that they have active habits so that they can carry it throughout their lives. As a place for children to learn, school is an ideal area for habituating physical activity [8]. Where within its scope there is early childhood which is easily controlled in terms of time and place. For this reason, PJOK as the only subject that utilizes physical activity as a learning medium is very strategic in achieving these goals. However, CHD in schools alone is not enough to have a significant impact on increasing physical activity, a special program is needed so that physical activity can be increased [9] and even physical fitness can be improved [10]. However, regardless of the form of the program applied.



## 2.2 Physical fitness and Body Mass Index

There is no other way, physical fitness can be obtained through physical exercise systematically and progressively [6]. Research on physical fitness has been carried out for a long time, including many efforts made to improve physical fitness through physical activity. VO2Max is a measure that can be used to determine whether someone is said to be fit or not [12]. For this reason, PJOK as a vehicle for student movement must provide various activities that support increased physical fitness. The results showed that CHD can have an impact on children who are less sociable (isolated / anti-social) to become sociable in programs to increase physical activity [13]. The next issue that is no less important to discuss is the condition of the student body composition. Obesity is one of the factors that increase the risk of death [14]. One of the factors in the occurrence of obesity is the lower rate of participation of a person in physical activity. Many people who use their spare time to be lazy tend to have a habit of eating unhealthy and excessive food. The use of free time for physical activity is very important. It is not easy to change the habit of using leisure time to relax into physical activity. It needs a systematic program and high motivation so that this can happen [15]. PJOK in schools, is the answer to making successful creation, implementation, and monitoring of physical activity programs for students to get used to and carried away until they are adults. One of the factors in the occurrence of obesity is the lower rate of participation of a person in physical activity. Many people who use their spare time to be lazy tend to have a habit of eating unhealthy and excessive food. The use of free time for physical activity is very important. It is not easy to change the habit of using leisure time to relax into physical activity. It needs a systematic program and high motivation so that this can happen [15]. PJOK in schools, is the answer to making successful creation, implementation, and monitoring of physical activity programs for students to get used to and carried away until they are adults. One of the factors in the occurrence of obesity is the lower rate of participation of a person in physical activity. Many people who use their spare time to be lazy tend to have a habit of eating unhealthy and excessive food. The use of free time for physical activity is very important. It is not easy to change the habit of using leisure time to relax into physical activity. It needs a systematic program and high motivation so that this can happen [15]. PJOK in schools, is the answer to making successful creation, implementation, and monitoring of physical activity programs for students to get used to and carried away until they are adults. Many people who use their spare time to be lazy tend to have a habit of eating unhealthy and excessive food. The use of free time for physical activity is very important. It is not easy to change the habit of using leisure time to relax into physical activity. It needs a systematic program and high motivation so that this can happen [15]. PJOK in schools, is the answer to making successful creation, implementation, and monitoring of physical activity programs for students to get used to and carried away until they are adults. Many people who use their spare time to be lazy tend to have a habit of eating unhealthy and excessive food. The use of free time for physical activity is very important. It is not easy to change the habit of using leisure time to relax into physical activity. It needs a systematic program and high motivation so that this can happen [15]. PJOK in schools, is the answer to making successful creation, implementation, and monitoring of physical activity programs for students to get used to and carried away until they are adults. It needs a systematic program and high motivation so that this can happen [15]. PJOK in schools, is the answer to making successful creation, implementation, and monitoring of physical activity programs for students to get used to and carried away until they are adults. It needs a systematic program and high motivation so that this can happen [15]. PJOK in schools, is the answer to making successful creation,

implementation, and monitoring of physical activity programs for students to get used to and carried away until they are adults.

### 3 Research Methods

This research is included in the type of survey. Conducted within the scope of the city of Surabaya in accordance with the distribution area, namely the western, central, southern, eastern and northern regions.

#### 3.1 Subject

A total of 60,487 high school students in the city of Surabaya (27,482 boys and 33,005 girls) became the study population. The selection of subjects as samples was carried out by means of multistage random sampling, which is a combination of stratified random sampling and cluster sampling. An illustration of the sampling process can be done using the sequence as shown in Figure 1 as follows.

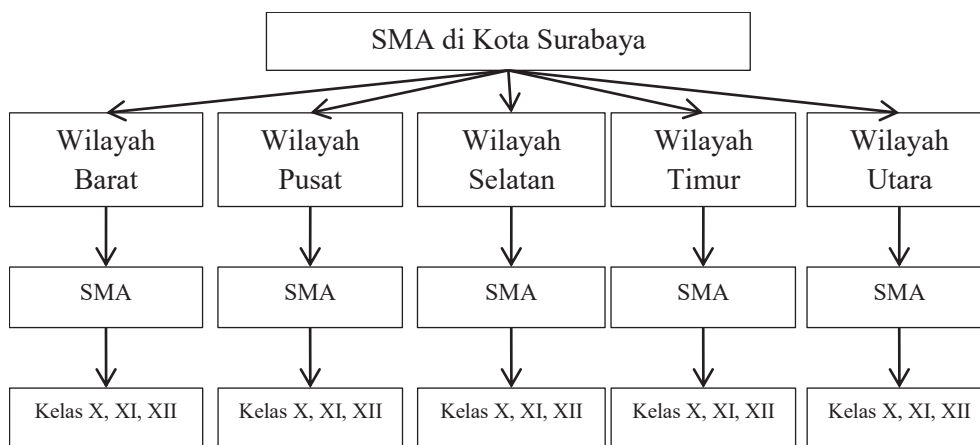


Fig. 1. Sample selection method

Sample selection will be carried out in 5 regions by choosing one school randomly, then randomly selected male and female students from each grade level according to the proportion of the number of students from each region. The proportion is determined by the percentage of students in each area compared to the population. The percentage in each region is then multiplied by the target sample size to be selected. The total sample to be selected is 500 students [16], [17].

#### 3.2 Instrumentation

The instruments used to measure each variable are as follows.

1. Physical activity = exercise habits questionnaire developed by the Sport Development Index team [6].
2. Physical fitness = using the Multistage Fitness Test (MFT) [6], [12].
3. *Body Mass Index* (BMI) = using a measuring tool for body weight and height [18].

### 3.3 Procedure

The research will begin with licensing the education office through Bakesbangpol. Furthermore, it is forwarded to the school principals according to the results of the sample takers. Data collection will be carried out by the team by means of tests and questionnaires. Height and weight measurements will be carried out prior to the implementation of the MFT. Physical fitness will be identified by MFT, which is running back and forth according to the standard cue as far as 20m. After completing the MFT, students are asked to fill out a questionnaire.

### 3.4 Analysis

Data analysis was carried out by means of descriptive and correlation. The choice of correlation type (parametric or non-parametric) will be determined according to the data and the form of data distribution formed after the data is collected.

## 4 Result and discussion

### 4.1 Descriptive statistics and comparison of physical fitness, physical activity, and BMI by region

Below is a comparison of physical fitness, physical activity, and BMI by region. The analysis used was ANOVA, the results of the analysis can be seen in table 1 as follows.

**Table 1.** Comparison physical fitness, physical activity, and BMI by region

Variable	Territory	N	Mean	SD	Min	Max	F	p	Ket
BMI	Southern (1)	91	21.92	4.02	15.6	39.4	4.13	0.003	1 > 3
	Central (2)	102	21.27	4.22	14.2	33.9			
	North (3)	71	19.33	4.76	12.7	44.7			
	Western (4)	88	20.07	5.39	0.0	35.6			
	Eastern (5)	101	20.92	4.32	12.8	37.2			
	Total	453	20.79	4.60	0.0	44.7			
Physical Activity	Southern (1)	91	6.88	3.05	0.0	15.0	9,1	0,000	1 > 3
	Central (2)	102	5.79	3.22	0.0	12.0			
	North (3)	71	4.56	3.97	0.0	12.0			
	Western (4)	88	5,53	3.97	0.0	14.0			
	Eastern (5)	101	7.42	3.15	0.0	14.0			
	Total	453	6.13	3.58	0.0	15.0			
VO2Max	Southern (1)	91	29.97	7.34	19.6	50.3	36.26	0,000	1 > 2; 1 > 3
	Central (2)	102	25.05	4.48	19.1	37.8			

North (3)	71	25.38	5.87	19.1	44.9	2 <4; 3 <4
Western (4)	88	34.97	8.89	22.6	59.0	4 > 5
Eastern (5)	101	26.26	5.65	18.1	42.1	
Total	453	28.29	7.53	18.1	59.0	

Based on table 1 above, it can be explained as follows.

The highest BMI is the BMI of students in the southern region. Significant differences occur in the southern and northern regions. However, others are stated to be the same. This means that in general the nutritional status of students in the city of Surabaya is the same, except for the southern and northern regions.

Physical activity - students in the city of Surabaya are stated to be diverse / different. The physical activity values are sorted from the highest to the lowest, are the East (N = 101, M = 7.42, SD = 3.15), the South (N = 91, M = 6.88, SD = 3, 05), the Central Region (N = 102, M = 5.79, SD = 3.22), the West (N = 88, M = 5.53, SD = 3.97), and the North (N = 71 , M = 4.56, SD = 3.97).

Physical fitness - students in the city of Surabaya are stated to be various / different. The physical fitness values in order from the lowest to the highest are the Central region (N = 102, M = 25.05, SD = 4.48), the North region (N = 71, M = 25.38, SD = 5 , 87), the East (N = 101, M = 26.26, SD = 5.65), the South (N = 91, M = 29.97, SD = 7.34), the West (N = 88 , M = 34.97, SD = 8.89).

#### 4.2 Differences in physical activity, nutritional status, and physical fitness based on gender

It is important to pay attention to the gender variable because of the different habits and body composition. It is necessary to examine differences in physical activity, nutritional status and physical fitness based on gender.

Following are the results of the analysis of differences in nutritional status based on gender (table 2).

**Table 2.** Differences in nutritional status by gender

BMI category		Gender		Total	X2	df	p
		Man	Women				
BMI category	Very thin	40	30	70	8.59	4	0.07
	Thin	31	33	64			
	Normal	106	143	249			
	Fat	19	12	31			
	Obesity	22	17	39			
Total		218	235	453			

Based on table 2 above, two things can be explained as follows.

- a. It can be concluded that the frequency in the NORMAL category shows a trend in the nutritional status of students. This means that the nutritional status of students in Surabaya tends to be NORMAL.
- b. The different test results show that the value of Chi-Square,  $X^2 (4, N = 453) = 8.59, p = 0.07$ . This means that there is no difference in nutritional status between male and female students in the city of Surabaya.

Furthermore, the differences in physical activity based on gender are explained. The results of the analysis can be seen in table 3 as follows.

**Table 3.** Differences in physical activity based on gender

		Gender		Total	X2	df	p
		Man	Women				
Physical Activity Category	Passive	23	55	78			
	Less Active	32	52	84			
	Active	133	116	249			
	Very active	30	12	42			
Total		218	235	453			

Based on table 3 above, two things can be explained as follows.

- a. It is concluded that the frequencies in the ACTIVE AND VERY ACTIVE categories indicate a tendency for the physical activity conditions of students. This means that students in Surabaya tend to be ACTIVE.
- b. Different test results show that the value of Chi-Square,  $X^2 (3, N = 453) = 26.17, p = 0.00$ . This means that there are differences in activity between male and female students in the city of Surabaya. Male students tend to be more active than girls.

Furthermore, the differences in physical fitness based on gender are explained. The results of the analysis can be seen in table 4 as follows.

**Table 2.** Differences in physical fitness differences based on gender

		Gender		Total	X2	df	p
		Man	Women				
Physical Activity Category	Passive	23	55	78			
	Less Active	32	52	84			
	Active	133	116	249			
	Very active	30	12	42			
Total		218	235	453			

Based on table 4 above, two things can be explained as follows.

- a. Based on the table, it can be concluded that the frequencies in the VERY BAD AND BAD categories indicate a tendency for students to be fresh. This means that students in Surabaya tend to have BAD fitness.
- b. Different test results show that the value of Chi-Square,  $X^2(6, N = 453) = 52.05$ ,  $p = 0.00$ . This means that there are differences in fitness between male and female students in the city of Surabaya. Male students tend to be more fit than girls.

#### 4.3 The relationship between physical fitness and physical activity

Next, it is necessary to analyze the relationship between physical fitness and physical activity. The results of the analysis can be seen in table 5 as follows.

**Table 3.** The relationship between physical fitness and physical activity

	N	Minimum	Maximum	Mean	SD	r	p
Physical Activity	453	0	15	6.13	3.58	,288 **	,000
VO2Max	453	18.1	59.0	28.29	7.53		

Based on table 5 above, two things can be explained as follows.

- a. Based on the table, it can be explained that the lowest score for students' physical activity is 0 (not doing physical activity regularly) and the highest is 15, the average value is  $6.13 \pm 3.58$ . The lowest physical fitness score was 18.1 (very poor) and the highest was 59.0 (special) with an average of  $28.29 \pm 7.53$  (mean).
- b. The results of the correlation test showed that there was a significant relationship between physical activity and students' physical fitness,  $r(453) = 0.288$ ,  $p = 0.000$ .

#### 4.4 Relationship between physical fitness and nutritional status and physical activity

Ancova is used to analyze the relationship between the three variables. The results of the analysis can be seen in table 6 as follows.

Dependent Variable: VO2Max

**Table 4.** Relationship between physical fitness and nutritional status and physical activity

Source	Type III	df	Mean Square	F	Sig.	Partial
Corrected Model	3638a	19	191	3.77	,000	,142
Intercept	128431	1	128431	2529	,000	,854
BMI	588	4	147	2.89	,022	,026
Physical Activity	1428	3	476	9.37	,000	,061
BMI * Physical Activity	219	12	18.2	,359	,977	,010
Error	21990	433	50.8			
Total	388086	453				
Corrected Total	25628	452				

- a. R Squared =, 142 (Adjusted R Squared =, 104)
- b. Computed using alpha = .05

Based on table 6 above, two things can be explained as follows.

1. Based on the ANCOVA test (between-subjects factor: nutritional status (BMI); covariate: physical activity, there is an effect of nutritional status (BMI) on physical fitness.  $F(4, 433) = 2.89$ ,  $p = 0.02$ , there is an effect of physical activity on physical fitness  $F(3, 433) = 9.37$ ,  $p = 0.00$ . The interaction between nutritional status and physical activity was not significant,  $F(12, 433) = 0.359$ ,  $p = 0.977$ .
2. So it can be concluded that physical fitness is significantly influenced by physical activity and nutritional status.

## 5 Conclusions and suggestions

Based on the results and discussion of the research, it can be concluded that (1) The nutritional status of students in the city of Surabaya tends to be NORMAL, gender does not affect nutritional status; (2) The physical activity conditions of students in the city of Surabaya tend to be active, males have higher physical activity than females; (3) The physical fitness condition of students in the city of Surabaya tends to be poor, males have a higher level of physical fitness than females; and (4) There is an effect of nutritional status (BMI) and physical activity on physical fitness. So it can be suggested that although the nutritional status tends to be normal, students in nutritional status are still obese, so it is necessary to regulate diet and physical activity to control nutritional status. The condition of the physical activity of female students is lower than that of boys, for this reason, PJOK learning needs to be designed to increase the proportion of physical activity for women. The physical fitness of students in the city of Surabaya tends to be poor, based on the results of this study, it is necessary to maintain the condition of nutritional status and increase physical activity so that physical fitness can be improved.

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# Response of Parents Towards Parental Class as A Collaborative Model in Physical Education

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**Abstract.** This study aims to describe the response of parents towards parenting class as a collaborative model in physical education involving teachers, parents and the community by sharing responsibilities, duties and involvement according to their respective roles. The results of the pilot study involved 6 primary schools in rural and urban areas for 12 months. This type of research is mix methods. The data were collected through questionnaire to 166 participants. Then, the data were analyzed by a sequential explanatory strategy. The results showed that parents' responses to the collaboration model in the primary schools regarded as 'good' with the overall-average score of 81.97%. Based on the results of the interview, parents could experience the benefits of the program such as knowledge enhancement, insight and parenting patterns as well as medium of communication between parents and teachers related to children's learning progress and character building.

**Keywords:** Response of parents, parental class, physical education.

## 1 Introduction

In terms of education, parents must have their way of parenting, It may vary one another as each has a diverse background; among others are level of education, job, socio-culture, and the surrounding environment. This diversity can make their children's growth and capacity development (such as cognitive, affective, and psychomotor) differently. It is hence, cultivating the understanding of their approach of educating and parenting their children is necessary to improve their quality. Parents who have certain quality will be able to nurture and educate their children as best as possible so that they can increase the capacity of theirs.

The roles and contributions of parents, families, and community leaders have been regulated in the National Education System Law Number 20 the Year 2003 Article 7 paragraph 1 that reads "Parents and the community have the right to participate in planning, implementing, monitoring and evaluating the educational programs". Education is our shared duty and responsibility comprising family, community, and government.

Partnerships between families, schools, and communities are built to create an educational-charactered ecosystem, a culture of healthy living and exercise and to improve learning achievement in terms of cognitive, affective, and psychomotor [1]. The family as the very first educational unit is expected to increase the growth and development of their children according to their level so that they become an independent, intelligent, and productive personality. Family (in this case parents) play several important roles and contribute to providing the basics of

education such as religion, personality, character, individual-socialistic characters, norms, regulations, instilling a healthy lifestyle, and exercising.

The implementation of good and qualified education requires a suitable, planned, programmed, and sustainable relationship as well as collaboration between teachers and parents and the community as a form of sound partnership and synergy. According to Palupi Raraswati [2], the partnership and collaboration between the school and the family is a positive and important thing because 1) parents are the first educators, but in fact, the majority of parents only leave over the system to the school, 2) schools act a role as a family partner in implementing the qualified, programmed and more systematic education, 3) the complex needs of the children who cannot fully be fulfilled by schools and families, 4) the collaboration between parents and teachers is a compulsory in education, 5) schools are obliged to encourage partnerships, collaboration and involvement with parents to cultivate and improve the quality of education itself.

Hence, to improve the quality of the parents in terms of education and parenting for their children, it is necessary to have a forum that can accommodate and facilitate parents and teachers, and stakeholders to be able to complement each other and harmoniously join hand in hand through the parent class in physical education. According to the General Directorate of Early Childhood Education and Community Education [3], the parental class is a forum for parents that can be used to unite parents, teachers, and the community into a single unit in a classroom to improve knowledge, insight, mindset and parental patterns through effective communication expecting that they can share their duties, roles, and involvements in the education process to create good collaboration between stakeholders in realizing the goals of national education. The communication and interaction between the school (teachers) and family (parents) have a positive impact on children such as being diligent in doing homework, behaving well, and being more active, and elevating social aspects, Kraft, MA, and Dougherty, S.M [4] [5].

Currently, there are several school programs such as the parent association that has tried to involve parents and stakeholders, but they have not yet related to physical education. The parental involvement program in the education process that has been running so far has not been effective and efficient due to unclear, unsustainable school programs, lack of parental awareness, and varied parental mindsets.

## 2 Method

This is research on parents' responses to parenting classes as a collaborative model in physical education. The subjects of this study were the parents of elementary school students in Magelang Regency in 2019 (166 participants). This is mixed-methods research combining qualitative and quantitative approaches, Sugiyono [6]. The utilized research design is sequential explanatory, in which quantitative data is first collected and analyzed, before the qualitative data. According to Creswell [7], qualitative data findings can be used to contextualize the quantitative data.

The following are the stages of data analysis used in this study:

**Quantitative Data Analysis.** The quantitative data were collected using a rating scale questionnaire with 25 statement items about the responses of parents towards parental class as a collaboration model in physical education which includes; 1) responsibility 2) tasks, 3) involvement 4) role 5) collaboration between parents and teachers and the education

community. The result of the questionnaire was then identified the mean value before it is analyzed in a descriptive percentage form. The data obtained through a questionnaire refers to the Likert scale parameter. The scores are determined as follows: SA: Strongly Agree (4); A: Agree (3); D: Disagree (2); SD: Strongly Disagree (1).

Qualitative Data Analysis. The interview data collection (qualitative) is carried out when the questionnaire data (quantitative) have been obtained. The qualitative data were obtained by interviewing 18 parents who were class administrators (chairperson, secretary, and treasurer) from 6 elementary schools, then the data were reduced (selecting and determining the important parts), then concluded.

### 3. Result and discussion

The response of parents in responding to the existence of this parental class program is of course diverse and vary. In details, based on the data of the rating scale questionnaire with 25 statement items regarding the responses of parents to the collaboration of model of teachers, parents, and society to 166 participants as in table 1. as follows:

**Table 1.** The response of parents towards the parental class as a collaborative model in physical education

No	Question	Statement Indicator	Response Percentage	Criteria
1	What collaborates in the Parental Class?	1 Parents have duty and responsibility to improve the quality of the physical education	89,61%	E
		2 Parents have duty and responsibility to enrich their children in terms of intellectuality	93,37%	E
		3 The importance of parents to be involved in schools' programs in terms of improving the quality of physical education	81,93%	E
		4 The importance of parents to participate in schools' programs to increase the quality of the physical education	80,72%	G
		5 The necessity of collaboration between teachers and parents to increase the quality of physical education	84,34%	E
2	How is the form of the parental class?	6 The necessity of sharing tasks and responsibilities between teachers and parents to cultivate the quality of physical education	81,48%	E
		7 The necessity of sharing roles between teachers and parents to increase the quality of physical education	78,85%	G
		8 Parents and teachers actively give responses and feedbacks about the development of the children	85,58%	E
		9 Parents and teachers invite and motivate each other to actively implicate in organizing parental class	76,44%	G

	10	The necessity of parent organization accommodated in the form of parental class	77,40%	G
	11	Parents can create a joyful, secure, and comfortable learning atmosphere	87,02%	E
	12	Parents and teachers are active in monitoring the attitude, social interaction, and development of children	89,90%	E
	13	Parents and teachers support the activity of the parental class program	78,37%	G
	14	Parents, teachers, community, and children can do an exercise together	76,92%	G
	15	Teacher as an initiator in organizing parental class program	80,12%	G
	16	Teacher as a mediator in organizing parental class program	81,02%	G
	17	Teacher as a motivator in arranging the parental class program	81,02%	G
	18	Teacher as a mediator in arranging the parental class program	80,12%	G
	19	Teacher as a controller in organizing parental class program	80,27%	G
3	20	The teacher is directly implicated in the formation of parental class organizer	79,52%	G
	21	The parent is directly implicated in the formation of the parental class program arrangement	78,31%	G
	22	The parent is directly implicated in the class management of parental class	77,86%	G
	23	The education community can deliver materials per the needs of the parental class program	77,26%	G
	24	The education community can be an instructor/teacher based on the necessity of the parental class program	76,05%	G
	25	The necessity of community education to be involved in the parental class program	77,26%	G
<b>Total Items:</b>	<b>:25</b>	<b>Overall Average</b>	<b>81.97%</b>	<b>G</b>

**Table 2.** Recapitulation of parents' responses

Percentage interval	Criteria	What is collaborated		How is the form of the collaboration		Who is the element of the collaboration	
		Frequency	%	Frequency	Percent age	Frequen cy	%
81,26% - 100%	Excellent	100	60%	96	58%	28	17%
62,51% - 81,25%	Good	64	39%	70	42%	132	80%
43,76% - 62,50%	Fair	2	1%	0	0%	5	3%
25% - 43,75%	Poor	0	0%	0	0%	1	1%
Total		166	100%	166	100%	166	100%
Overall Average		85,99%		83,38%		78,98%	
Criteria		Excellent		Excellent		Good	

Based on data shown in Table 1 and table 2 the response of parents to the collaborative model of teachers, parents, and community in terms of sharing tasks, responsibilities, involvement, and roles of each other is considered as Excellent with an overall average of 81.97%. In detail, this consists of 1) parents' response to the collaborated matters is 85.99% (E), 2) the response of parents related to how the form of collaboration is 83.38% (E), 3) the response of parents related to the personnel involved in the collaboration is 78.98% (G).

Furthermore, based on the results of the open interview with 10 question items to class administrators consisting of the chairman, secretary, and treasurer from each school, totaling 18 people, generally stated that essentially the participants strongly agreed with the existence of the parental class. This program allows parents to be directly and actively involved in efforts to improve the quality of education and to shape the character of their children enhanced. The following is one of the excerpts of the interview to one of the parental class administrators:

*{“..... essentially, we strongly agree with the parental class program because with this parental class, there are mutual collaboration and cooperation between parents and teachers. Therefore, concerning physical education, in particular, it is very very helpful. With this parent class, Mr. Slamet, it turns out that it is also able to increase parents' awareness and their involvement even more real and clear, not only in the physical education but also related to UKS (School Health Unit) and so on. This parental class can build good communication between the school and parents so that everything related to education, sports, character, and children's development can be monitored together and we strengthen each other.*

*In addition to this, it turns out that, Mr. Slamet, with the existence of this parent class, can really increase the level of discipline of the child, and we, as parents, often meet with other parents and the school administrators, so that there is positive communication, especially when we get guidance from the resource person of the parenting activities... ”}*

The results of the interview indicate that the collaborative model through the parental class is well accepted and responded to. The enthusiasm of the parents in participating in this parental class activity is also immense because they have experienced several benefits such as:

1. The ability to raise awareness for parents to be more caring and active in accompanying their children.
2. Increasing the knowledge, insight, and ability of parents in educating and caring for children at home.
3. Sharing knowledge, insights, and experiences with fellow parents.
4. Increasing their role, participation, and contribution in collaboration between classroom teachers, physical education teachers, parents, and the community.
5. Establishing a system and model of parent class that is suitable for the needs.
6. Empowering parents to play a role and participate actively in implementing parent class programs to improve the quality of physical education, sports, and health at the primary school level.
7. Knowing and understanding physical education materials as the subject of the parental class program.
8. Knowing and understanding physical education materials taught at the primary school level according to the child's level.
9. Building partnerships and collaborating with interested people and can contribute to the implementation of the parental class program.
10. Equipping parents about good and correct parenting patterns for the child's future.
11. Building effective communication between physical education teachers, school principals, parents, and the community
12. The harmonization of education that children receive at school and home.
13. Supporting from parents to children is increasingly clear and programmed.
14. The ability to do sports together.
15. Parents' attention to children will increase and children will respect their parents more.
16. The formation of a better children's character.
17. The ability to organize and manage time for school, play, study and sports, and other activities.
18. The ability to improve discipline and student attendance.
19. To be more aware of how important it is to study with anyone, anywhere.
20. Understanding the background, social, cultural, economic, and parenting patterns in the family.
21. The ability to respect and understand the differences between parents.
22. The ability to share information between teachers and parents about learning outcomes, growth, and development of their children.
23. There is good communication between teachers and parents.
24. Minimizing the gap between teachers and parents.
25. Learning media and classroom facilities are becoming more complete and better

## 4 Conclusion

In general, the response of parents to the collaborative model of teachers, parents, and the community in physical education in elementary schools is classified as good with an overall average of 81.97%. The enthusiasm of the parents in joining the parental class is also enormous because they have experienced numerous benefits. This form of collaboration in the parental class is a form of interaction, discussion, compromise, cooperation, sharing of roles, duties, and responsibilities related to students, parents, teachers, or other stakeholders. We need to know together that education is our common duty and responsibility, therefore to create a qualified education we must unite, synergize and collaborate. This collaboration involves several elements of school members and stakeholders such as; 1) principal, 2) class teachers and physical education teachers, 3) parents, 4) the education community (school committee, school supervisor, instructor, education practitioner, etc.).

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# The Role of Teachers In Reducing Hyperactive Behavior of Children with Special Needs Is Reviewed from The Characteristics of Speed And Balance

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**Abstract.** This study to analyze the role of teachers in reducing the hyperactive behavior of children with special needs reviewed the characteristics of speed and balance. The case study using qualitative and quantitative approaches was used. The samples used in this study were children with special needs in Karanganyar Special School and Sukoharjo Special School as many as 40 respondents with the provisions of 20 male and 20 female. Data analysis techniques use descriptive statistical analysis and inferential analysis. Overall data analysis using the help of Statistical Package for the Social Sciences (SPSS) version 23. The results of this study showed there is a role of teachers in reducing hyperactive behavior of children with special needs reviewed from the characteristics of speed and balance. However, further research is needed involving other modified physical activity variables in reducing hyperactive behavior in children with special needs.

**Keywords:** hyperactivity behavior, speed, balance, children with special needs.

## 1 Introduction

Characteristics of children with special needs consist of the blind, deaf, speech deaf, deaf, deaf, autistic, hyperactive or Attention Deficit Hyperactivity Disorder (ADHD), and double deafness. But in this study only limit children's hyperactivity or Attention Deficit Hyperactivity Disorder (ADHD). Children with special needs, especially those who have hyperactive behavior if do not allow to do the physical activity then the child will not be able to have a qualified physique, and vice versa if the child is allowed to perform physical activity following the needs of motion and gender characteristics through exercises supervised by teachers/trainers who understand about the child's development, then the child will have a qualified quality.

Research on the hyperactive behavior of children with special needs was conducted by many previous researchers, among others in his research to accompany and educate children must understand the characteristics and needs of children with special needs [1]. Castellanos & Proal stated in accompanying the child ADHD should pay attention to the characteristics of the child's development [2]. Distraction hyperactivity in children the need for attention and mentoring both teachers and parents [3], ADHD children in particular who have emotional disorders [4], hood ADHD, [5] researching about prevalence in children ADHD examined attention disorders in children who have hyperactive behavior [6], [7] in his research suggesting that hyperactive behavior can be identified early as the behavior of children who have a high



risk both disturbing in the family environment and social environment [8] in his research describing how to care for children with special needs [9] in his research describing the discrimination of children with special needs, and [10] in his research describing how the model of social relations of children with disabilities through the approach of special needs education. However, in the previous study, no one has studied the role of teachers in reducing hyperactive behavior of children with special needs reviewed from gender characteristics and motor skills. Thus the researchers provided one solution in the form of an alternative to reduce the hyperactive behavior of children with special needs reviewed from gender characteristics and motor exercises.

Following the characteristics of children who have hyperactive behavior if given the opportunity to perform motion activities through learning Physical education and sports, automatically the child will be happier in doing motion activities to maintain the quality of physical condition. Doing physical activity is one of the important components to keep the physical condition in shape. To maintain good physical quality, the need to practice structured and systematic physical conditions through the assistance of teachers at least have experience handling hyperactive behavior of children with special needs.

Based on the phenomenon in the form of facts, researchers provide solutions in the form of alternatives, one of which is through scientific studies on the role of teachers in reducing hyperactive behavior of children with special needs reviewed from the characteristics of speed, and balance. Thus, the main purpose of this study is to analyze the role of teachers in reducing the hyperactive behavior of children with special needs reviewed from the characteristics of speed and balance.

## 2 Methods

The survey method used in this study while the design of this study uses comparative. The research was conducted in January-March 2021 at Karanganyar Special School and Sukoharjo Special School, Central Java Province, Indonesia. Target this research is all Special School students in Central Java while the research subjects are students of Karanganyar Special School and Sukoharjo Special School numbered 40 people, with the provision of 20 sons and 20 daughters. Furthermore, the design in this study can be seen in table 1

**Table 1.** Research design

Variable	Hyperactive behavior of children with special needs	
	Karanganyar Special School (A)	Sukoharjo Special School (B)
Speed ( $X_1$ )	$X_{1A}$	$\neq X_{1B}$
Balance ( $X_2$ )	$X_{2A}$	$\neq X_{2B}$

Description:

- A = Hyperactive behavior of children with special needs at the Karanganyar Special School
- B = Hyperactive behavior of children with special needs at the Sukoharjo Special School
- $X_1$  = Speed students of Karanganyar Special School and Sukoharjo Special School

X2 = Balance students of Karanganyar Special School and Sukoharjo Special School

In this study there are several steps taken, namely " (1) establishing the group of research subjects; (2) carry out modified speed, and balance tests; (3) carry out a speed test using a 30-meter running test and a standing balance test with one modified leg; (4) looking for the average score of the tests performed and compared between the two; (5) looking for differences between the two averages through speed, and balance tests accompanied by hyperactive behavior in children with special needs following the characteristics of children with special needs use (t-test)"to know whether or not the difference in speed tests and balance modified to reduce hyperactive behavior of children with special needs between Karanganyar Special School and Sukoharjo Special School". The population and samples of this study are Karanganyar Special School and Sukoharjo Special School Central Java Province, using a sample of 20 males and a sample of 20 females aged 10-12 years.

The sample criteria in this study are children in outstanding schools, (ii) This study was approved by respondents through parental consent informed through a statement of approval to be sampled, and (iii) this study put forward ethical, value, and moral principles in the survey research through the modified treatment of speed, and balance tests. Before this study was conducted, researchers held a meeting with the school and the student's families to explore information related to this study about the role of teachers in reducing hyperactive behavior of children with special needs reviewed from the characteristics of speed, and balance. Furthermore, data collected through motor ability tests are analyzed descriptively and inferentially. Descriptive analysis is intended to get an overview of data that includes average values, value ranges, maximum values, and minimum values while inferential analysis is used to test research hypotheses using t-tests at a significant level of 95% or  $\alpha=0.05$ . Overall statistical data analysis is used in general using computer systems in SPSS version 23 programs.

### 3 Results and discussion

Based on the results of the descriptive analysis found several things, namely identification about speed, and balance accompanied by hyperactive behavior in children with special needs can be described as follows;

#### 3.1 Descriptive analysis of data

Descriptive analysis of data aims to draw in general relation to the distribution of speed and power hyperactive behavior of children with special needs. A recap of the results of the descriptive analysis of the data can be seen in table 2.

**Table 2.** Descriptive analysis results of speed, and balance of male

Mean	Hyperactive behavior of children with special needs	
	Karanganyar Special School	Sukoharjo Special School
Speed	4.99	5.34
balance	24.04	18.97

Based on the results of the descriptive analysis in table 2 can be concluded that there are differences in speed, and balance of children with special needs have reviewed the characteristics of children. This is evidenced from 20 samples obtained the difference in an average value for speed 4.99 – 5.34 difference of 0.35 and balance of 24.04 – 18.97 difference of 5.07. Thus, it can be concluded that Karanganyar Special School speed quality and balance are better when compared to Sukoharjo Special School, this is due to one of the characteristics of different regions. Therefore, the role of teachers in reducing the hyperactive behavior of children with special needs varies. Furthermore, after obtaining a descriptive analysis of frequency to strengthen the findings in the field can be seen histogram average value speed, and balance of students on in figure 1

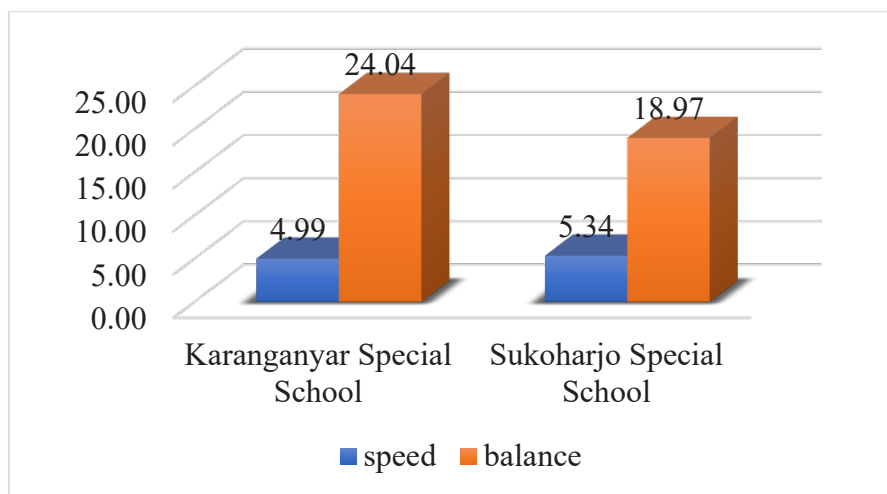


Fig. 1 speed, and balance of male students

Table 3. Descriptive analysis results of speed, and balance of female

Mean	Hyperactive behavior of children with special needs	
	Karanganyar Special School	Sukoharjo Special School
Speed	6.16	7.31
balance	19.75	14.66

Based on the results of the descriptive analysis in table 3 can be concluded that there are differences in speed, and balance of children with special needs children reviewed characteristics of children. This is evidenced from 20 samples obtained differences in average values for speed 6.16 - 7.31 difference 1.15 and balance of 19.75 - 14.66 difference 5.08. Thus, it can be concluded that Karanganyar Special School speed quality and balance are better when compared to Sukoharjo Special School, this is due to one of the characteristics of different regions. Therefore, the role of teachers in reducing the hyperactive behavior of children with special needs varies. Furthermore, after obtaining a descriptive analysis of frequency to

strengthen the findings in the field can be seen histogram average value speed, and balance of girls in figure 2.

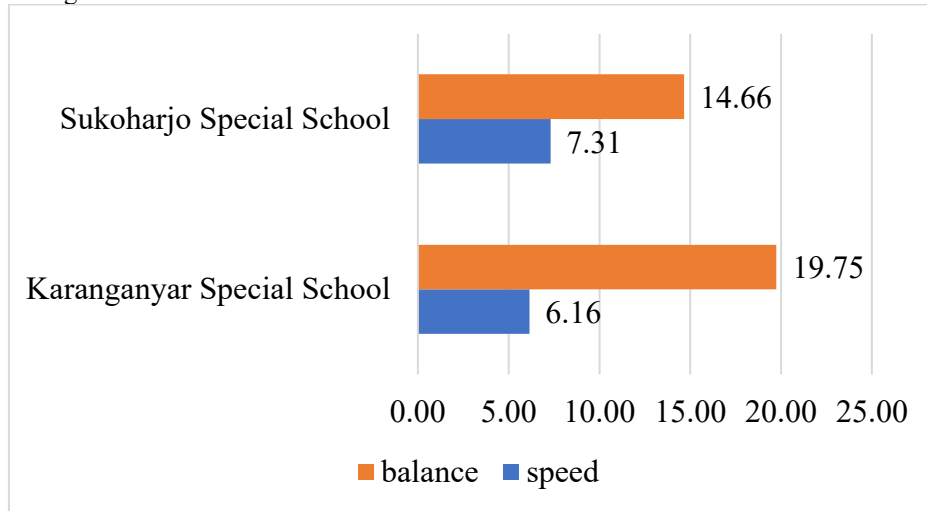


Fig. 1 speed, and balance of female

To prove the significance of differences in the role of teachers in reducing hyperactive behavior of children with special needs reviewed from the characteristics of speed, and balance, it is necessary to conduct statistical testing with "t\_test". After the results of the descriptive analysis are described thoroughly then continued with the normality test data using Kolmogorov-Smirnov Z test (KS-Z) at a significant level  $\alpha = 0.05$  as a prerequisite for the test of the research hypothesis, while the results of normality of research data can be seen in the normality test table.

### 3.2 Data normality test

Table 4. Data normality test results "speed, and balance" students male

Statistics	Hyperactive behavior of children with special needs			
	Karanganyar Special School	Sukoharjo Special School	Karanganyar Special School	Sukoharjo Special School
	Speed		Balance	
Number of Samples	10	10	10	10
Kolmogorov-Smirnov Z	.951	.737	1.009	.602
Asymp. Sig. (2-tailed)	.326	.648	.260	.861

**Table 5.** Data normality test results "speed, and balance" students female

Statistics	Hyperactive behavior of children with special needs			
	Karanganyar Special School	Sukoharjo Special School	Karanganyar Special School	Sukoharjo Special School
	Speed		Balance	
Number of Samples	10	10	10	10
Kolmogorov-Smirnov Z	.541	.918	.350	.724
Asymp. Sig. (2-tailed)	.932	.369	1.000	.671

Based on the results of the data normality test in tables 4 and 5 Kolmogorov-Smirnov Z (KS-Z) values in all data groups, both sons and daughters turned out to be greater than the value of  $\alpha = 0.05$ . Thus it can be concluded that the sample of this study comes from a normally distributed population. This conclusion provides implications that parametric statistical analysis can be used to test the hypotheses proposed in this study so that the first conditions for hypothesis testing have been met. Furthermore, the homogeneity test is conducted with the Barlett test at  $\alpha = 0.05$ . recapitulation of homogeneity analysis results with Barlett test using Oneway Anova test of homogeneity of variances analysis presented on the homogeneity test table.

### 3.3 Homogeneity test

**Table 6.** Homogeneity test results

Group	$\chi^2$	$\chi^2_{\alpha \text{ tables} = 0.05}$	Sig. (p)
Speed	1.811	18.307	0.218
Balance			

The test results indicate the results of Levene test obtained values of 1,811 and  $p = 0.218 > \alpha 0.05$  or testing indicates that the value of  $\chi^2$  counts = 1,811 smaller than the value of  $\chi^2$  tables = 18,307 with a significant degree (p) = 0.218 so that it is concluded that the eight groups of data tested came from a population with homogeneous variance. Based on both test results the above analysis requirements provide the conclusion that the analysis requirements required for variance analysis are met so that it is feasible to conduct further analysis in looking at the role of teachers in reducing hyperactive behavior of children with special needs reviewed from the characteristics of speed and balance. After the test conditions are met then the hypothesis test is then conducted as for the results of the hypothesis test to know the significance of the role of teachers in reducing hyperactive behavior of children with special needs reviewed from the characteristics of speed, and balance can be seen in table hypothetical test below.

### 3.4 Statistical test

**Table 7.** T-test data results "speed, and balance" students male and female

Statistics	t <sub>count</sub>	Sig.	t <sub>table (0,05)</sub>
The difference in speed male	2.298	0.047	
The difference in balance male	0.740	0.027	
The difference in speed female	3.614	0.006	1.833
The difference in balance female	1.596	0.002	

Based on analysis coefficient of correlation t-test in table 7 above obtained the value of  $t_{\text{count}}$  for speed of sons and daughters respectively of 2,298 and 3,614 and greater than  $t_{\text{table}}$  (9;0.05) 1,833 while for the value of  $t_{\text{count}}$  for the balance of sons and daughters respectively of 2,631 and 4,319 and greater than  $t_{\text{table}}$  (9;0.05) of 1,833. Based on these results, it can be concluded that the correlation coefficient (t-test) between speed and balance is significant or  $H_0$  is rejected and received  $H_1$ . Thus it can be concluded that there is a significant influence on the role of teachers in reducing hyperactive behavior of children with special needs reviewed from the characteristics of speed, and balance. This means that the coefficient can be generalized or can apply to the overall population of students where a sample of 40 people was taken.

#### 4 Discussion

This study was conducted to analyze the role of teachers in reducing hyperactive behavior of children with special needs reviewed from the characteristics of speed and balance. The results of this study were consulted into the literature and the results of previous research, aimed at making reference guides for educators, parents, and stakeholders related to the application of learning for children with special needs in Indonesia through the role of teachers in reducing hyperactive behavior of children with special needs reviewed from the characteristics of speed, and balance. In the context of the literature review, no research has been found related to the role of teachers in reducing hyperactive behavior of children with special needs, judging by the characteristics of speed, and balance. Therefore, the findings of this study are useful as a consideration and reference material to be applied in learning and educating both in the school environment and in the social environment. In the context of research, one of the updates of this study is about the role of teachers in reducing hyperactive behavior of children with special needs is reviewed from the characteristics of speed, and balance, namely how teachers act as educators, mentors, designers/designers of learning, artists/actors, mediators, and motivators to handle hyperactive behavior of children with special needs.

In a study conducted by Volex from the results of the study found that endurance exercises require continuous and structured exercise and accompanied by competent people in their field [12], [13] in the need for self-training exercises that are integrated with the purpose of exercise according to the needs, [14] advance to provide training focus on the transition of quantitative exercises towards qualitative. The point is that quality exercises must be balanced with quantitative exercises to develop individual cognitive. [15] in the process of exercise should learn from sports science so that in the process of exercise obtain useful results, [16] to reduce hyperactive behavior in hyperactive children the need for continuous exercise [17] in his research was put forward to reduce hyperactive behavior of children through learning Sports education, [18] continuous physical exercise to reduce hyperactive behavior of children, and [19] exercises using racquet media to reduce children's hyperactive behavior and improve children's cognitive behavior.

If a review of gender characteristics in children ADHD required mentoring and special strategies in providing learning following the characteristics and needs for hyperactive children [20] suggests fostering a caring attitude in children through social interaction, [21] in reducing hyperactive behavior of children one of which is through the implementation of inclusion schools. Similarly, research conducted by [22] that to meet children with special needs at an early age through inclusion education. [23] in his research stated that inclusive education has

a positive impact in educating children with special needs both in the school environment and social environment. [24] suggests to reduce hyperactive behavior, especially in children with attention disorders, the need to approach motion training through physical fitness gymnastics exercises, [25] to reduce hyperactive behavior of autistic children the need to pay attention to the school environment and support social family, [26] one solution to reduce the attitude of children is through training skills social, and [27] lifestyle can affect the health of children with special needs.

Looking at the results of the study, the need to study the results of education and teaching research, one of which is through the learning of sports education in reducing hyperactive behavior. As a comparison of the results of research conducted globally. [28] one of the strategies to reduce children's hyperactive behavior is through sports activities, [29] recommendations of the results of this study to reduce the hyperactive behavior of children one of them through athletic exercises accompanied by trainers, similarly, recommended by [30] one of the alternatives to treat children who have hyperactive behavior one of them is through resistance circuit training, and [31] that the results of this study were put forward to increase trust and reduce hyperactive behavior of children one of which is through social interaction through the education of children with special needs.

Thus, it can be concluded that to reduce the hyperactive behavior of children with special needs, one of them is through education and sports learning by involving the role of teachers by considering the characteristics of hyperactive behavior contained in children with special needs following the characteristics of hyperactive behavior of children. One of the updates of this study on the role of teachers in reducing hyperactive behavior of children with special needs is reviewed from the characteristics of speed, and balance indicated by how teachers act as educators, mentors, learning designers/designers, artists/actors, mediators, and motivators to handle hyperactive behavior of children with special needs.

## 5 Conclusion

Based on these findings, the researchers predicted that the role of teachers in reducing hyperactive behavior of children with special needs was reviewed from the characteristics of speed, and balance. The results of this study also contributed to expanding the current knowledge about the hyperactive behavior of children with special needs through the role of teachers in reducing hyperactive behavior through the characteristics of speed, and balance. Since this study only involves a small sample, caution needs to be taken to determine more effective and efficient parenting and learning patterns in children with special needs. However, further research is needed to reduce the hyperactivity behavior of children with special needs taking into account social, psychosocial environmental variables, applying modified motor skills exercises, and those related to problems in reducing hyperactive behavior in children with special needs.

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# Effectiveness of Private Vocational School Lesson Learning In Pandemic Covid-19

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**Abstract.** This study to determine the effectiveness of online learning PJOK subjects in Covid-19 pandemic. The descriptive qualitative was used. A questionnaire and validity used source triangulation. The results are: the factor of planning and making teacher learning materials is effective at 22.5, effective students are 22.5 and parents are quite effective at 17.26; the material delivery factor according to the teacher is classified as effective at 23.5, students are classified as quite effective at 19.05, and the parents are classified as quite effective at 18.53; the interactivity factor of learning from the teacher's point of view is classified as very ineffective at 6.5, students are very ineffective at 5.23, while parents are very ineffective at 5.03; the learning evaluation factor according to the teacher's view is quite effective at 18.5, students are quite effective at 16.34 and parents are quite effective at 16.34. The concluded was online PJOK was a quite effective.

**Keywords:** effectiveness of online learning, COVID-19 pandemic.

## 1 Introduction

The implementation of education with the intention of one of them is to increase quality human resources (HR), for the advancement of the Indonesian nation and state. The basis and objectives of education are fundamental problems in the implementation of education, because the basis of education will determine the style and content of education. The function of education is to prepare for the future so that it is far more prosperous both as individuals and collectively as citizens both nationally and between nations. Sports and Health Physical Education (PJOK) has an important role in the development of student behavior. Sports and health physical education is an educational process aimed at achieving educational goals through physical movement.

However, the Covid-19 pandemic at this time has an impact on all aspects of life including aspects of education from elementary school to college. The existence of this virus outbreak hampers teaching and learning activities that usually take place face-to-face, the Covid-19 pandemic forces a policy of maintaining distance (physical distancing) to minimize the spread of the virus. With the Covid-19 outbreak, teaching and learning activities in Indonesia were replaced from offline learning methods (face-to-face) to online (online) to slow down the rate of spread of the virus. Teachers and students are not face to face but occur remotely which allows teachers and students to be in different places. The government's decision to dismiss students, move the teaching and learning process at schools to be at home.

In general, online learning systems are implemented through computers or laptops and smartphone (HP) connected to an internet connection. Teachers are expected to be able to learn

together at the same time using groups on social media such as WhatsApp (WA), Google Form, Google Classroom, Gogle Meet, Telegram, Instagram, Zoom or other media as learning media.

In a positive light, this learning is very helpful for the continuity of learning in this pandemic. However, changes in patterns or habits that are very fast and unexpected are very difficult to carry out and are normal when they occur. This significantly changed habits, for example, first, teachers and participants rely heavily on computer devices and internet connections, both teachers and students must be able to change styles, strategies or teaching and learning methods, the third teacher and students must be able to change their communication styles during online learning. this.

Based on the background of the problem above, the problem in this study can be formulated as follows: Can online learning in PJOK subjects be implemented effectively in the Covid 19 era?

## 2 Theory study

The word effectiveness comes from the English language, namely effective, which means successful, precise or achieving the desired target. According to the Big Indonesian Dictionary (KBBI), the definition of effectiveness is something that has an effect or result, is effective, brings results, and is the success of an effort or action. The way to measure effectiveness is to determine the transferability (ability to move) the principles studied. If the goals can be achieved in a shorter time with a particular strategy than with other strategies, then that strategy is used efficiently.

In learning, careful planning is needed, making learning tools, choosing strategies, media, techniques, learning models, and evaluating learning, all of which are mutually sustainable. It is necessary to use effective and innovative learning models so that learning can be more varied and run smoothly. The use of the learning model is also adjusted to the material to be taught so that the suitability between the two and all components becomes appropriate.

Measuring the effectiveness of learning must always be linked to the achievement of learning objectives. The effectiveness of learning is a measure of the success of an interaction process between students and between students and teachers in educational situations to achieve learning objectives. The effectiveness of learning can be seen from the activities of students during learning, students' responses to learning and mastery of concepts. To achieve an effective and efficient learning concept, it is necessary to have a reciprocal relationship between students and teachers to achieve a common goal, besides that it must also be adapted to the conditions of the school environment, facilities and infrastructure, as well as the learning media needed to help achieve all aspects the development of students.

John Carrol in his book entitled "A Model of School Learning", states that Instructional Effectiveness depends on five factors: 1) Attitude; 2) Ability to Understand Instruction; 3) Perseverance; 4) Opportunity; 5) Quality of Instruction [1]. Knowing some of these indicators shows that learning can run effectively if there is an attitude and willingness in the child to learn, the readiness of students and teachers in learning activities, and the quality of the material presented. Online learning is an extension of learning in a network (online) with learning patterns through the help of internet networks so that there will be interactions in teaching and learning activities between students and teachers.

The concept of online learning is a learning system that is carried out not face to face, but using a platform that can help the teaching and learning process carried out even though it is far

away [9]. The purpose of online learning is to provide quality learning services in a network that is massive and open to reach more and wider learning space enthusiasts. Another opinion from E-learning is an asynchronous learning activity through electronic computer devices connected to the internet, where learning participants seek to obtain learning materials that suit their needs [3].

Learning planning is basically a description of some of the activities and actions that will be carried out during the learning process. Thus it can be concluded that the e-learning-based learning planning application contains plans, estimates and an overview of learning activities by utilizing computer networks, both internet and intranet. The scope of learning planning includes four main components, namely objectives, teaching materials or materials, teaching and learning activities, and evaluation.

Learning with e-learning is learning by utilizing internet technology to improve a learning environment with rich content with a wide range of coverage. E-learning is the use of learning media using the internet, to send a series of solutions that can increase knowledge and skills. A statement that reads " in the learning and performance architecture is e-learning not e-learning as it is traditionally practiced but a broader. E-learning is the use of internet technologies to create and deliver a rich broad array of instruction resources and solutions, the goal of which is to enhance individual and organizational performance" [8].

Learning evaluation is an indicator tool for assessing the achievement of predetermined goals and assessing the overall teaching implementation process. Evaluation is not just assessing an activity spontaneously and incidentally, but is an activity to assess something in a planned, systematic, and directed manner based on clear objectives [11].

Evaluation activities for the implementation of e-learning learning can be seen in terms of increasing knowledge and skills of the learning environment, and their effects. Evaluation of e-learning implementation is a process of analyzing the quality of the web learning process (e-learning) and the extent to which the achievement of the e-learning process can be felt by learners. The evaluation is carried out as a form of assessment of the various components contained in e-learning.

PJOK is a very important subject for students to learn today because with knowledge of health and sports practices students can fortify one of them by increasing body resistance (immunity) to prevent the Covid-19 virus. However, the outbreak of pandemic cases since March 2020 until now requires all teaching and learning activities for students to be temporarily carried out at home, this is done to minimize mass physical contact so that it can break the chain of spreading the virus. The government takes a learning policy to be carried out through distance learning with online media (in a network) using either a cellphone, PC, or laptop.

Based on this, it is necessary to have strategies and learning models from good PJOK teachers to be applied to students to improve their competence. Learning strategies and models are a way that teachers use to achieve active and efficient teaching and learning activities. Moreover, the result of the Covid-19 pandemic that hit so that PJOK learning did not run optimally because they had to stay at home and apply physical distancing. So that distance learning / online with its learning pattern through the help of internet networks is applied to PJOK learning so that there will be an interaction of teaching and learning activities between students and teachers and is one of the solutions for teachers in delivering learning material.

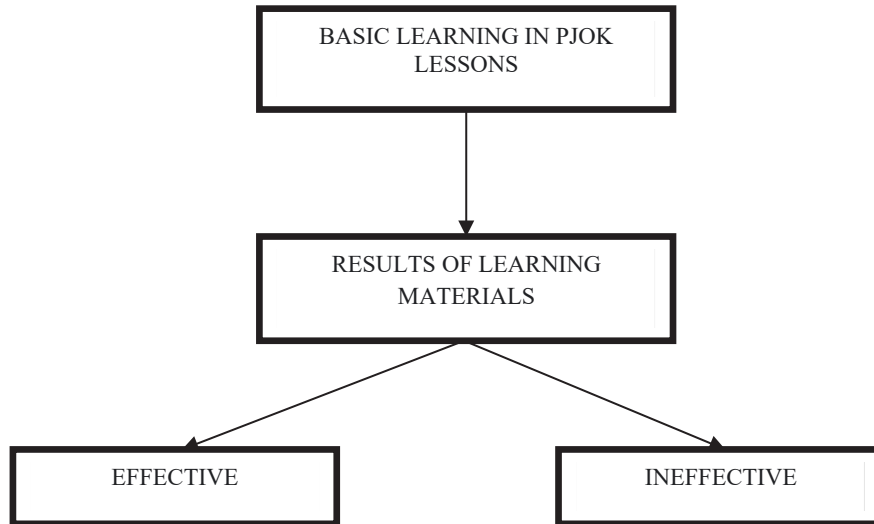


Fig. 1. Research Framework

### 3 Research methods

The research method used by researchers in this study is a qualitative research method. "Qualitative research is a problem-solving strategy in research without using statistical analysis, but by using a logical way of thinking based on qualitative data collected through observation or in-depth interviews with research objects or subjects"[5].

The approach used in this research is a descriptive approach. The analytical descriptive approach is an approach aimed at investigating human activities and work in detail with the aim of providing input for future needs [10]. This study aims to find a detailed and comprehensive picture of the effectiveness of online learning in PJOK subjects. In this study, researchers sought information through giving questionnaires to informants.

The data collection technique used by researchers is nonprobability sampling. In collecting data, this research uses source or data triangulation techniques. Researchers chose informants for class IX SMP Negeri 2 Pematang, so that the data obtained could represent the effectiveness of online learning in PJOK subjects.

## 4 Discussion

### 4.1 Planning and making learning materials (factor 1)

The items used to track this indicator are questions number 1 to 6. The results that are tracked are planning and making learning materials. The results of the answers to the questions on planning and making learning materials are presented in table form as follows:

**Table 1.** Responses on Planning and Making Learning Materials

Sample	Data Tabulation						amount	Average
	Score Item							
	1	2	3	4	5	6		
Teacher	8	8	8	6	7	8	45	22.5
Student	939	899	778	743	700	675	4734	16.90
Parents	921	906	798	783	721	705	4834	17.26

#### 4.2 Delivery of Material (factor 2)

The items used to track this indicator are questions number 7 to 13. The result that the items tracked is the delivery of e-learning material. The results of the answers to the questions regarding the delivery of e-learning material are presented in table form as follows:

**Table 2.** Responses on Delivery of Material

Sample	Data Tabulation						amount	Average
	Item Question							
	7	8	9	10	11	12		
Teacher	6	6	8	8	7	7	5	23.5
Student	911	814	618	662	927	680	733	19.05
Parents	858	792	604	662	861	692	720	18.53

#### 4.3 Learning Interactivity (factor 3)

The items used to track this indicator are questions number 7 to 13. The results that the items tracked are e-learning interactions. The results of the answers to the e-learning learning interaction questions are presented in table form as follows:

**Table 3.** Responses on Learning Interactivity

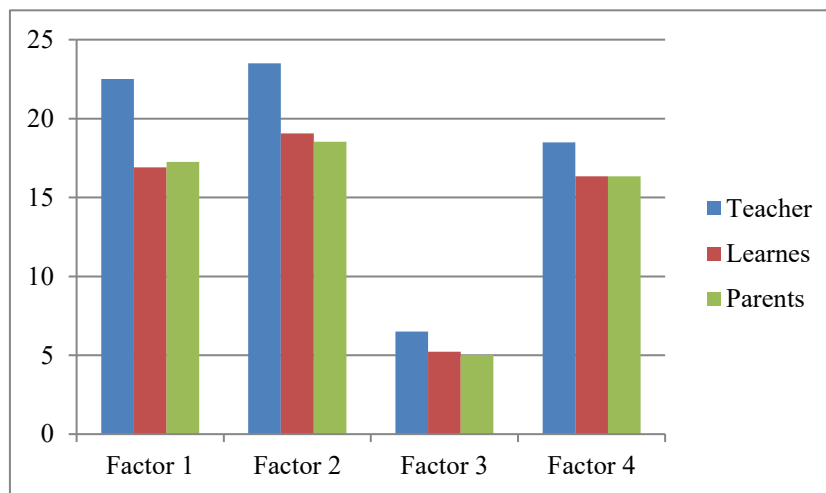
Sample	Data Tabulation		amount	Average
	Item Questions			
	14	15		
Teacher	7	6	13	6.5
Student	719	746	1465	5.23
Parents	709	699	1408	5.03

#### 4.4 Learning Evaluation (factor 4)

The items used to track this indicator are questions number 16 to 21. The result that the items tracked is the evaluation of e-learning learning. The results of the answers to the evaluation questions on e-learning are presented in table form as follows:

**Table 4.** Responses on Learning Evaluation

Sample	Data Tabulation						amount	Average
	16	17	18	19	20	21		
Teacher	8	6	4	5	6	8	37	18.5
Student	684	705	793	697	923	774	4576	16.34
Parents	686	674	851	722	898	745	4576	16.34

**Fig. 2.** Response Bar Chart for Teachers, Students, and Parents

Based on the results of the responses from teachers, students, and parents regarding several factors of the effectiveness of online learning in PJOK, it is known that the first factor is the teacher's average of 22.5, students 16.90, parents 17.26. The second factor was obtained by an average of 23.5 from teachers, students 19.05, parents 18.53. The third factor was obtained by an average of 6.5 teachers, 5.23 students, 5.03 parents. And the fourth factor obtained an average of 18.5 from teachers, 16.34 students, and 16.34 parents.

**Table 5.** Rating Category Table

No.	Interval	Category
1	6 - 10.5	Very Ineffective
2	10.6 - 15.1	Ineffective
3	15.2 - 19.7	Effective enough
4	19.8 - 24	Effective

From the results of the research that has been carried out, the results obtained data on the effectiveness of online learning in PJOK subjects in class IX students at SMP Negeri 2 Pemalang in the academic year 2020/2021. From the data obtained about several factors on the effectiveness of online learning in the PJOK subject, it shows a different average from the respondents of teachers, students, and parents, namely as follows:

Planning and Making Learning Materials

Based on the results of data analysis about the factors of planning and making learning materials according to the PJOK teacher, it has an average of 22.5 with the Effective category, according to the students having an average of 16.90 which is quite effective, while the parents have an average of 17,26 which is classified as Moderately Effective.

#### Delivery of Material

Based on the results of data analysis about the delivery factors of online material in PJOK subjects using the google meet application, according to the PJOK teacher, it has an average of 23.5 with an Effective category, according to the students having an average of 19.05 which is classified as Quite Effective, parents have an average of 18.53 which is classified as Enough Effective.

#### Learning Interactivity

Based on the results of data analysis about the factors of online learning in PJOK subjects using the google meet application, according to the PJOK teacher, it has an average of 6.5 with the Very Ineffective category, according to the students having an average of 5.23 which is classified as Very Ineffective, while the parents have an average of 5.03 which is classified as Very Ineffective. When the teacher will divide the group for discussion of the material that will be given it will be difficult to do because the facial appearance of the students cannot be used as one screen, so it is also difficult to interact and discuss the students in one group and the teacher who cannot directly supervise whether the students are all Students are active or not, especially if the internet is slow according to the opinion of Sawitri D.

#### Learning Evaluation

Based on the results of data analysis on the evaluation factors of online learning in PJOK, according to the PJOK teachers, it has an average of 18.5 with the Fairly Effective category, according to the students having an average of 16.34 which is classified as quite effective, while the parents have an average of 16.34. average 16.34 which is classified as Moderately Effective.

## 5 Conclusion

From the results of the analysis and discussion in chapter IV on the effectiveness of online learning in PJOK subjects, the results are quite effective as a whole, but also still require increased mastery of certain indicators that exist in the aspect of effectiveness of online learning. In planning and making learning material factors according to the teacher is classified as effective with an average of 22.5, while according to students it is classified as quite effective with an average of 16.90, and parents are classified as quite effective with an average of 17.26. The material delivery factor according to the opinion of the teacher was classified as effective with an average of 23.5, while the students' opinion was classified as quite effective at 19.05, and the parents were classified as quite effective with an average of 18.53. The learning interactivity factor from the teacher's point of view is classified as very ineffective with an average of 6.5, according to the students it is classified as very ineffective with an average of 5.23, while parents are also classified as very ineffective with an average of 5.03. And the learning evaluation factor according to the view of the teacher is classified as quite effective with an average of 18.5, according to students it is classified as quite effective with an average of 16.34 and according to parents is also quite effective with an average of 16.34.

Based on the description above, it can be concluded that learning about PJOK through the Covid pandemic in 2020/2021 was quite effective.



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# Relationship Between Physical Activities and Emotional Mental Health on High School Students in 2018

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**Abstract.** This study aims to determine the relationship between physical activity and emotional mental health in Indonesia's high school students in 2018. This research is a type of correlation research with two variables, physical activity and emotional mental health. The research was carried out in all provinces in Indonesia. With the sampling technique using Two Stage Sampling, the sample in this study amounted to 46,230 samples with the characteristics of male and female school students aged 15-18 years. This study used secondary data obtained from the Health Research and Development Agency. The data analysis technique used is Chi Square analysis. The results showed that there was a significant positive relationship between physical activity and emotional mental disorders, and  $H_0$  is accepted. There is a relationship between physical activity and emotional mental health in Indonesia high school students in 2018.

**Keywords:** Physical activity, emotional mental health.

## 1 Introduction

Health is often perceived from a physical point of view. Though healthy also means mental health. Unfortunately, mental health issues are still considered less important than physical health. Even though currently there is health insurance that offers protection related to mental health. The World Health Organization (WHO) said that young people, aka the millennial generation, are currently more susceptible to mental disorders. In Indonesia alone, the number of mental disorders among the population aged 15 years and over has increased from 6% in 2013 to 9.8% in 2018 [2]. Among Indonesian adolescents, there are many phenomena of students' inability to manage stress. The result will be tragic things such as running away and committing suicide, for example, 25 students committed suicide because they were declared not passing the exam [28], Elementary school students commit suicide because they get bad grades [29]. In this era of globalization, there are many challenges that must be faced by school age children or students in Indonesia in the form of pressures caused by various conditions in their surroundings.

Most of the sources of student pressure come from academic problems [7]. This pressure can arise from changes in learning demands from the previous period and from year to year. The Ministry of Education and Culture sets the graduation standard which is always increasing. In addition, the demand for the curriculum used in Indonesia is the 2013 curriculum, which requires students to be more active during Teaching and Learning Activities (KBM) and increase lesson hours so that students leave in the morning and return home in the afternoon,

and maybe some students also take additional lessons. out of school. So they don't have time to do physical activity.

According to WHO (in Welis) physical activity is a body movement produced by skeletal muscles that requires energy expenditure. Changes in lifestyle towards a sedentary, namely a lifestyle that has less physical activity affect physical and mental health. The benefits in the health aspect are preventing obesity because by doing activities calorie burn will occur [20]. Physical exercise can increase attention and motivation, through increasing levels of dopamine and norepinephrine, thereby making a more positive mood, reducing anxiety, and increasing self-confidence [2]. Physical exercise can also increase serotonin [2]. Serotonin is the third monoamine neurotransmitter, also known as 5-HT, aka 5- hydroxytryptamine. The effects on behavior are complex. Serotonin plays a role in mood regulation, control of eating, sleeping, and wakefulness, as well as in pain regulation[21].

There are several factors that affect mental emotional health. There are two factors that affect mental health, namely internal and external factors [5]. These internal factors include personality, physical condition, development and maturity, psychological conditions, diversity, attitude to face life problems, meaningfulness of life, and balance in thinking. As for what includes external factors, among others, social, economic, political conditions, customs, environment, and so on. Furthermore, reveals that the two factors above[5], the most dominant are internal factors. The factor of peace of life, peace of mind or inner happiness does not depend much on external factors such as social, economic, political, customs, etc. However, it depends more on the way and attitude to deal with these factors. In the current condition of school children, they tend to rush in making decisions, such as wanting to end their own life because the daily test scores are unsatisfactory or doing negative things such as using narcotics because they do not pass the exam.

Research published in the American Journal of Psychiatry in 2018 that examined 22,000 Norwegian participants found a strong association between not exercising and depressive disorders. The results also showed that regular exercise could prevent depression by as much as 12%, even with just one hour of physical activity a week [12].

#### Physical Activity

Physical activity as body movements produced by skeletal muscles that require energy expenditure, including activities performed while working, playing, doing household chores, traveling or activities involved in recreation. Physical activity can be planned, structured, repetitive, and aims to improve or maintain one or more components of physical fitness[31].

The right physical activity will spur the child's growth and development optimally. The benefits of physical activity for the child's emotional are:

#### Intellectual Development

Exercise is also beneficial for intellectual development. Sport also provides opportunities for children to move to express themselves, shout sounds according to the movements carried out, activate cognitive functions through symbolic roles, language development, and use of symbols at an early age, and develop strategic learning skills, make decisions, integrate information, and solve problems at later age development.

#### Emotional and Social Development

Physical education is useful for personal and social development which requires individual efforts to interact with others. The acquisition of desired social values such as cooperation, commitment, leadership, honesty as well as responsibility and tolerance need to be taught through participation in activity-based teaching. Enjoying physical activity will increase self-confidence and social awareness. States that physical abilities are closely related to children's self-image. Children who have better physical abilities in sports will cause them to be

appreciated by their peers [10]. Physical activity also provides an opportunity for release of emotional tension in appropriate ways. When participation is shown by students who are also supported by the environment,

#### Emotional Mental Health

Mental health is a condition in which an individual has a visible well-being that is able to realize his own potential, has the ability to cope with the pressures of normal life in various situations in life, is able to work productively and generously, and is able to contribute to his community. Furthermore, mental health problems often occur in the elderly, women, low levels of education, and lack of income [32]. stated that individuals aged 16 years and over and groups of students who experience harassment and condescending attitudes by their parents have more than twice the risk of experiencing mental emotional symptoms [16].

#### Framework of thinking

Physical activity is a body movement produced by skeletal muscles that requires energy expenditure. There are many benefits that can be obtained when doing regular physical activity, including in terms of psychic such as reducing stress, increasing self-confidence, and building a sense of sportsmanship. Conversely, if a person is not moving enough, it causes various health problems, both physical and psychological. Based on the results of the study, high school aged high school children often experience mental emotional health disorders characterized by feelings of loneliness, worry, and suicidal thoughts. This may be due to the demands of a fairly long study time that is imposed on them, resulting in periodic accumulation of stress and lack of physical activity. Based on these thoughts, the authors are interested in investigating whether physical activity has a relationship with emotional mental health in high school students in Indonesia

## 2 Methods

This research is a type of correlation research. This study used a cross sectional design. In a cross-sectional study, the relationship between the independent variable (risk) and the dependent variable (effect) is sought by taking a momentary measurement.

The population in this study were all households in Indonesia based on the highest level of welfare and education completed by KRT (Head of Household) [2]. The sample is part of the number and characteristics of the population [26]. In this study, the sample used was household member with the characteristics of school work [2] aged 15-18 years who had male and female sex. The age range is the age group for high school students in Indonesia [27]

This study uses secondary data obtained from the Indonesian Health Research and Development Agency (Litbangkes). The data used in this study were physical activity data and mental emotional health disorders in high school students aged 15-18 years in Indonesia. Physical activity data were obtained from a modified Global Physical Activity Questionnaire (GPAQ) questionnaire from WHO. The description of physical activity behavior includes heavy and moderate physical activity in daily activities (combined at work / at home, leisure time and transportation) in the number of days per week and the number of minutes per day.

Strenuous physical activity is physical activity carried out for  $\geq 3$  days / week and MET (Metabolic Energy Turnover) minute per week  $\geq 1500$  (MET minute value for strenuous physical activity = 8). MET is a unit of energy expenditure and is used to measure physical activity in minutes. MET minute is a unit used to measure the volume of an individual's physical

activity. Moderate physical activity is physical activity that is carried out for  $\geq 5$  days a week with an average length of activity  $\geq 150$  minutes a week (or  $\geq 30$  minutes per day).

### 3 Results

#### 3.1 Descriptive Analysis

In this study, the data in question is data obtained using secondary data and data collection techniques using a questionnaire. This study uses two variables, the independent variable, namely physical activity, and the dependent variable, namely mental emotional health. The research data were obtained from 46,230 samples with the criteria of respondent age 15-18 years who have male and female sex. The age range is the age group for high school students in Indonesia.

**Table 1** Descriptive Statistics

	Descriptive Statistical Analysis				
	N	Min	Max	Mean	SD
Physical Activity	46,230	1	2	1,524	0.499
Mental Health Problems	46,230	1	2	1,909	0.288
Gender	46,230	1	2	1,489	0.500
Age	46,230	15	18	16,216	1,057
Valid N (listwise)	46,230				

#### 3.2 Characteristics of Respondents

**Table 2.** Gender Frequency Distribution

Category	Frequency	Percentage(%)
Man	23,611	51.1
Women	22,619	48.9
Total	46,230	100

The table above shows the gender. Based on the table above, it is known that 23,611 respondents (51.1%) were male and 22,619 respondents (48.9%) were female. Based on this information, it is known that most of the respondents are male.

**Table 3.** Respondents' Age Frequency Distribution

Category	Frequency	Percentage(%)
15 years	15,053	32.6
16 years	13,002	28.1
17 years	11,303	24.4
18 years	6,872	14.9
<b>Total</b>	46,230	100

The average age of the respondents was 15 years old, with the youngest being 15 years old and the oldest being 18 years old. Most respondents are 15 years old.

### 3.3 Univariate Analysis

The results of the analysis were carried out to analyze the individual characteristic variables that existed descriptively using frequency distributions and proportions. Univariate analysis in this study was carried out on research variables which include: physical activity and mental emotional health.

**Table 4.** Physical Activity Frequency and Emotional Mental Health Distribution

Characteristics	Category	Frequency	Percentage(%)
Physical Activity	Active	22,023	47.6
	Less active	24,207	52.4
	Total	46,230	100
Emotional Mental Health	Yes	4,207	9.1
	Not	42,023	90.9
	Total	46,230	100

### 3.4 Bivariate Analysis

Analysis of the relationship between physical activity and mental emotional health can be seen in table 5.

**Table 5.** Cross Tabs

	Emotional Mental Health Disorders					
	Yes		Not		Total	
Physical Activity	N	%	N	%	n	%
Active	2,127	4.6	19,896	43	22,023	47.6
Less active	2,080	4.5	22,127	47.9	24,207	52.4

Based on the table above, it is known that respondents who did physical activity in the active category were 22,023 respondents (47.6%). Of the 22,023 respondents, 2,127 (4.6%) experienced mental emotional health problems. While the majority, namely 19,896 respondents (43%) did not experience mental emotional health problems. Based on information that most respondents do not experience mental emotional health problems. After that, there were 24,207 respondents who did physical activity in the less active category (52.4%). Of the 24,207 respondents, 2,080 respondents (4.6%) experienced mental emotional health disorders. Meanwhile, most of 22,127 (47.9%) did not experience mental emotional health problems. Based on information that most respondents do not experience mental emotional health problems.

So it can be concluded that respondents who are active in physical activity tend not to experience mental emotional disturbances, while respondents who are less active in physical activity tend not to experience mental emotional disorders.

The two groups of physical activity have the same conclusion, namely that most of them do not experience mental emotional health problems. Even so, there is a slight difference in the percentage of respondents who experience mental emotional health disorders.

To know for sure whether there is a relationship between physical activity and emotional mental health, a statistical test is needed. The statistical test used is the chi square test:

**Table 6.** Chi Square Test

Statistics	<i>Chi Square</i>	P	Kendall tau correlation
Score	15,827	0,000	0.019

## 4 Discussion

The results of statistical calculations obtained a value of  $\chi^2$  of 15,827 and a probability value of 0,000. The probability value is  $<0.05$ , which means that there is a significant relationship between physical activity and emotional mental health. In the previous explanation, it is not known whether the pattern of influence is positive or negative, because the two groups produced the same conclusion, namely respondents with active or active physical activity. less active are less likely to experience mental emotional health problems. But it turns out that the results of statistical tests show the effect of physical activity on mental emotional health. The pattern of the relationship can be seen from the sign of the Kendall tau test, if it is positive then the relationship is positive and vice versa. The results of the Kendall tau calculation obtained a correlation coefficient value of 0,019 which means that the closeness of the relationship is very weak with a coefficient value of  $<0.25$ . However, the value of the relationship is positive so that the relationship between physical activity and mental emotional health is positive. Positive relationship here means that the higher the respondent performs physical activity, the better the mental emotional health.

## 5 Conclusion

Research on the relationship between physical activity and emotional mental health in high school students in 2018 in Indonesia has the following conclusions, namely that the physical activity of students is almost balanced between those who are active and less active, namely 47.6% of students are active in physical activities and the remaining 52.4 % of students are less active in physical activity. Then most of the students did not experience mental emotional health problems, namely as much as 90.9%. Meanwhile, the remaining 9.1% experienced mental emotional health problems. Then there is a significant positive relationship between physical activity and mental emotional disorders. This is evidenced by the chi square statistical test, the probability value is  $<0.05$  and the Kendall tau test is obtained a value of  $0.019 > 0$  (positive).

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# The Analysis Of The Online Physical Education Learning During The Pandemic In The Outmost Area

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**Abstract.** This study aims to identify how the online physical education learning process is during the pandemic. The design used is causal comparative (*ex-post facto*). The aim is to see how the learning activities and what media are used by Physical Education teachers. The instrument used was an online questionnaire with several questions, starting from the identity of the teacher, the media used, the obstacles experienced by teachers in online learning and the teacher's perceptions of online learning today. The sample used was elementary to high school physical education teachers. The results showed that the use of learning application media was obtained for elementary school physical education teachers who preferred more to use social media WhatsApp for teachers aged <40 years = 49%, junior high school teachers aged 24-40 years = 35.54% preferred more to use google classroom, while high school teachers who were dominated by teachers aged 24-40 years = 34% using 3 learning application media with a small difference, namely, google classroom, Whatsapp and manual. The dominant use of applications in each educational unit cannot be denied, apart from the age factor, other things, namely, the geographical location factor and the ability of the human resources of the physical education teachers themselves.

**Keywords:** Online Learning, Physical Education, Learning Application Media

## 1 Introduction

The Covid-19 pandemic emerged in December 2019 has effected many sectors of human life including the education. All indoor activities are postponed to do including school activities to anticipate the spread of the Covid-19 infection, so those school indoor activities are shifted from classroom to the online learning media. Moreover, there was also the official circular letter (Circular Letter No. 13 Education and Culture Authority 2020 about the education policy under emergency situation of Covid-19 pandemic) published by local education authority ordering “the learning process being done via online media as the alternative of learning media” [1] explains that “there are two learning models which can be used by teachers as the media of learning to deliver the knowledge, namely, online and mixed or blended learning model (the combination of two learning methods online and offline learning)”. Under this circumstance, the government has given the freedom to each school and also the teachers in that institution to choose and use the online learning platform to apply in their classrooms. The ministry of education also provides two free online learning platforms named “*Rumah Belajar*” and “*Program Guru Berbagi*”. Those free platforms give several

benefits to the users where *Rumah Belajar* gives and provides the learning materials and the other additional features possibly being accessed by the users. The platform *Berbagi antar Guru* enables teachers to share the lesson plans among the teachers across the country. According to Ismail, the learning process cannot be separated from the important role of the teacher and students to achieve the better learning process. Therefore, lesson planning is the main key of teacher's effort to prepare the learning activity. Through the learning combination model, teachers and students will always continue the application of technology which is combined by the face-to-face method to have a comprehensive learning practice. The internet connection, smartphone, and laptop which become the part of the current technology have been widely used whereas the users make use of them to do the distance learning. Nadia states that "based on the Indonesian topography characterized by archipelagic and mountainous area, it needs the widespread accessible cellular service where, factually, there are still so many areas which have not yet received the internet connection service so that condition causes the online learning still difficult to maximally" [2]. "The another factor is the lack of fast and reliable technology and internet access for the students living in the rural area and in the low class family" [3]. This type of learning makes use of the internet technology equipped with the accessibility, connectivity, flexibility, and ability enabled the learning interaction variety in a virtual classroom [4]. "The fact in the field, based on the explanation from Titis Ekawati quoted by Antara, shows that the characteristic of area in Sanggau varies from one place to the other and not all area are available with internet connection"[5]. According to [6], there are some obstacles faced by the physical education teachers in the process of virtual learning application; "(1) Not all physical education teachers and students have the access to the computer, laptop, and smartphones. (2) there are some teachers who are not skillful yet to make use of the learning media both hardware and software; (3) the internet access is still limited in most of area where the teachers work; (4) the physical education teachers are mostly confused to choose the learning platform that can facilitate the physical education".

There are several factors which should be considered so that the distance learning can be done well. Those factors are the attention, teacher's confidence, experience, ability and creativity to use the supporting devices and ability to create an interaction to the students. The distance learning is attributed by the benefits of location and time flexibility. The school staffs, teachers, and students struggle adapting to the new model of online learning [7]. Under this circumstance, the teachers and students, not only in Indonesia but also the other countries all over the world, have been practicing the online learning to solve the problems of the absence of face-to-face learning caused by the pandemic. The other benefits of the online learning media are "the high level of autonomy and interaction in learning, the improvement of memorizing ability, the wider range of learning experience through the use of texts, audios, videos and animation being used to deliver the information, and also an easy access to updating the content, downloading, e-mailing among students, sending comments in discussion forum, using chat room, and having teleconference for a direct communication" [8]. "The obstacles or issues faced in the process of distance learning are founded in the field. Based on the preliminary survey done by *Pustekkom* team, there were several reports about the common problems faced in the outmost location area which were related to information and

computer technology issues. Those problems were 1) the absence of the electricity, 2) the absence of internet connection, 3) the absence of internet and computer infrastructure, 4) the absence of human resource to information technology, 5) the bad or even absence cellular in several areas” [9]. The ICT skill of teachers in Indonesia is not distributed equally in all areas. The big gap of Indonesian education quality is also one of the obstacles. The other factors are the internet access, the teacher qualification, education quality, and the lack of ICT skill causing the problems in the distance learning initiative.

The implementation of the online learning in the field requires the readiness both the education providers, teachers, and the participants, students [10]. The online learning has been already done by some teachers in several areas in Kalimantan, especially, Landak Regency, West Kalimantan. Nevertheless, the reality shows that the online learning does not run well. There are some schools in the outmost area near the border between Indonesia and Serawak, Malaysia. The observation of the online learning in those areas could not be done because those areas are not provided with the internet connection. That situation also happened in physical education subject [11]. It may be difficult to imagine how the online learning is implemented in physical education subject. Moreover, physical education subject requires the physical activities in its learning process. This research is conducted based on the statements presented previously where the aim is to search for the information on how physical education learning should be designed online during the pandemic and also about how teachers choose the learning media, materials, and identify the problems in the learning process.

## 2 Method

In the qualitative research, the validity of the data depends on the source and techniques to collect the data [12]. The researcher collected data from the result of the survey where the data was collected and proceeded in *MS Excel spreadsheet*. The statistical presentation is originally the result of some statements characterized by general quantitative. The design applied in this research was causal comparative (*ex-post facto*) which was aimed to observe what the learning media and activities applied by physical education teachers during the pandemic. The questionnaire was used as the instrument of the research spread by online. the questionnaire consisted of several questions about personal information of the teachers (name, gender, degree, age) and learning media used in their online learning classes. In this research, the validity testing to the instrument of the research was conducted through bivariate Pearson (Pearson correlation product moment). The method was conducted by correlating each item score with the item total score. The item correlative coefficient with Pearson bivariate can be identified with the following formula:

$$r = \frac{n\sum ix - (\sum i)(\sum x)}{\sqrt{[n\sum i^2 - (\sum i)^2][n\sum x^2 - (\sum x)^2]}}$$

where :

r : the coefficient of total item correlation

I : score of item

x: total score

n : number of subject (Priyatno, 2010:91)

The instrument validity testing was conducted toward 200 respondents outside the targeted sample but it still represented the population characteristic. To determine the validity of the items, it was based on the number of respondents and r table value at 5% significance level, namely, 0.361. It means that the item is categorized as valid item if its t count is larger than t table, 0.361. The result of the testing is presented in the following table :

**Table 1.**Validity Testing of Variable X

Item	Corrected Item- Total Correlation	Critical limit	Status
P1	0,466	0,361	Valid
P2	0,545	0,361	Valid
P3	0,403	0,361	Valid
P4	0,646	0,361	Valid
P5	0,681	0,361	Valid
P6	0,708	0,361	Valid
P7	0,590	0,361	Valid
P8	0,469	0,361	Valid
P9	0,612	0,361	Valid
P10	0,699	0,361	Valid
P11	0,540	0,361	Valid
P12	0,640	0,361	Valid
P13	0,666	0,361	Valid
P14	0,496	0,361	Valid
P15	0,545	0,361	Valid
P16	0,432	0,361	Valid
P17	0,683	0,361	Valid
P18	0,418	0,361	Valid
P19	0,393	0,361	Valid
P20	0,553	0,361	Valid
P21	0,543	0,361	Valid
P22	0,585	0,361	Valid
P23	0,638	0,361	Valid
P24	0,559	0,361	Valid

The result of validity testing of variable X (the obstacles in the online learning) shows that all 24 question items for variable X are valid because of the corrected item-total correlation larger than 0.361.

**Table 2.**Validity Testing of Variable Y

Item	Corrected	Critical	Status
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	Item- Total Correlation	limit	
P1	0,674	0,361	Valid
P2	0,713	0,361	Valid
P3	0,664	0,361	Valid
P4	0,681	0,361	Valid
P5	0,457	0,361	Valid
P6	0,366	0,361	Valid
P7	0,565	0,361	Valid
P8	0,469	0,361	Valid
P9	0,447	0,361	Valid
P10	0,598	0,361	Valid
P11	0,833	0,361	Valid
P12	0,498	0,361	Valid
P13	0,806	0,361	Valid
P14	0,366	0,361	Valid
P15	0,603	0,361	Valid
P16	0,713	0,361	Valid
P17	0,664	0,361	Valid
P18	0,477	0,361	Valid
P19	0,833	0,361	Valid
P20	0,498	0,361	Valid
P21	0,498	0,361	Valid
P22	0,806	0,361	Valid
P23	0,457	0,361	Valid
P24	0,366	0,361	Valid

Similar to the previous validity testing toward variable X, the validity testing toward variable Y also shows that 24 items for variable Y are also valid because the corrected item-total correlation is larger than 0.361. Reliability relates to the trustworthy toward the test instrument. The reliability requires the stability between the observation and the instrument. There some primary steps in analysing the reliability, namely: a) Adding the score of even numbered question (x) and odd numbered question (y), b) Identifying the product moment coefficient  $r_{xy}$  between x and y, c) Correcting  $r_{xy}$  using *Spearman Brown* formula.

Those steps were applied to measure the level of reliability of the instrument for variable X and Y. The application used to do the measurement was SPSS for Windows Release 16. The reliability testing toward the instrument involved 200 respondents. The result of the test is presented in the following table:

**Table 3** The Result Of Instrument Reliability Testing

Variable	Item	Score-Total Correlation	Sig. (2- tailed)	Status
X	24	0.861**	0,000	Reliable
Y	24	0.831**	0,000	Reliable

Based on the Score-Total correlation in the table, the result shows that both instrument score for variable X and Y are 0.861. It shows that those instruments have a high level of correlation or they are all reliable. It is characterized by the sign of stars

on the Score-Total Correlation. The sample of the research was the teachers in the Landak regency from the elementary to the senior high school level. The number of the sample in each educational level or unit is presented in the following table.

**Table 4.** Physical Education Teacher Respondents in Landak Regency

Educational Unit	Respondents
Elementary school	50
Junior high school	40
Senior high school	110
<b>Total</b>	<b>200</b>

### 3 Result and Discussion

The conclusion from the previous statements is that the physical education teachers of elementary school in Landak Regency during the pandemic used Whatsapp application (35.0%), google classroom (25%) and manual learning (40%) where they were used by teachers aged from 24-40. The users of whatsapp were 39.0% and 50% of teachers aged 40. It can be concluded that the users of google classroom are still rare if it is contrasted to the users of Whatsapp where they consider the application easier to be used and accessed. Moreover, there are many teachers who still had the manual or offline learning caused by the presence of internet connection and devices (smartphone, laptop and etc.) to use in that area. This research is purposed to identify on how the physical education learning activity is done during the pandemic. That research was done through the review from the learning media used by the physical education teachers. The population of the research are physical education teachers of elementary school (50 respondents), junior high school (38 respondents), and senior high school (36 respondents). The total is 128 respondents in Landak Regency. The researcher used the interview, questionnaire and document as the technique of data collection. The research was conducted from September to December 2020. The data and its analysis from the questionnaire of this research to the physical learning during the pandemic are presented.

**Table 5.** The age description of elementary, junior and senior high school in Landak Regency

Educational Unit	Age	Frequency	Percentage (%)
Elementary school	24-40	23	23,00%
	>40	30	30,00%
Junior high school	24-40	20	20,00%
	>40	6	6,00%
Senior high school	24-40	24	24,00%
	>40	7	7,00%
Total		100	100%

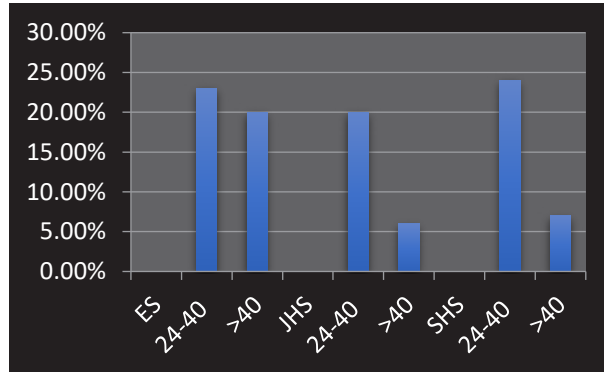


Diagram 1. Picture based on the age

Based on the diagram above, it can be identified that the age percentage for elementary school teachers is that the lowest age is 40 years old above with the percentage 20.00% while the range of the age 24-40 years old, the percentage is 23%. The age percentage for junior high school teachers is that the lowest is 40 years old above 6.00% while the age 24-40 is 20.00%. The age percentage for senior high school teachers is that the lowest is 40 years old above 7.00% while the age 24-40 is 24%. That means that the age of teachers in Landak Regency is mostly categorized in the age between 24-40. That range of age is a productive age where the young teachers can update and develop the education in the future. At the moment, teachers should always challenge themselves to develop and be creative in facing the change and technology development. Creativity and innovation can help teachers to encounter the global issues. The teachers' unpreparedness in facing the pandemic is so unfortunate because they have to do the online learning. There are several issues faced by teachers and students in the online learning identified from the result of the questionnaire. Researcher has analyzed the preparation of schools, teachers and students to do the online learning during the pandemic [13]. Below is the questionnaire analysis of learning media applications which are used by teachers in Landak Regency.

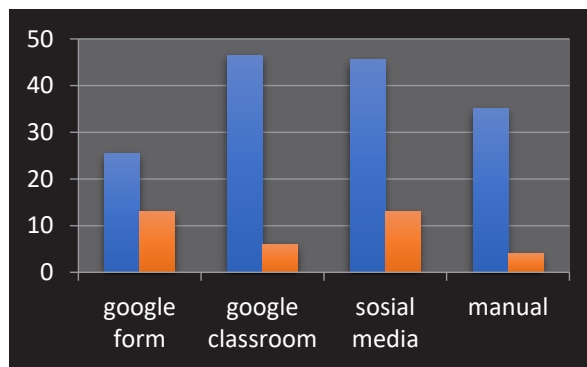


Diagram 2. The use of learning media application in Elementary School



Based on the diagram above, there are 5% teachers using Google Form, 2.5% Google Classroom, 85.0% Whatsapp application and 7.5% using the manual method. This information was collected through questionnaire filled by every teacher in the elementary school. So, it can be concluded that the use of application media by junior high school teachers puts Whatsapp with the highest percentage of use 85.0% and the manual method follows after.

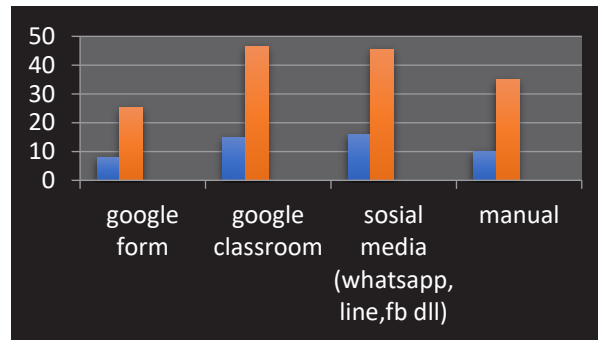


Diagram 3. The use of learning media application in Junior High School

Based on the diagram above, there are 25,36% teachers using Google Form, 46,54% Google Classroom, 45,6% Whatsapp application and 35% using the manual method by collecting the assignment to the school. This information was collected through questionnaire filled by every teacher in the junior high school. So, it can be concluded that the use of application media by junior high school teachers puts google form with the highest percentage of use. Some junior high school with internet connection could do the learning via google classroom but for those which do not have the internet connection could not do that so they chose the manual method.

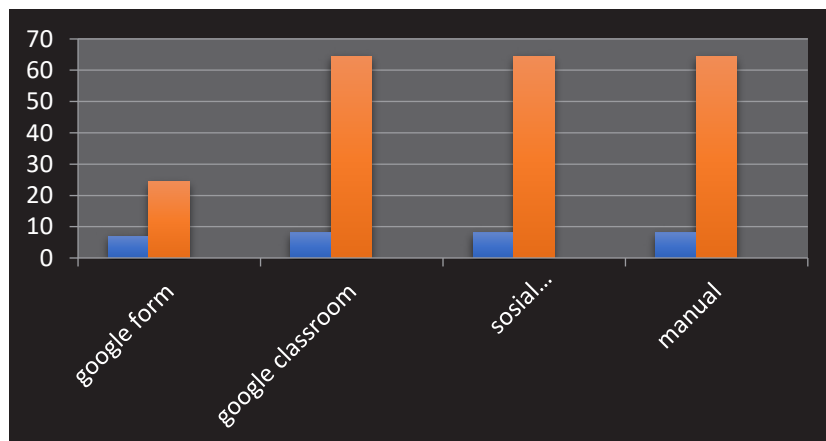


Diagram 4. The use of learning media application in Senior High School

Based on the diagram above, there are 24,42% Google form, 64,46% Google Classroom, 64,47% Social Media Whatsapp, dan 64,42% manual technique. Therefore, it can

be concluded that junior high teachers use the application media equally potential among the use of Whatsapp, google classroom and manual. In the online learning process, the teachers' ability in using the application to students' learning where the schools provide the facilities is so important [14]. The geographic location and teachers ability also affect the benefits and the use of media in the learning process. Below is the graphic of the use of learning media by the physical education teachers:

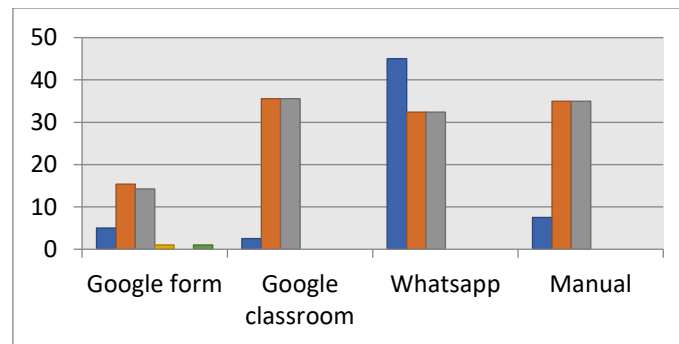


Diagram 5. The use of learning media by the physical education teachers

Based on the data presented above, the physical education teachers in elementary school aged 24-40 very often use the Whatsapp (45%) while the teachers aged 40 above (49%) belong to the high level category. The teachers in junior high school aged 24-40 often uses the media of google classroom (35,54%) and teachers aged 40 above (34,32%) belong to the high level category. Meanwhile, teachers in senior high school aged 24-40 equally use three media, namely, google classroom (35,54%), Whatsapp 32,43% and manual 35%. While for teachers aged 40 above, they belong to the high level category (30,33%). Therefore, it can be concluded that the use of social media Whatsapp tends to be used by teachers of elementary school, and then the use of google classroom tends to be used by junior high school teachers and the equal use of google classroom, Whatsapp and manual technique by teachers in the senior high school [15].

Based on the result above, it can be concluded that the online learning being done by teachers in Landak Regency from educational units (elementary, junior and senior high school) on the use of application media and the age of teachers shows that it is so varies in the outmost area. Therefore, the conclusion is that the application media use by teachers during the pandemic which is very new for them is effectively used by teacher in their own house. Many people think that the online learning is not effective, but, in fact, it is now held by teachers and students during the pandemic. Some applications can be used during the pandemic, namely, Whatsapp, Youtube, Telegram, google classroom, and google form. Whatsapp is one of the applications used widespread by teachers because of the easiness to use it. Nevertheless, in the outmost area, it is so difficult to access all the applications because of the internet connection, teachers and students limitation in operating and also owning the supportive devices required, and the other factors. There is also a manual technique where

students take the assignment in the school and bring it back to school later on [16]. Although, there are also some teachers living in the strategic area can make use of google classroom.

## 4 Conclusion

Based on the research having been done by researcher, it can be concluded that every teacher especially physical education teacher must be able to prepare and be ready to face any changes from the current situation. Teachers are required to have competency to adapt the development, be update to the current information technology, and not be dependent to the current situation around them. That suggestion, without any exception, goes the same way to the physical education teachers in the outmost area. They should keep working and learn to take some benefits from the technology to be applied in the learning process because to give up on the bad situation is not the solution that can be given to our students. Teachers should be responsive toward the technology development and always try to develop so they can create the academic environment which is active, creative, humanist and solutive.

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# Adaptive Physical Education Learning During Pandemic in School for Children with Special Needs

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**Abstract.** There are various phenomena regarding learning during the pandemic, especially in adaptive physical education learning in school for children with special needs. The ability of adaptive physical education teachers to plan, implement, and evaluate learning is the key to expected learning outcomes. This study aims to analyze adaptive physical education learning during the pandemic in school for children with special needs. This is qualitative research conducted in three schools for children with special needs academic years 2020/2021. Data collection method using observation, interviews, and documentation. Data analysis through data reduction, presenting data and concluding the results. Adaptive physical education teachers have implemented the learning strategy. However, they have not been able to choose the correct learning method to be implemented in adaptive physical education learning during the pandemic. This research concludes that adaptive physical education learning during the pandemic has not been implemented optimally in school for children with special needs.

**Keywords:** Physical Education, Pandemic, Learning, Special Need.

## 1 Introduction

Education is a significant factor in improving the quality of human resources on earth [1]. Through education, we can form quality human resources and have high character. Physical education is essentially an educational process that utilizes physical activity to produce holistic changes in individual qualities, both physically, mentally, and emotionally [2]. Physical education is an integral part of education as a whole, which has 3 aspects of assessment, that is affective, cognitive, and psychomotor, by using physical activities to develop students' overall abilities from physical abilities, spiritual abilities, and health quality so that students have harmony in their development. Physically, mentally, and can interact socially well [4]. Adaptive physical education is an educational process through movement activities for the rate of growth and development both physically and psychologically in order to optimize all potential abilities, physical skills that are adjusted to children's abilities and limitations, intelligence, physical fitness, social, cultural, emotional, and a sense of beauty. In order to achieve the goal of education, namely the formation of a whole human being [5].

In his research, Gunawan said that the purpose of learning is not only to develop the skills of students, but to develop the students' personal development completely, so that the basic concepts and teaching models of physical education are important to be understood by educators to achieve an effective learning process [6]. Especially for students with special needs, where they are not yet fully independent.

Implementing skills is the professional duty of the teacher in creating a system or carrying out teaching activities. There are three main tasks or activities in implementing teaching, namely: 1). Opening teaching, 2). Manage teaching activities and 3). Closing the teaching [7]. So that the role of adaptive physical education teachers is needed in the learning process. This is in line with research conducted by Ainin that in implementing adaptive physical education learning, a teacher needs to make good learning preparation so that the learning process can run smoothly [8]. Especially in this pandemic era, adaptive physical education teachers are increasingly required to be more creative and innovative in learning. It is because offline learning has changed to online learning. So learning objectives will be achieved if they receive support from various parties.

Boyolali Regency is one of the areas in Central Java Province which has many School with Special Needs, that is 11 schools. And there are 3 schools that have been accredited B, that is SMPLB YPALB Cepogo, SMPLB N Boyolali, and SLB YPCM Boyolali. Based on the preliminary observations that have been made, it is found that several diverse phenomena regarding adaptive physical education learning patterns. In terms of learning preparation, there is a mismatch between the lesson plan that have been made with the implementation of the learning for each category of disorder. In addition, there are teachers who prepare lesson plans at the end of the semester, not at each meeting. As well as reference materials and learning infrastructure are also very minimal provision.

This study aims to describe the patterns of implementation, implementation, and learning strategies in adaptive education used during the pandemic.

## 2 Methods

This research is descriptive qualitative. Creswell defines it as an approach or search to explore and understand a central phenomenon [9]. The results of qualitative research in the realm of education are descriptive. The purpose of qualitative research is to understand individual views, search for and explain processes, and explore in-depth information about a limited research subject or background [10].

The subjects of this study is physical education teachers at SMPLB YPALB Cepogo, SMPLB N Boyolali, and SLB YPCM Boyolali. In selecting research subjects, researchers used the purposive sampling technique. Purposive sampling is a "sampling technique with certain considerations" [11]. The choice of this subject is motivated because the purpose of this study is how the online learning process of adaptive physical education subjects and what factors support and hinder teachers in the online learning process for adaptive physical education teachers.

A good instrument will produce good data too. The instruments used in this study were interview guides, questionnaires, and documentation given to adaptive physical education teachers. The data collection technique is an activity carried out by researchers to obtain the data used in the study. The data collection techniques used in this study were interviews, questionnaires, and documentation. The type of interview used in this study was a structured interview. The type of questionnaire used in this study is an open questionnaire. An available questionnaire contains questions or statements that can be filled in freely by the respondent. Documents are records of past events. Documents can be in the form of writings, pictures, or monumental works of a person [12].

Data analysis used in this research is the analysis technique of Miles and Huberman. The activities in qualitative data analysis are carried out interactively and continue to completion so that the data is saturated. Data analysis has three activities: data reduction, display data, and

conclusion drawing/verification. There are quite a lot of data obtained in the field at the data reduction stage, so it needs to be recorded carefully and in detail. Reducing data means summarizing, choosing the main things, focusing on important things, looking for themes and patterns, and removing unnecessary. Data that has been reduced will provide a clearer picture and make it easier for researchers to carry out further data collection and look for it if needed. At the data display stage, the aim is to make it easier for researchers to understand what is happening and plan the next steps based on what has been understood. The final stage is the conclusion drawing/verification in qualitative research may or may not answer the problem formulated at the outset. This happens because qualitative research is still temporary and will develop after the study is in the field.

The research procedure used in this research is divided into three stages, namely the pre-field stage, the fieldwork stage, and the data analysis stage. At this stage, the pre-field step compiles a research design to understand the methods and techniques in research. Choosing a research field, exploring and assessing the field in the form of a field orientation with the aim and purpose that the researcher tries to get to know all elements of the social, physical and natural environment and the introduction of the field is also intended to assess the situation, situation, setting, and context whether there is suitability with the problem. Prepare research equipment in the form of equipment needed or used in research, such as research permits, stationery, and other equipment to support research. In the fieldwork stage, the researcher understands the research background first. Researchers need to prepare themselves to start researching to obtain data or information required in research. The data obtained came from questionnaires and interviews conducted with adaptive physical education teachers at the designated research sites. Researchers made an analysis to get more in-depth results regarding the online learning process carried out by adaptive physical education teachers during the pandemic and the supporting factors and factors that hinder teachers in implementing learning during the pandemic. After the data is obtained, the researchers compile data descriptively and in-depth so that the information that has been obtained can be appropriately studied. In the data analysis stage, in qualitative research, the data obtained comes from various data sources collected through multiple data collection techniques and is carried out continuously until the data is saturated. The researcher carried out the data analysis, that is processing the data collected and obtained in the field, both the form of informants and documents in the previous stage, then compiled into a study.

### 3 Result and Discussion

Based on the data obtained from open questionnaires and structural interviews, the results are:

1. Does your school use the 2013 curriculum?  
*"Yes, here has implemented the 2013 curriculum".*
2. Do you carry out assessment activities for students as one of the initial strategies in adaptive physical education learning activities?  
*"-."*
3. What are your considerations in determining learning media during the pandemic period?  
*"During the pandemic, schools took a policy to eliminate the learning process. In this case, there is no distance learning activity. Learning media is only written in the lesson plan but not implemented."*

4. What are your considerations in determining learning methods during the pandemic period?  
*"During the pandemic, schools took a policy to eliminate the learning process. In this case, there is no distance learning activity. The learning method is only written in the lesson plan. Still, it is not implemented."*
5. How did you apply this learning method during the pandemic?  
*"In its application, distance learning is replaced with a home visit. Each teacher conducts a visit to each student's home to check their progress."*
6. How are the facilities and infrastructure in schools that support adaptive physical education learning during the pandemic period?  
*"Facilities and infrastructure in the sports sector are very fulfilling, but during the pandemic, they were not used for learning activities."*
7. What is the role of learning media in adaptive physical education learning during the pandemic?  
*"Even though I did not study during the pandemic, I understand one thing that learning media is essential to facilitate learning activities."*
8. What is the learning system like during a pandemic?  
*"This school does not hold learning activities that are carried out remotely or online. We only held a home visit."*
9. How do you apply the curriculum in learning activities?  
*"Yes. For the curriculum, we use the pandemic curriculum with several modifications, especially in lesson plans. The curriculum and lesson plans are still limited, like the curriculum during the pandemic. "*
10. How did you modify learning media during the pandemic?  
 -
11. How do you prepare lesson plans before implementing learning activities?  
*"I prepare my lesson plan at the beginning of the semester normally."*
12. How was your preparation before carrying out adaptive physical education learning activities during the pandemic?  
 -
13. How did you prepare facilities and infrastructure for adaptive physical education learning activities during the pandemic period?  
 -
14. What evaluation tool did you prepare in the learning evaluation activity during the pandemic period?  
*"The evaluation tool is only contained in the lesson plan, but it is not implemented because there is no distance learning."*
15. How do you understand adaptive physical education?  
*"Adaptive physical education is a part of physical education subjects specifically for students with special needs."*
16. How is adaptive physical education implemented during the pandemic period in schools?  
*"There are no adaptive physical education learning activities during the pandemic period, given the conditions of students that make it impossible if distance learning is carried out."*
17. How do you deliver material to students?  
 -
18. How do you use learning media in learning activities?  
*"The media used can be interactive video, audio, and pictures."*

19. How is the feedback of students on the delivery of the material that you have delivered?  
-
20. How did you generate learning motivation for students during the pandemic?  
*"I collaborated and communicated with parents to remind students to continue learning and maintain health."*
21. How did you provide services to students during the pandemic?  
*"The service is carried out by holding a home visit."*
22. How did you apply the assessment techniques in adaptive physical education learning during the pandemic?  
*"The assessment technique is as stated in the lesson plan and syllabus."*
23. How did you provide an authentic assessment of attitudes, knowledge, and skills in adaptive physical education during the pandemic?  
-
24. What is the mechanism for scoring in attitudes, knowledge, and skills during the pandemic?  
-
25. How did you apply the instruments that were prepared in the assessment activity?  
-
26. How do you understand the abilities of each student, especially during the pandemic?  
*"Analyzing the results of the home visit that has been carried out."*
27. How do you condition students in adaptive physical learning activities during the pandemic?  
*"Cooperating with students' parents to supervise them while at home".*
28. How do you develop the academic/non-academic potential of students?  
*"Continue to motivate students."*
29. How do you communicate with students who are children with special needs?  
*"Taking an approach to get to know the character of each student."*
30. How do you respond to parents or guardians of students who are critical of their child's development during adaptive physical education learning activities?  
*"Being open and candid when explaining and trying to understand the wishes of the parents of students."*
31. What is your educational background?  
*"Physical Education Department of Semarang State University."*
32. How did you design adaptive Physical Education teaching materials during a pandemic?  
*"Adjusted to the lesson plans that have been prepared".*
33. How do you synchronize the curriculum with the material that will be delivered to students?  
*"The material contained in the curriculum is adjusted and adapted to the conditions of each student."*

Based on the results of research with descriptive qualitative methods through data collection techniques in the form of questionnaires and interviews that have been conducted on physical education teachers in school for student with special needs, it can be concluded as follows: the learning strategy aspect that has not been fulfilled is the indicator of conducting an assessment and selecting learning media. Conducting assessments such as conducting assessment activities as an initial learning strategy have not been implemented by SLB YPCM Boyolali. Choosing learning media, such as taking into account before choosing learning media, has not been implemented by the SLB YPCM Boyolali.

The learning method aspect that has not been fulfilled is the indicator for selecting the learning method. These indicators are considered before determining the learning method that has not been applied by the SLB YPCM Boyolali and SMPLB YPALB Cepogo. The aspect of learning modification that has not been fulfilled is the learning media indicator. These indicators



are like making modifications to learning media that the SLB YPCM Boyolali has not implemented.

The unfulfilled planning aspect consists of three indicators: lesson plan implementation, teaching preparation, and evaluation tool planning. Learning implementation plan indicators such as preparing RPP have been implemented in SMPLB N Boyolali, SLB YPCM Boyolali, and SMPLB YPALB Cepogo. SLB YPCM Boyolali has not implemented teaching preparation indicators such as preparation before learning. Evaluation tool planning indicators, such as preparing evaluation tools for attitudes, knowledge, and skills, have not been applied in the SMPLB YPALB Cepogo and SLB YPCM Boyolali.

Implementing learning that has not been fulfilled consists of two indicators: teaching techniques and the use of learning media. Teaching technique indicators such as implementing distance learning have not been implemented in SLB YPCM Boyolali. Indicators of using learning media, such as maximizing the use of learning media, have not been implemented by SLB YPCM Boyolali.

The unfulfilled aspects of the assessment consist of three indicators: the assessment aspect, the assessment technique, and the assessment instrument. Indicators of assessment aspects such as assessing aspects of attitudes, knowledge, and skills have not been implemented in SLB YPCM Boyolali. Indicators of assessment techniques such as aspects of attitude using observation, aspects of knowledge using task collection, and aspects of skills using practical activities have not been implemented by SLB YPCM Boyolali and SMPLB YPALB Cepogo. Indicators of assessment instruments, such as using instruments in evaluation activities, have not been implemented by SLB YPCM Boyolali and SMPLB YPALB Cepogo.

The aspect of teacher competence, which consists of three indicators: pedagogical competence, professional and social competence, has been fulfilled by all SMPLB in Boyolali Regency.

The learning process is related to learning strategies and teacher competence in implementing learning. Before carrying out the learning process, the first steps that a teacher must take are selecting, deciding and considering the materials, procedures, methods and media used to achieve learning objectives through movement activities. When designing learning for students with special needs, the teacher must find and know the unique needs of each type of disorder that exists by students. So that education for children with special needs must be able to make modifications to meet students' educational needs. These modifications will be fulfilled in order to develop learning strategies that will later support the learning process.

Seeing the learning strategies in adaptive physical education during the pandemic period in SMPLB in Boyolali Regency, it can be said that the implementation of learning strategies has not been fulfilled in the adaptive physical education learning process, because there are still some indicators that have not been applied in some schools.

In determining the learning strategy, two activity indicators need to be considered: conducting an assessment and selecting learning media. Before determining the appropriate learning media for students with special needs, an assessment should be carried out first. The assessment is carried out to categorize each student's needs, which will make it easier for teachers to choose learning media. Indicators of assessing and selecting instructional media have not been implemented in SLB YPCM Boyolali. During the pandemic, the school did not organize a learning process either online (distance learning) or offline. The aspects of the learning method used by teacher to create an atmosphere of learning process so that students achieve basic competencies from indicators. The selection of learning methods is adjusted to the students' situation and conditions, as well as the characteristics of each indicator and competency to be achieved in adaptive physical education subjects. Given the importance of the

learning method in teaching and learning activities, it is necessary to consider the appropriate learning methods for children with special needs as a teacher.

Indicators for selecting learning methods in the aspect of learning methods have not been fully fulfilled because they have not been implemented by SLB YPCM Boyolali and SMLB YPALB Cepogo. SLB YPCM Boyolali has not considered the learning method media because the school did not carry out a process of teaching and learning activities during this pandemic. Indicators for selecting learning methods have not been implemented in the SMPLB YPALB Cepogo because those who play an essential role as learning companions during the pandemic or distance learning are the parents/guardians of the students. The teaching method is entirely up to the parents/guardians of the students, remembering those who better understand their child's condition.

Education for children with special needs must be able to make modifications so that the educational needs of students are met, the skills provided are fully functional and mastered, and all members of the activity can fully participate. The learning modification aspect consists of three indicators: facilities and infrastructure, curriculum, and learning media. The indicators that have not been fulfilled are learning media, where the teacher makes modifications to the learning media. Learning media used in teaching and learning activities must be made according to students' needs following the disability category. Modifications to learning media have not been implemented in SLB YPCM Boyolali, considering that it did not organize learning activities during the current pandemic.

Teachers play an essential role in providing learning to students. The teacher's ability to manage adaptive physical education learning starting from the planning stage, the implementation stage, to the evaluation stage in learning greatly determines whether or not the learning objectives are achieved. Detailed planning is needed in providing physical education learning to students with special needs. Teachers must be able to determine methods, strategies and formulate appropriate evaluation forms by the conditions of the disabilities of each student. The provision of materials, teaching materials, and infrastructure is also needed to support adaptive physical education learning.

The planning aspect consists of planning the implementation of learning, teaching preparation, preparing facilities and infrastructure, and planning evaluation tools. All SMPLB has fulfilled the indicators for the preparation of the Lesson Plan in the Boyolali Regency. The preparation of a learning implementation plan is an essential point in the learning process because the plan is a reference for implementing the teaching and learning process in the classroom so that it can run more effectively and efficiently. Every teacher in an education unit is obliged to compile a complete and systematic Lesson Plan so that learning provides sufficient space for students to be creative and develop their talents and interests and physical and psychological development.

The preparation of the lesson plan has been implemented by all the adaptive physical education teachers concerned. However, in its implementation, there is a mismatch between the lesson plan and the learning activities. This is due to adjustments to the material and media prepared with the conditions of students in the field. In his research, Ega Trisna Rahayu suggests that a learning implementation plan is prepared for every meeting and ideally prepared at the beginning of the school year or before the learning process begins [13]. This condition has been met in all SMPLB in Boyolali Regency.

The following planning activity is to make teaching preparations. Teaching preparation is an essential element for the success of learning in the classroom. This preparation can be in the form of planning learning materials, media, and learning methods. Learning material planning must be tailored to the needs of students by considering various factors. According to

Beltasar Tarigan that in determining adaptive physical education learning materials, it is necessary to consider the recommendations and diagnoses of doctors who treat children with special needs and the types of sports that are most popular. In addition to the material, there is also a need for the preparation of learning methods and strategies, both of which are arranged in a variety of ways and according to the material to be delivered and adjusted to the conditions of the learners [14]. Teaching preparation was not implemented in SLB YPCM Boyolali because the school did not organize learning activities during the pandemic period.

Planning for supporting facilities and infrastructure in learning activities is carried out by considering the availability of the media itself and the students' conditions. Facilities and infrastructure such as supporting equipment for physical education learning activities are available in all SMPLB in Boyolali Regency. School also provides internet packages for teachers of Rp. 50,000 and Rp. 25,000 for students, which are used to support distance learning activities during the pandemic. The hope is that learning activities can run smoothly.

Evaluation tool planning is carried out by preparing evaluation tools from three aspects: attitude, knowledge, and skills. Physical education teachers should have planned in advance the evaluation tools to use. The evaluation tool used to assess the attitude aspect is in the form of an observation sheet, the knowledge aspect is the assignment, and the skills aspect is using practice. SMPLB N Boyolali only fulfills the indicator for planning evaluation tools. In conducting the assessment, SMPLB YPALB Cepogo did not prepare such an evaluation tool. Although the results assessed are in the form of assignments and practices, the evaluation tool planning has not been applied.

The implementation of learning is the core of the learning process, including preliminary activities, core, and closing activities. In this study, the implementation of learning uses material mastery indicators as a form of preliminary activity, teaching techniques, and media as a form of core activity. During this pandemic, learning activities were replaced in the form of online or distance learning. Mastery of the material includes the teacher's ability to understand the nature of adaptive physical education and the material taught to students.

Mastery of the material is essential in the learning process because it will determine the success or failure of a teaching and learning activity. The teacher is the spearhead in improving the quality of learning in the classroom so that to be able to teach well, and a teacher must master the material to be taught. All SMPLB has implemented material mastery indicators in Boyolali Regency. Even though SLB YPCM Boyolali did not carry out distance learning during this pandemic, adaptive physical education subject teachers could master the material contained in the lesson plans that had been compiled.

Teaching technique is a method or strategy used by teachers to achieve maximum results during teaching. The teaching techniques used during this pandemic are different from those used before the pandemic. Before pandemic learning was carried out face-to-face, pandemic learning was carried out remotely or commonly known as online or in a network. Distance learning is formal education where group learning systems are separated and interactive communication systems are used for learners, learning resources, and instructors [15].

Distance learning has been implemented in SMPLB N Boyolali and SMPLB YPALB Cepogo. SLB YPCM Boyolali does not apply distance learning because it sees students' conditions that are not possible. Disabilities experienced by students are considered difficult for teachers in conditioning when learning takes place. Even so, the adaptive physical education teacher at SLB YPCM Boyolali still conducted a home visit to control each student's development and condition. Besides, adaptive physical education teachers also issued warnings or appeals to stay healthy during this pandemic.

Physical education teachers carry out the use of instructional media in distance learning by considering the media's availability with the condition of the students. Indicators of the use of learning media have been implemented by SLB N Boyolali and SMPLB YPALB Cepogo. In learning activities, there is a modification of learning media. Physical education teachers provide parents/ guardians with opportunities to maximize media use during distance learning. The media used does not have to be the same as it should be in the teaching materials or material books. However, it is adjusted to the students' conditions to carry out adaptive physical learning smoothly. Modification of learning media can be replacing large basketball balls with plastic balls or paper balls that do not burden students. The essential thing in this learning, students are willing and able to move regardless of the media used.

Assessment is a series of activities to obtain, analyze, and interpret data about students' process and learning outcomes, which are carried out systematically and continuously so that it becomes meaningful information in decision-making [16]. Assessment of the achievement of basic competencies of students is based on indicators. Indicators in this aspect include aspects of assessment, assessment techniques, and assessment instruments. Assessment of student learning outcomes in primary and secondary education includes aspects of attitudes, knowledge, and skills.

An attitude assessment is an activity carried out by the teacher to obtain descriptive information about students' behavior. Knowledge assessment is an activity carried out to measure students' mastery of knowledge. Skills assessment is an activity carried out to measure students' ability to apply knowledge in performing specific tasks. Indicators for assessing attitudes, knowledge, and distance learning skills have been implemented in SLB N Boyolali, SMPLB YPALB Cepogo. SLB YPCM Boyolali was not fulfilled in this aspect because it did not organize distance learning activities.

The assessment technique used is the process and outcome assessment. Assessment of the learning process uses an authentic assessment approach. Evaluation of the learning process is carried out during the learning process, which is used to assess aspects of attitude. Attitude aspect assessment can use the observation sheet. Assessment of learning outcomes is carried out during the learning process and at the end of learning. Assessment of the knowledge aspect is carried out by collecting assignments, while the skills aspect uses practical activities. This kind of assessment technique has been applied in SLB N Boyolali. In distance learning practice, physical education teachers conduct attitude assessments via electronic media, assessing knowledge and skills through assignment collection by students. Students submit assignments to the teacher in the form of videos. Like SLB N Boyolali, SMPLB YPALB Cepogo also used the same technique in the assessment process. The difference lies in the attitude assessment where SMPLB YPALB Cepogo conducts attitude assessment with tolerance assessment.

Law No. 14 of 2005 on teachers and lecturers explains that a teacher must possess four competencies: pedagogic, professional, personality, and social. Pedagogic competence is the ability to manage student learning, evaluate learning outcomes, and develop students to actualize their various potentials. Pedagogic competencies in this study include teachers' ability to find ways to understand students' abilities, the ability to condition students, and the ability to develop academic/non-academic potential. All SMPLB has fulfilled indicators of pedagogic competence in Boyolali Regency. Even though they did not hold distance learning during the pandemic, physical education teachers at SLB YPCM Boyolali had abilities related to their pedagogical competencies.

Professional competence is the ability to master learning material broadly and deeply, enabling it to guide students to meet competency standards. Professional competence in this research is the educational background of physical education teachers, compiling learning

materials according to the lesson plans, and synchronizing the curriculum. All SMPLB fulfills indicators of professional competency aspects in Boyolali Regency.

Social competence is the ability of educators to communicate and interact effectively with students, fellow educators, education personnel, parents/guardians of students, and the surrounding community. Social competence in this study includes the teacher's ability to communicate with students and parents. All SMPLB has fulfilled indicators in the aspect of social competence in Boyolali.

#### 4 Conclusion

During the pandemic in SMPLB Boyolali Regency, the adaptive physical education learning pattern was carried out online or better known as distance learning. This learning pattern is only applied at SLBN Boyolali and SLB YPALB Cepogo.

Implementing adaptive physical education learning during the pandemic that has been implemented in SLBN Boyolali and SLB YPALB Cepogo has been running well, as seen from the fulfillment of several aspects: adaptive physical education learning planning activities, implementing adaptive physical education learning and adaptive physical education learning assessments.

The adaptive physical education learning strategy in SMPLB Boyolali Regency has been fulfilled, seen from the formulation of learning strategies before carrying out learning activities, modifying learning methods, learning media, and learning activities.

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# The Relationship between Sports Students Exchange Experience and English Learning Motivation of Unnes and UITM Students

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**Abstract.** Sports students exchanges has been widely popular due to its benefits for students, one of which is to improve their English skills. In the Faculty of Sports Science, UNNES and Faculty of Physical Education and Health, UiTM, many students who are going abroad mostly in Asia use English, as a lingua franca, to communicate with others whom first language is not English. However, limited studies have discussed on the relationship of joining exchanges program toward the students' motivation in learning English. This study will be conducted to explain the relationship between participating and non-participating in sports students exchange programs toward the students' motivation in learning English. The subjects are sports students from UNNES and UiTM. A non-experimental research design with a causal-comparative method will be conducted with a set of questionnaires and an interview rubric as the instrument. The data will be analyzed statistically and will be explained using a descriptive quantitative approach.

**Keywords:** sports students, students exchange, motivation, English as a lingua franca, English skills..

## 1 Introduction

A student exchange program has gained a lot of traction in universities worldwide [1], as the program proposes several benefits either for students or for the institution. Research discussed several benefits of student exchange program namely students have the opportunity of learning and embracing themselves with a new language [2], [3]; students get social and cultural experiences, students become more multiculturalism [4], [5], getting a new understanding of the country they visited, and building international relationship among students [2], [3], [6]. Interestingly, students who experience exchange study develop beyond their area of study and able to embrace themselves in an international and intercultural interaction [7], [8]. The exchange program is also the best way to become proficient at speaking a foreign language, experience different teaching styles, and build an International Resume [9], [10]. An International collaboration project is also great in improving students' cultural competency skills and basic networking [7], [11].

Faculty of Sports Science (FSS), Universitas Negeri Semarang (UNNES) is one of the Faculty in UNNES, which shows a high commitment to Internationalization [12]. Its internationalization history is closely tied with the history of Aucpess (ASEAN Universities

Conference on Physical Education and Sport Sciences). AUCPESS started in 2011[13]. Since July eight, 2014, AUCPESS expanded its scope and upgraded its name to be ACPES (ASEAN Council of Education and Sport) to accommodate many sports' community aspirations and expressions. The first ACPES conference in 2015, was hosted by Universitas Negeri Negeri Semarang Indonesia. Nowadays, ACPES has networking eleven universities from five countries namely Thailand, Malaysia, Indonesia, Singapore, and Philippines. Its member universities managed various activities, namely hosting international conferences, joint research programs, joint publication programs, lecturer exchange programs, student exchange programs, community services, and internship exchange programs, to name but a few. Upon those many Internationalization programs, one of which is a student exchange program.

In line with the Faculty of Sports Science, UNNES, the Faculty of Physical Education and Health (FPEH), Universiti Teknologi Mara (UiTM), Malaysia, also very active in expanding its International network. It also one of ACPES active member and has been hosted some international program. The 3rd ACPES was hosted by UiTM in collaboration with UPM, Malaysia in 2018. Besides, The faculty opens for inbound and outbound program with some countries namely Japan, Malaysia, Thailand, South Korea, Philippines, Cambodia, China, and Indonesia [14].

The Sports Student Exchange Program (SSE) is a program where students from partner universities from sport-related majors come to our faculty and vice versa. The student exchange program is a reciprocal activity between two universities or more to exchange students for a certain period. Hinojo\_lucena in his research about International collaboration, found that the collaboration between also countries improve learning and relevance for exchange information [15]. It also teaches different methods and systems in learning specific knowledge [15], [16].

The exchange students from various country sometime hard to communicate using country dialect, thus English role as a lingua Franca to connect this multiculturalism background of the students. English as a lingua franca is the use of English between speakers of various first language for whom English is the only communicative medium of choice and frequently the lone alternative [17]. English language is highly needed to raise the value of our graduate in the International level [18]. Therefore, the benefit of exchange program in motivating the students to communicate using the English language is highly valued.

As the coming of industrial revolution 4.0, the demand of Sports Scientist who are able to communicate well in English is getting higher. The present of Asean School Games on July 2019 has shown that the event needed more than 100 sport science student volunteers and lectures to help as the event organizer, judges, as well as guides for foreign athletes and sports organizer [19]. Previous event of ASEAN Games 2018 held in Jakarta and Palembang, Indonesia needed over than 10.000 volunteer across Indonesia [20] to help as protocol assistant, assistant for National Olympic Committee (NOC), Liaison office and work force [21]. In addition to that, Sports Science Faculty is also preparing for ASEAN University Network- Quality Assurance which forced our faculty to broaden its network minimum in ASEAN level. Here, English roles as a medium of instruction between countries on their collaboration which includes students exchange, joint degree, joint research, joint internship, guest lectures, to name but a few. It goes without saying that, preparing a good English in Sports science is required to equip the students with soft skill needed either during their academic study or for their job market.

Research by Suraya et.al mentioned that students of sports science faculty who have joined an exchange program tend to repeat their experience by joining another exchange program whenever offer[22]. They also more active in some international events compared to



those who never joined the program. An observation was conducted in UiTM, students who have previously involved in exchange program were more supportive toward any internationalization program in the university. However, there is a minimum study which discuss the relationship between the exchange program toward the students motivation to learn the English language, especially the English as lingua Franca [23]. Therefore, this study aims to fill the gap by asking question if there is any difference between students who joined exchanges program and those who did not join exchange program with respect to their motivation in learning English for the students of UNNES, Indonesia and UiTM, Malaysia. The questions guiding the study is; is there any difference in students motivation in learning English between FSS, UNNES and FPEH, UiTM for students who joined exchanges program?

This research aims to understand the difference between FSS, UNNES and FPEH, UiTM students motivation in learning English for those who joined exchanges program.

## 2 Method

This is a non-experimental research design with a causal-comparative approach. It aims to determine if exchanges experience toward English learning motivation experience differed among students who participated in students exchange and did not participate in students exchange for Indonesian students and Malaysian students. A causal-comparative research design looks into the causes of already existing differences among groups of people [24]. The causal-comparative research design fits for this study as the independent variable were not manipulated and no treatment was given to all participants. It what make a difference with the experimental research design since the causal-comparative doesn't provide any treatment to any group.

The population of the study are students who joined and did not joined SSE program. The students are at least sophomore level so there should be enough chance for them to choose joining or not joining an exchange program. The sample is composed of Indonesian representative and Malaysian representative. The Indonesian sample is the students from FSS, UNNES and the Malaysian sample is the students from FPEH, UiTM, Malaysia by using a purposive sampling technique.

The primary data will be collected from survey tests and interviews. The survey instrument, in the form of online questionnaire, will be validated through expert judgement. Questionnaire is a data collection technique which is done by giving a set of questions or written statements to respondents to be answered. The method used is a closed questionnaire [25]. The test analysis will use a quantitative descriptive analysis.

In preparing the questionnaire, indicators have been determined which will be used as the basis for compiling the questions in the questionnaire:

**Table 1.** Questionnaire Indicators.

Answer choices	Score for positive statement	Score for negative statement
Strongly agree	4	1
Agree	3	2
Disagree	2	3
Strongly disagree	1	4
Strongly agree	4	1

The indicators of the motivation to learn English questionnaire can be seen in the table below:

**Table 2.** Motivation Indicators.

Indicator	Number of item	Total Number
Intrinsic motivation	1-10	10
Extrinsic Motivation	11-20	10

There will be 10 questions for intrinsic motivation and 10 for extrinsic motivation. The questionnaire will be consulted and validated by expert as well as tested by validity and reliability test.

The next instrument is an interview rubric. The interview intended to gain knowledge about the subjective meanings understood by the individual regarding the research topic. The interview will be conducted through zoom meeting or whatsapp video call. According to Lexy J. Moleong in [26] an interview is a conversation with specific goals. In the implementation of this research, the researcher used a semistructured interview technique which will be conducted to the respondents in two universities. The purpose of using structured interviews is to find problems in a more closed manner and do not extend from the focus of the problem.

The stages carried out for interviews, then the stages carried out by researchers in conducting interviews, namely [27]

1. Make guidelines for interview questions arranged in accordance with the formulation of the problem
2. Determine subject of the interviews, namely representatives of SSE and Non SSE UNNES students and representatives of SSE and non-SSE UiTM students.
3. Interview method via zoom or whatsapp video call
4. Record the interview and convert it in a script.
5. Ensure that the results of the interview are in accordance with the information required by the researcher
6. Analyze the results of the interview

The study uses data analysis techniques based on data that has been collected. Quantitative data will be processed using statistical analysis. The data will be explained using descriptive quantitative analysis.

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# A Study of Conceptual Development on Internet-Based Academic Service (Internship Program Related) as A Manifestation of UNNES the Conservation University

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**Abstract.** An embodiment of the quality management system, minimizing the errors lead to complaining, Easiness, and Effectiveness to access or to run any kind of activity, also facilitating all people who are engaged in the academic system are some of the most important reasons why we should always improving the academic service quality. On another hand, an internship is one of the challenging programs that all university students must accomplish, because it is the integration of academic environment and real job ambient that involving not only lecturer and student but also the mentor, administration staffs, and other people like the client or customer. Moreover, since the pandemic Covid-19 has been attacking all over the globe, the manual administration things nowadays must adapt and migrate to an online service. Therefore, A new system that could become the platform to accommodate all the needs related to academic services especially for the internship program seems a promising solution.

**Keywords:** *quality service; digital era; climate change.*

## 1 Introduction

As a conservation university, Universitas Negeri Semarang (UNNES) acknowledges a lot of manifestations from conservation values, and conservation's perspective includes the ideology, principal, and behaviors (preservation, maintenance, care, preservation, also development) which implemented in daily life on natural resources and socio-cultural values, and more particularly in academic service. Those principals become the soul of three fundamentals activities in higher education at UNNES.

Since Coronavirus disease (COVID-19) has been attacking Indonesia, it challenges many sectors not only health, economic, tourism, but also education. All educational levels must be responsive and quick enough to adapt to this global pandemic challenge. In 2020, the Department of Sports Science, Faculty of Sports Science, UNNES issued the policy that every sports science student who engages with the internship program must carry out in their own city, the reason was trying to suppress the increasing number of infected people in Indonesia. Meanwhile, education activities still can be performed.

Regarding the previous online system called *sistem layanan akademik program studi ilmu keolahragaan* (SILAPOR)/academic service which Department of Sports Science UNNES launched in 2020, it makes a better change in general service related to many bureaucracies such as the research topic submission, final defense, title verification, plotting advisor, and many more become feasible, effective and much easier.

Based on the brief elucidation above, a study of conceptual development on an academic service system must to generate. Hence, this generation may lead to a manifestation of UNNES the conservation university as well as an adaptation to global pandemic Covid-19.

## 2 Methods

This paper is a part (to find) of the series stage in research and development. While, methods for research and development were applied in this study, which aims to find, fix, develop, produce, to test, until a standardized new product successfully created. At the stage to find we did research and collecting the related information. Tabulation and compilation for all related data; detailed examination for chosen data and construction to profound a new concept; conclusion generating to end the process of traditional literature study are steps we did perform. Furthermore, original studies, Policies of the University Related to the topic, and other references were used as materials and supporting data to generate the appropriate concept to solve the issue.

## 3 Results and Discussion

### 3.1 The Conservation Values of Universitas Negeri Semarang

Any effort that performed to maintain, sustain, and protect any form of thing could be a living organism, goods, environmental-related things, or even a system can be called conservation. More specifically, the process of affecting a person's emotions, attitudes, knowledge, and behavior is known as conservation education. This process required talented also skilled educators who adaptive to any changes or different situations include modify their techniques, methods, and assessments to achieve their determined goals.

Universitas Negeri Semarang as a conservation university has seven pillars to implement the program, are: 1) biodiversity conservation; 2) green architecture and internal transportation systems; 3) waste management; 4) **Paperless policy**; 5) clean energy; 6) conservation ethics, arts, and culture; and 7) conservation regeneration.<sup>1</sup> The paperless policy pillar aims to efficiently implement conservation-oriented administration. **The paperless policy pillar program is implemented through optimization of information technology-based systems, efficient use of paper, utilization of recycled paper, and use of environmentally friendly paper.**<sup>2</sup>

Universitas Negeri Semarang aims to develop eleven conservation values as its characteristics, they are: 1) spiritual; 2) honest; 3) smart; 4) fair/sportif; 5) responsible; 6) care; 7) tolerant; 8) democratic; 9) nationalist; 10) strong, and 11) polite.<sup>3</sup> Further, each faculty at Universitas Negeri Semarang must to have one of eleven conservation values as its specific characteristic, and **Sportif becomes the main characteristic of the Faculty of Sports Science, Universitas Negeri Semarang in their all academic services.** The embodiment of Sportif

value in academic service could be many forms, but the simple description is once the system of academic services has been integrated, transparency, and accountable.

### 3.2 SITIKA as the Promising Solution in the Digital Era

Jill Shepherd in his study state that the digital era is beyond the evolution system of technology because it turns our knowledge very high, and can be out of human control, the worst this era is a time in which our lives become more difficult to manage.<sup>4</sup> In fact, every aspect of life now has been merging with the need of updating technology. This revolution started about four decades ago. Begins with the internet, then followed by mobile devices, then social networking, big data, data clouds, even the revolution work practices in healthcare and education. Additionally, in the last three year as well as the Corona Disease in 2019 become the Global Pandemic, many aspects of life urge to adapt rapidly. One of many effects from Covid-19 is the industrial era has been shifting into the digital era. There is no exception for the education industry.

A different generation of students from time to time i.e. Millennial versus Gen-Z, and their own unique characteristics, attitudes, and behavior make us considering and must choose what the best and appropriate approach to facilitate them to learn.<sup>5</sup> In line with this study, as an effort, the Department of Sports Science has been developing a system to facilitate students. Currently, they are at the stage of migration from manual service into systemic digitalization services. The current upcoming system which is developed by the Department of Sports Science called “*Sistem Praktik Kerja Lapangan (SITIKA)*” as known as the internship system at program study level is expected to be the appropriate solution.

In the education industry, using an online system on the ways to run things-related process are so easy and many benefits from it, such as better time management, improving collaboration, improving communication, global perspective, refined critical thinking-skill, new technical skill, performed self-motivation, and flexible in avenue.<sup>6</sup> Moreover, adopting from key performance indicators for online education by Jens Ischebeck, SITIKA as the online academic service must have the following indicators to ensure the system quality are: 1) the number of students who performs the internship program each batch; 2) demographic information about students, it will help for any official announcement-related internship; 3) number of partner institutions, it will helps on the development and partnership programs; 4) online evaluation form for partner institution, to help improving the quality for the next batch, and 5) online attendance for students to evaluate the rate of their engagement during the internship program.<sup>7</sup>

### 3.3 The Use of Technology for Internship Program

An internship program is designed to encourage students to experience the real work-world, by implementing all theories they have been learning in the class to the real duty either administration kinds of stuff or practical work, and this program has been evaluated to have positive effects on the professional growth and students’ skill.<sup>8</sup> While, based on the students’ point of view on their satisfaction with the internship program, there are some crucial factors that positively contributing: feedback, autonomy, supervisor (lecturer) and mentor, academic preparedness, flexible working hours, student self-initiative, location, and skills variety.<sup>9</sup>

Technology becomes part of the society in order to make things easier with less time consuming, and low-cost budget. This role in the educational industry obviously can be seen as the relationship between teacher to student, or student to student improved; it makes the learning process more fun and insightful, and facilitate students to collaborate with their classmate.<sup>10</sup> Hence, nowadays the use of technology is considered as the best approach to deliver teaching materials before, during, and probably after Covid-19 as the hybrid methods of teaching.

Once SITIKA is launched, it will definitely support UNNES in improving and sustaining the academic services conservation. As the optimization of academic services technology-based systems, SITIKA is believed will makes better changes related to the administration of the internship program by 1) allow students to submit their proposal via the system, which means they do not need to print out the document (paperless); 2) allow the institution to issue any related document through the system; 3) allow either the advisor (lecturer) and the mentor to do supervision or even submit their final score related to student's performance by online.

#### 4 Conclusion

Sportif is one of the eleven conservation value become the main characteristic of the Faculty of Sports Science, Universitas Negeri Semarang, and "*Sistem Praktik Kerja Lapangan (SITIKA)*" as known as the internship system at program study level is expected to be the appropriate solution, meanwhile SITIKA is one of the manifestations of paperless policy as digitalization academic services going into the right decision.

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# Traditional Railway Games on Physical Education and Sports Learning with a Teaching Personal and Social Responsibility Approach of Lower Graders at Elementary School

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**Abstract.** This study aims to develop a model of physical education and sports learning. Development was carried out on physical education learning of non-locomotor archetype materials in elementary school using Teaching Personal And Social Responsibility approach. This research method uses Research and Development Approach. The research consisting of five main stages, were: 1) Needs Analysis, 2) Product Planning and Design Learning Model, 3) Expert validation, 4) Field trials, 5) Product Revision. The results of the needs analysis show that teachers and students need improvised learning materials of non-locomotor basic motion materials. The recommendations need to develop a model of physical education and sports learning for lower graders in elementary school. The average expert rating of 89.73% falls under the category "Excellent". The developing a model of physical education and sports learning, of non-locomotor archetype materials in elementary school using Teaching Personal And Social Responsibility approach, shows the students were able to explore non-locomotor motion skills in train games. The value of non-locomotor attitudes, knowledge and movement skills has increased.

**Keywords:** Model, Learning, Motion, Basic, Non Locomotor, Physical.

## 1 Introduction

There is evidence to suggest that basic movement skills of children aged four to seven years and weak physical activity are related (Smith, 2014). More specifically, research shows that the motor skills of children affect the physical activity and fitness of adolescents. Therefore, the ability to perform various Fundamental Movement Skills (FMS) increases the likelihood of a child participating in different physical activities throughout their life. Furthermore, sufficient fundamental movement skills are considered to be one of the most important antecedents of physical activity and can facilitate participation and success in many sports and sports activities undertaken during school and leisure.

Several studies have shown that childhood and adolescence are crucial periods in the adoption of an active physical lifestyle since the level of physical activity adopted in childhood (Friedman et al. 2008; Telama et al. 2005; Trudeau, Laurencelle, and Shephard 2004). Several other studies, however, have shown that physical activity usually decreases during puberty. The decline in levels of physical involvement is very steep during junior high

school (ie, between the ages of 13 and 15) (Nader, Bradley, and Houts 2008; Telama and Yang 2000). These findings have led researchers to investigate possible antecedents of physical activity participation during childhood and adolescence.

Fundamental Movement Skills (FMS) consists of locomotor, manipulative, and balance skills. Locomotor skills refer to the body moving from one point to another in vertical or horizontal dimensions. Activities, such as walking, running, jumping, skipping, running, sliding, jumping, and climbing are examples of locomotor movement skills (Gallahue and Cleland-Donnelly 2007). Manipulative skills include gross motor movement or fine motor movement. Gross motor manipulative skills involve movements that provide power to objects or receive forces from objects. Throwing, catching, kicking, trapping, striking, volleying, bouncing, rolling, and punting are examples of basic gross motor manipulative skills. Fine motor manipulative skills refer to the activities of handling small objects that emphasize motor control, precision and accuracy of movement. Equilibrium refers to both bodies remaining in place but moving around a horizontal or vertical axis (Gallahue and Cleland-Donnelly 2007) and processes for maintaining postural stability (Westcott, Lowes, and Richardson 1997). More specifically, Westcott, Lowes, and Richardson defined static balance as 'the ability to maintain posture, such as balancing a standing or sitting position', and dynamic balance as 'the ability to maintain postural control during other movements, such as reaching an object or walking across a yard. grass. According to Gallahue and Cleland-Donnelly (2007), axial movements, such as bending, Westcott, Lowes, and Richardson defined static balance as 'the ability to maintain posture, such as balancing a standing or sitting position', and dynamic balance as 'the ability to maintain postural control during other movements, such as reaching an object or walking across a yard. grass. According to Gallahue and Cleland-Donnelly (2007), axial movements, such as bending, Westcott, Lowes, and Richardson defined static balance as 'the ability to maintain posture, such as balancing a standing or sitting position', and dynamic balance as 'the ability to maintain postural control during other movements, such as reaching an object or walking across a yard. grass. According to Gallahue and Cleland-Donnelly (2007), axial movements, such as bending,

In the motor learning literature there are two hypotheses that describe skill acquisition. One of them is transfer, which implies the influence of previous practice or skill performance or skills on the learning of new skills (Magill 2007). Another one is called the specificity hypothesis which suggests that the ability is specific to the task or purpose of the activity and cannot be transferred (Henry 1958). According to O'Keeffe, Harrison, and Smyth (2007), researchers have typically applied either transfer or specificity hypotheses as theoretical frameworks for the study of motor learning and only a few studies have utilized both perspectives simultaneously. Therefore, this hypothesis is somewhat contradictory in motor learning research and has created debate among scientists. Other findings from O'Keeffe, Harrison, and Smyth (2007) argue that there is not much empirical evidence on either of the two hypotheses in practical learning / teaching situations. This suggests that the conclusions made by many practitioners when choosing learning and teaching methods may not have a solid scientific basis. O'Keeffe, Harrison, and Smyth (2007) also found that few researchers have attempted to combine the transfer and specificity hypotheses (Cratty 1966; Sharp 1992). According to this assumption, beginners can use basic motor skills with some degree of success. However, when a learner adopts more skills, the techniques become more distinctive and the practice must be specific. and Smyth (2007) argue that there is not much empirical evidence on either of the two hypotheses in practical learning / teaching situations. This suggests that the conclusions made by many practitioners when choosing learning and teaching methods may not have a solid scientific basis. O'Keeffe, Harrison, and Smyth (2007)

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Motion learning must be taught from an early age. Human life is shaped by the capacity for skillful movement. Some movement skills make life possible. Without essential movement skills, we cannot protect ourselves from the dangers of our environment, build shelters, provide food, move from one place to another, or reproduce. (William H Edward, 2010). Some of the research results found that: In the implementation of basic movement education in elementary schools, there are many obstacles and obstacles, including limited facilities and infrastructure at school, the result is low basic movement skills of children (Agustini, Tomi, & Sudjana, 2016; Ayu Septiani, Sri Hanani Department of Physical Education, Health and Recreation, & Sport Science, 2016; Hidayat, 2017). In addition, the results of other research on basic motion learning found that the basic movement abilities of students who were treated with Game Series Learning Strategies (SPRP) were better than students who were taught with Conventional Learning Strategies (SPK). The results of the conclusions about the students' basic motor skills concluded that the basic movement abilities of school students in cities were better than those in the suburbs (Bakhtiar, 2014).

Learning development in this research, Researchers will develop basic motion material with the TPSR model (Teaching Personal And Social Responsiveness) into the lower class learning process. This TPSR model has a strong foundation in humanism to create a student-centered approach with the aim of facilitating the development of student personal and social responsibility. The uniqueness of this model lies in its focus on setting goals for student participation in class. Another important aspect of this model is to encourage students to be

more reflective in decision making and to provide access for students to express their opinions, interests, and feelings. The aim is for students to be able to model appropriate choices of behavior and activities through this type of teaching, and will show a greater concern for the well-being, safety, and quality of their peers' experiences. (Clocksin, Wattson, Williams, & Randsell, 2009; D. Watson & Clocksin, 2013; DL Watson & Clocksin, 2011). If it can be implemented properly, this program will be able to form an attitude of personal responsibility and social responsibility of the participants, and the role of the instructor / teacher also plays an important role in creating such a situation, so that this TPSR model can be integrated into the learning program in schools.

## 2 Method

**Research design.** This study uses Research and Development research which is used to develop or validate products used in learning education. Furthermore, it is stated that the research and development procedure basically consists of two main objectives, namely: (1) product development, and (2) testing the effectiveness of the product in achieving the goal. This development model is descriptive of development, because the procedure used describes the steps that must be followed, and is used to find a model or prototype, and can be used for learning (Arikunto, 2006). According to Dwiyo (2016) in each development can choose and find the most appropriate steps for their research based on the conditions and constraints faced.

**Research procedure.** Based on some of the opinions above, the procedure used in the development of the basic movement pattern learning model for the lower classes of Elementary Schools through the TPSR approach consists of five main stages, namely:

### **Needs Analysis**

Conducted visits to elementary schools (SD Patemon 01, SD Patemon 02, SD Sekaran 02, SD Sukorejo 02, SD Sampangan 01, SD Sronol Kulon 02) to make direct observations by analyzing teacher books and student books related to the content of class locomotor basic motion patterns 1 in accordance with the demands of KD in the 2013 curriculum.

The follow-up action was to conduct FGDs with 20 Primary School Physical Education Teachers in several cities in Central Java (Semarang City, Pemalang Regency, Brebes City, Pati Regency, Tegal City, Wonosobo Regency, Kendal Regency).

### **Literature analysis from books and previous research (books & journals)**

Visiting Elementary Schools (SD Sukorejo 02, SD Sampangan 01, SD Sronol Kulon 02) to analyze the Physical Education learning process related to the use of teaching approaches and methods in grade 1 schools.

### **Planning and Designing Learning Model Products**

The results of the above needs analysis then the researcher designed the basic locomotor motion learning model for class 1. With the steps as follows:

**Initial observations** at SDN 01 Sukorejo, SDN Patemon 01 and 02, SDN Sekaran 01 and 02, SDN 01 Sampangan and SDN 02 Sronol Kulon, to determine the movement characteristics of grade 1 students, to know the game material that has been taught and to know the condition of the area of the school environment to design the shape the field that will be used to play.

**Analysis of the character of attitudes in students** grade 1 and the result is that in general they are not accustomed to having a responsible attitude towards assignments, not accustomed to respecting and caring for others, not accustomed to respecting others

**Game technical analysis** namely: a. Purpose of play, b. The various roles to be played, c. Characteristics of motion in play, d. Game rules, e. Determine how to play, f. Sarpras to be used in playing, g. Assesses the principles or ways of developing a game.

#### **Expert validation**

The initial product of developing a basic motion learning model using the TPSR approach, before being tested in a small-scale test, it is validated by experts in accordance with this field of research. To validate the product to be produced, the researcher involved 4 (four) experts from lecturers and professional teachers. The product design was evaluated by 4 experts with different competencies, namely 1. Mr. Donny Wirayudha K. Ph.d as a game expert, 2. Mr. Supardi SPd. M. Or as a game expert, 3. Mr Slamet Mokhamed SPd as a Learning expert, 4. Mr Krismunadi SPd as a learning expert.

#### **Field Trial**

**Small Scale Trial** conducted in Sukorejo 02 State Elementary School with the research subjects were all 24 students of grade 1

**Large Group Trials**, conducted at the Sampangan 01 Elementary School with the research subjects were all students in grade 1 totaling 28 students

**Feasibility Trial**, conducted at the Srandol Kulon 02 Elementary School with the research subjects were all grade 1 students totaling 28 students

#### **Data collection technique**

The instrument uses a questionnaire for learning experts and game experts, attitude value observation sheets, knowledge value observation sheets and skill value observation sheets for field trials.

#### **Product Revisions**

The revision of the product model for the low-class basic locomotor motion pattern was carried out based on input from experts, as well as trial results. to repair the product before the end product is used.

#### **Data Sources and Research Subjects.**

The data source of this research came from information on the Physical Education Teachers at SD Patemon 01 and 02, SD around 02, 10 SD in Gunungpati district and 10 SD outside Semarang City, 4 game experts and learning experts. The subjects of this study were all students of SD Negeri Sukorejo 02 class 1 totaling 24 students from Sampangan 01 Elementary School with 28 students in grade 1, Srandol Kulon 02 Elementary School with 28 students in grade 1.

#### **Data Collection Techniques and Instruments**

The instrument used in the development of the learning model, in the form of an observation guide. Observation is used to find out about the efficiency and effectiveness of learning models about improving student attitudes, knowledge and skills as well as expert opinion. Assessment is used to obtain information in the form of a nominative assessment of the model product to be produced. In this study, the instrument used to collect data on children's learning outcomes was an assessment of children's learning outcomes in one learning process in one meeting. Instrument validation for physical education learning models (Donny, 2015).

#### **Data analysis technique**

The test result data will be analyzed in a descriptive analytic manner, by carrying out an in-depth study and analysis of the information and / or feedback that can be captured from the

test subjects. The product of this learning model will be said to be successful if it can be used as a learning model in schools and is able to complete student learning outcomes in accordance with the learning objectives.

### 3 Result and Discussion

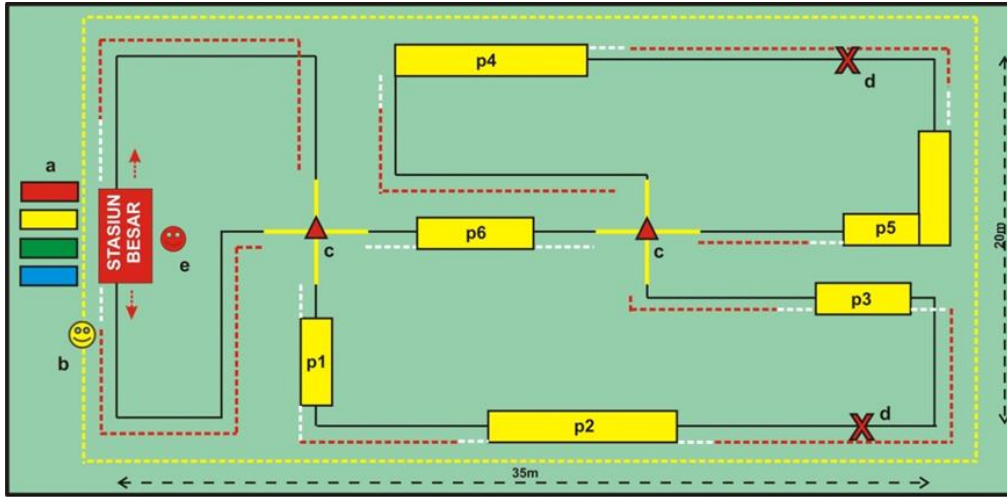
**Needs Analysis.** The results of the discussion with the teachers, in the FGD, about the implementation of the learning process in schools that have been carried out so far are: 1. There is a need for improvisation of the process related to learning material for locomotor basic motion. 2. There was confusion in the implementation in the field, even though they had followed the Bintek. 3. Teachers teach based only on the experience they have. For the minutes of this discussion, it is necessary to develop a learning model for basic movement patterns for grade 1 in elementary schools. The results of the FGD can be seen in table 1 below:

**Table 1.** Results of Class 1 Teacher Book Analysis

<b>Teacher's Book Material Content</b>	<b>Complete</b>	<b>Less complete</b>	<b>Incomplete</b>	<b>Nothing</b>
<b>The content of the book material is related to religious attitudes (living and practicing the religion they adhere to) and social attitudes</b>			20	
<b>The content of social education materials related to the formation of children's character, for example: discipline, independence, cooperation, respect for others and so on</b>			4	16
<b>Locomotor basic motion material content</b>		16	4	
<b>The suitability of the material with the development of students</b>		14	6	

#### 3.1 Planning and Design of Class Learning Model Products 1

From the results of the observation data obtained, it is concluded that the traditional game "Ride the Train" is considered appropriate and effective to use for Learning Model research, there are objectives, kinds of roles, characters, provisions and regulations as stated in the technical analysis above. Overall, the reason is that the traditional game "Ride the Train" is in accordance with the school conditions and situation.



**Legends:**

a = train carriage  
 b = station master  
 c = traffic controller  
 d = latch  
 e = supervisory officer  
 white line = road  
 red line = run  
 yellow line intersection = railroad crossing line

yellow line = station master route,  
 p1 = jump crank obstacle post,  
 p2 = straight bridge obstacle post,  
 p3 = hurdle jump post,  
 p4 = oblique bridge obstacle post,  
 p5 = the train obstacle post backward,  
 p6 = rail barrier post is damaged

Movements made in accordance with the level of development and growth of grade 1 elementary school children and in accordance with the demands of KD at the 2013 Kurikulum, namely:

**Table 2.** Basic Motion of Class 1 Locomotor

Movement Type	Movement Purpose	Attitude Built
Play train: 1. Walk straight, walk turns, walk sideways and walk backward 2. Running straight, running turns, running sideways and running backwards 3. Jump / crank your legs, turn straight and jump sideways. 4. Jumping two straight legs, jumping sideways. This game can be varied with various movements and adapted to the basic competencies of grade 1 SD.	To build students' physical fitness by exploring qualities: 1. Motion agility. 2. Movement speed. 3. Endurance of motion 4. Muscle strength 5. Flexibility of motion.	In playing, it involves all students to play a role in accordance with their duties, both individually and in groups, so that it will foster attitudes: 1. Responsibility for yourself and others. 2. Participation and self-control. 3. Respect for others 4. Cooperating between friends without supervision 5. Care / help / sacrifice for others.

### 3.2 Expert Validation

Experts agree to provide some suggestions and revisions to the design of game products as follows: 1) The shape of the field should not have many turns making it difficult for students to play, so it is advisable to make simple forms such as regular square-shaped fields so that students can easily remember them; 2) The number of obstacles that must be passed is large, so it is recommended to reduce the number. The product revision results are as shown in the following figure.



#### Legends:

a = station master	p2 = straight bridge obstacle post
b = latch	p3 = hurdle jump post
c = traffic controller	p4 = oblique bridge obstacle post
d = train	p5 = reverse train obstacle post
yellow line (stationmaster route)	p6 = rail barrier post is damaged
p1 = jump crank obstacle post	

Movements made in accordance with the level of development and growth of grade 1 elementary school children and in accordance with the demands of KD in the 2013 curriculum, namely:

**Table 3.** Basic Motion of Class 1 Locomotor

Movement Type	Movement Purpose	Attitude Built
Play train: 1. Walk straight, walk turns, walk sideways and walk backward 2. Running straight, running turns, running sideways and running backwards 3. Jump / crank your legs, turn straight and jump sideways. 4. Jumping two straight legs, jumping sideways. This game can be varied with various movements and adapted to the basic competencies of grade 1 SD.	To build students' physical fitness by exploring qualities: 1. Motion agility. 2. Movement speed. 3. Endurance of motion 4. Muscle strength 5. Flexibility.	In playing, it involves all students to play a role in accordance with their duties, both individually and in groups, so that it will foster attitudes: 1. Responsibility for yourself and others. 2. Participation and self-control. 3. Respect for others 4. Cooperating between friends without supervision 5. Care / help / sacrifice for others.



### 3.3 Field Trial

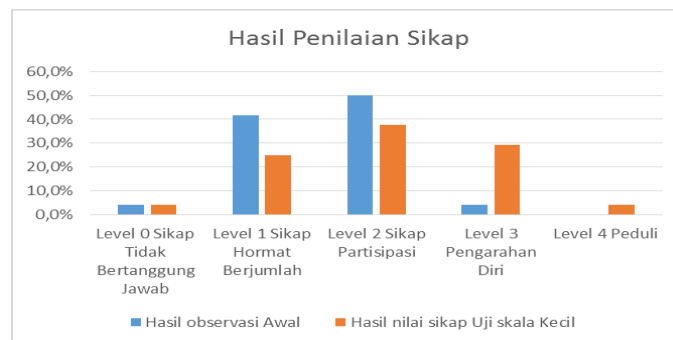
#### Small Scale Trial Results

**Attitude Assessment (TPSR).** The results of increasing the attitude value in the small-scale test learning process are presented in the table as follows:

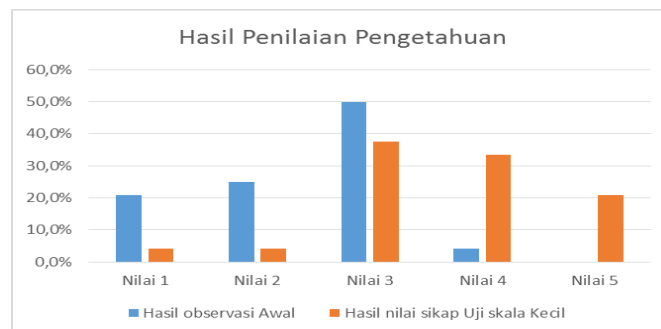
**Table 4.** Results of Attitude Improvement

No.	Information	Observation results	The results of the small scale test attitude value
1	Level 0 Irresponsibility	1	1
2	Level 1 Respect Numbered	10	6
3	Level 2 Attitude of Participation	12	9
4	Level 3 Self-Direction	1	7
5	Level 4 Caring	0	1

The results of the attitude assessment show that there is an increase in the attitude character score at level 1, 2, 3, 4, but at level 0 it does not increase. Based on the data above, it can be concluded that this game is able to explore the ability of attitudes in grade 1 elementary school students. The data above can be presented in the form of the following diagram.



**Knowledge Outcome Assessment.** The graph of the results of the assessment is as follows:



**Fig. 3.** Value of Knowledge Results

The results of the knowledge assessment show that all students are able to get scores with the distribution as above, so it can be concluded that this game is able to explore students' knowledge abilities and is able to explore students' courage to dare to speak in front of friends and teachers.

**Skills assessment.** The graph of the results of the assessment is as follows:

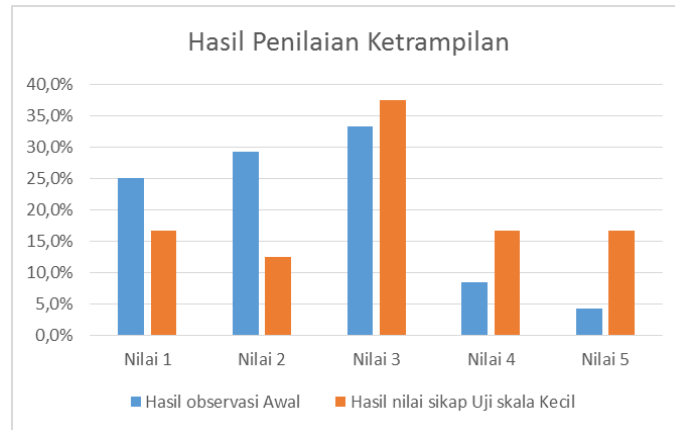


Fig. 4. Results of Skills Value.

The results of the skills assessment show that all students are able to get the scores with the distribution as above, so it can be concluded that this game is able to explore the students' locomotor ability.

**Large Scale Trial Results**

**Attitude Assessment (TPSR).** The observation results obtained initial attitude data as follows:



Fig. 6. The Value of the Attitude of the Large Scale Test

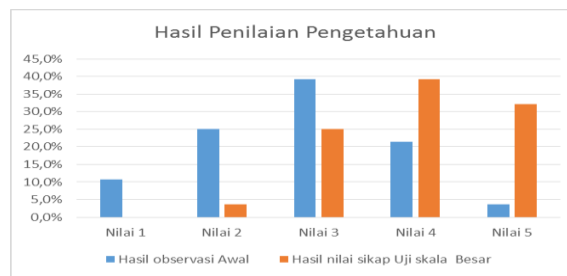
The results of increasing the attitude value in the large-scale test learning process are presented in the table as follows:

**Table 5.** Results of Attitude Improvement

No.	Information	Observation results	The results of the attitude value test on a large scale
1	Level 0 Irresponsibility	0	0
2	Level 1 Respect Numbered	1	1
3	Level 2 Attitude of Participation	19	15
4	Level 3 Self-Direction	8	10
5	Level 4 Caring	0	2

The results of the attitude assessment show that there is an increase in the attitude character score at levels 1, 2, 3, 4. Based on the data above, it can be concluded that this game is able to explore the attitude abilities of grade 1 elementary school students.

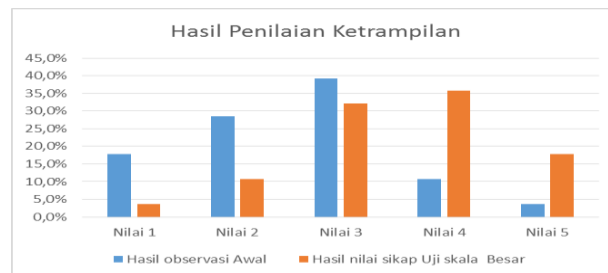
**Knowledge Assessment.** The graph of the results of the assessment is as follows:



**Fig. 7.** Value of Knowledge Results

The results of the knowledge assessment show that all students are able to get scores with the distribution as above, so it can be concluded that this game is able to explore students' knowledge abilities and is able to explore students' courage to dare to speak in front of friends and teachers.

**Skills Assessment.** The graph of the results of the assessment is as follows:



**Fig. 8.** Value of Skills Results.

The results of the skills assessment show that all students are able to get the scores with the distribution as above, so it can be concluded that this game is able to explore the students' locomotor ability.

### Feasibility Test Results

**Attitude Assessment (TPSR).** The results of increasing the attitude value in the feasibility test learning process are presented in the table as follows:

No.	Information	Observation results	The results of the attitude value test on a large scale
1	Level 0 Irresponsibility	0	0
2	Level 1 Respect Numbered	0	0
3	Level 2 Attitude of Participation	16	7
4	Level 3 Self-Direction	10	14
5	Level 4 Caring	2	7

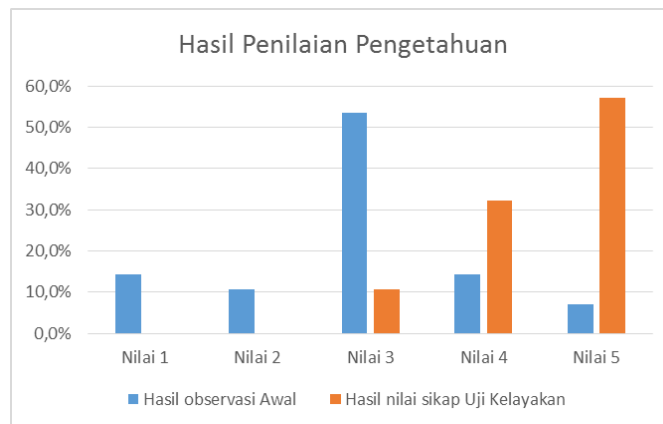
As in the table above, the following diagram can be presented



**Fig. 9.** Attitude Value

The results of the attitude assessment show that there is an increase in the attitude character score at levels 2, 3, 4. So it can be concluded that this game is able to explore the attitude abilities of grade 1 elementary school students.

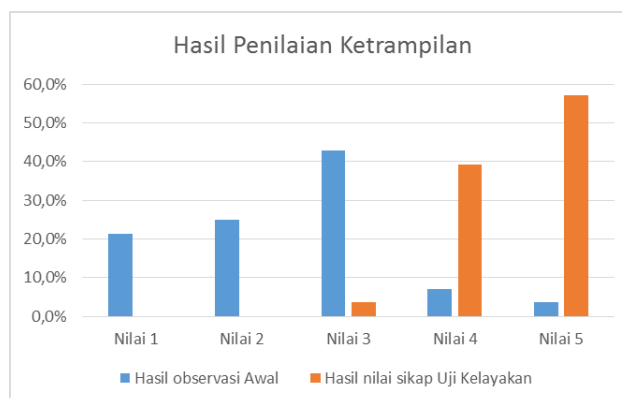
**Knowledge Assessment.** The graph of the results of the assessment is as follows:



**Fig. 11.** Value of Knowledge Results

The results of the knowledge assessment show that all students are able to get scores with the distribution as above, so it can be concluded that this game is able to explore students' knowledge abilities and is able to explore students' courage to dare to speak in front of friends and teachers.

**Skills Assessment.** The graph of the results of the assessment is as follows:



**Fig. 12.** Values of Skills Results.

The results of the skills assessment show that all students are able to get the scores with the distribution as above, so it can be concluded that this game is able to explore the students' locomotor ability.

## 4 Conclusion

Based on the research results, 1) Needs Analysis: 1. There needs to be an improvisation of the learning material process for locomotor basic motion. 2. There were difficulties in implementing it in the field, even though it had followed the Bintek. 3. Teachers teach based on experience only. The resulting recommendations need to develop a learning model for basic movement patterns for grade 1 in elementary schools. 2) Planning and Design of Learning Model Products: A design that develops a design of field shapes and sizes that is appropriate and effective in accordance with the characteristics of the environmental conditions of lower class elementary school students. 3) Expert validation: The average result of the overall expert judgment is 89.73% and this percentage is included in the "Very Good" category. 4) Field trials: The field trials assessed include: a) attitude value in the learning process; there is an increase, but level 0 has not increased; b) Assessment of Knowledge Results: the game is able to explore students' knowledge and courage skills, c) Skills assessment: the game is able to explore students' locomotor movement abilities. 5) Product Revision: Based on the evaluation of game experts and game learning experts, it can be used for physical education learning material for basic locomotor motion patterns for lower classes of elementary school. The developing a model of physical education and sports learning, of non-locomotor archetype materials in elementary school using Teaching Personal And Social Responsibility approach, shows the students were able to explore non-locomotor motion skills in train games. The value of non-locomotor attitudes, knowledge and movement skills has increased.

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# Students' Sport Activities During Covid-19 Pandemic Situation

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**Abstract.** Covid-19 pandemic in Indonesia forces the learning process at school to be carried out online. This study aims to determine student sports activities during the pandemic. This research is quantitative descriptive conducted at SMK Negeri 1 Tonjong, Brebes. The research sample was 459 students of XII grade. Data collection was gained through questionnaire technique with Google form. Data analysis used percentage descriptive analysis. The results showed that during the pandemic, 85% of students did sports activities and 15% did not do sports activities. Sports activities in a week, 37% did it sometimes, 50% 1-3 times. Time per sport activity, 86% 0-60 minutes, 14% 60-120 minutes. Types of sport activities are 5% swimming, 65% athletics, 17% gymnastics, 2% biking and 11% jogging. The purpose of sports activities is 74% to maintain health. Sport activity places, 55% at home, 30% in public facilities. The conclusion is that during the Covid-19 pandemic, students continue to do sports activities with the aim of maintaining health.

**Keywords:** Activities, Sports, Pandemic, Covid-19

## 1 Introduction

Vocational High School (SMK) is an educational unit that provides vocational education at the secondary education level. Vocational education is a secondary education that prepares students, especially to work in certain fields [1]. The specific objectives of vocational education are: 1) Producing graduates who have competencies in accordance with the demands of the business world and the industrial world both nationally and globally, 2) Producing graduates who have vocational skills in technical expertise [2] programs that meet the competencies and certifications required by the world of work and professional associations in engineering that are relevant and able to compete in the global market, 3) Producing various research products and innovative programs in the PTK (vocational technology education) and technical disciplines that are useful for improving the quality of human resources in national development, 4) Becoming a center for information and dissemination in the fields of technology and vocational education as well as in the engineering field, 5) Producing many educators / trainers in the field of vocational technology who have an entrepreneurial spirit (entrepreneurship) [3].

In addition to having high competency to face the world of work, vocational students must also have good physical fitness, because physical fitness has a very big role for someone in carrying out the work they do. A person who has good physical fitness will have the ability to carry out daily activities effectively because he has enough fitness to be able to support core



activities as well as additional daily activities. Without having a good level of physical fitness, a person will not be able to carry out activities and complete tasks properly.

Physical fitness is an important factor in carrying out daily activities in order to not experience excessive fatigue. According to physical fitness is the ability to perform daily tasks vigorously without feeling excessive fatigue and full of energy doing and enjoying activities in spare time that can face emergencies when it comes. In line with this, the definition of physical fitness according to [4]. Physical fitness is the capability and ability of the body to make adjustments (adaptations) to the physical liberation that is given to it (from daily work) without causing excessive fatigue. Physical fitness is the degree of dynamic health of a person whose basic physical ability is able to carry out tasks that must be carried out (5).

Physical Education Sports and Health is an integral part of the national education program, aims to develop some aspects of physical fitness, movement skills, critical thinking skills, social skills, reasoning, emotional stability, moral action, healthy lifestyles and the introduction of a clean environment through learning experiences using selected body activities that carried out systematically based on the values of faith and devotion to God Almighty. One of the competencies developed in the subject of Physical Education, Sports, and Health (PJOK) in Vocational Schools is the ability to analyze concepts and practice exercises, measuring components of physical fitness. From this competency, it is expected that students have the knowledge and ability to plan and carry out physical fitness activities and have the ability to measure the level of physical fitness. With this competency, it is hoped that vocational students will have good level of physical fitness which is certainly necessary when they have to face the world of work.

In early March 2020, positive cases of Covid-19 in Indonesia were first detected and on April 9, the Covid-19 pandemic had spread to 34 provinces in Indonesia. Responding to these conditions, at the end of March 2020 the Minister of Education and Culture issued Circular Letter Number 4 of 2020 concerning Implementation of Education Policies in the Emergency of the Spread of Corona Virus Disease-19 (COVID-19). In the circular, it is explained that the learning process is carried out at home through online learning. The learning process from home can be focused on life skills education, regarding the COVID-19 pandemic. This is one of the government's steps in an effort to break the rope of the spread of COVID-19 in Indonesia [6].

During the emergency period of the spread of Corona Virus Disease-19 (COVID-19), the learning process of physical education, sports and health cannot be carried out in schools. The implementation of Large Group Social Restrictions (PSBB) to break the chain of Covid-19 spread requires teachers to carry out WFH (work from home) in carrying out their duties as educators. The condition of teaching activities that suddenly changes drastically is a challenge for teachers, especially physical education, sports, and health (PJOK) teachers so that the goals and objectives of physical education, sports, and health can be achieved. Even though the Minister of Education and Culture circular letter no 4/2020 regarding learning guides at home during the pandemic period requires the teachers not to burden students through demands for curriculum achievement as class promotion requirements.

Physical education, sports, and health subject is very important subject for students to learn today, because with knowledge about health and sports practices students can fortify themselves, one of them is by increasing body resistance (immunity) to prevent corona virus, with regular exercise be one way to maintain health. In online learning, a physical education, sports, and health teacher must give assignments to the students so that they continue to do sports activities at home as part of physical education material that must be done at school.

Twelfth grade vocational students will soon graduate and they must be ready to enter the world of work. During the emergency period of the spread of Corona Virus Disease-19 (COVID-19), they are expected to always foster their level of physical fitness by doing sports activities so that they have a good level of physical fitness. Based on the foregoing, it is necessary to conduct a scientific study, how do sports activities carried out by twelfth grade vocational students of SMK Negeri 1 in Brebes Regency in fostering a level of physical fitness during the Covid-19 pandemic?

### 1.1 Covid-19

Coronavirus Disease 2019 (COVID-19) is an infectious disease caused by Severe Respiratory Syndrome Coronavirus2 (SARS-CoV-2). SARS-CoV-2 is a new type of coronavirus that has never been previously identified in humans. There are at least two types of coronavirus known to trigger diseases that can cause severe symptoms such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). Common signs and symptoms of COVID-19 infection include acute respiratory symptoms such as fever, cough, breathless. The average incubation period is 5-6 days with the longest incubation period of 14 days. In severe cases of COVID-19, it can cause pneumonia, acute respiratory syndrome, kidney failure, and even death. Indonesia reported its first COVID-19 case on March 2, 2020 and the number continues to increase until now. As of 30 June 2020, the Ministry of Health reported 56,385 cases of COVID-19 confirmation with 2,875 deaths (CFR 5, 1%) spread across 34 provinces. As many as 51.5% of cases occurred in men. Most cases occur in the age range 45-54 years and the least occurs at the age of 0-5 years. The highest mortality rate was found in patients aged 55-64 years [7].

Coronavirus is a zoonotic (transmitted between animals and humans). Research states that SARS is transmitted from civet cats to humans and MERS from camels to humans. The animal that is the source of transmission of COVID-19 is still unknown. Based on current epidemiological and virological studies, it is proven that COVID-19 is mainly transmitted from symptomatic people to other people who are at close range via droplets. Droplets are water-filled particles with a diameter of  $> 5-10 \mu\text{m}$ . Droplet transmission occurs when a person is in close proximity (within 1 meter) of someone who has respiratory symptoms (for example, coughing or sneezing) so that the droplets are at risk of hitting the mucosa (mouth and nose) or the conjunctiva (eyes). Transmission can also occur through objects and surfaces contaminated with droplets around infected people. Therefore, transmission of the COVID-19 virus can occur through direct contact with an infected person and indirect contact with surfaces or objects used on an infected person (for example, a stethoscope or thermometer). In the context of COVID-19, airborne transmission may be possible in special circumstances where aerosol-producing supportive procedures or treatments such as endotracheal intubation, bronchoscopy, open suction, administration of nebulized medication, manual ventilation before intubation, turning the patient into a prone position, disconnecting the ventilator, noninvasive positive-pressure ventilation, tracheostomy, and cardiopulmonary resuscitation. There is still a need for further research on airborne transmission. COVID-19 is a disease that attacks vital human organs, namely the lungs and until now a vaccine to prevent this disease is still being researched. One of the preventions is by implementing a healthy life and doing physical distancing.

## 1.2 Physical education, sports, and health

Physical Education, Sports and Health (PJOK) can be defined as an educational process that utilizes physical activity to improve physical fitness, develop motor skills, get used to a healthy and active lifestyle, sportsmanship, and emotional intelligence. Physical education is part of education in general. Physical education is also an educational subsystem that has a role in developing human quality.

Physical Education, Sports, and Health (PJOK) learning is an inseparable part of general education. This learning is a place to interact in terms of kinesthetic intelligence. Physical Education, Sports, and Health (PJOK) is an integral part of education because it participates in educating the nation. Physical Education, Sports, and Health (PJOK) Physical Education, Sports, and Health (PJOK) has the goal 1) developing body organs to improve physical health and fitness 2) neuromuscular, 3) mental and emotional 4) social and 5) intellectual. The ultimate goal of Physical Education, Sports, and Health (PJOK) lies in its role as a unique vehicle for enhancing character, and as a vehicle to form a strong personality, good character and noble attitude in accordance with the goals of national education. Given the importance of physical education, sports and health in composing physiological and psychological students, it needs to be supported by various factors in the learning process [8].

Thus, Physical Education, Sports, and Health (PJOK) can be interpreted as an educational process that utilizes physical activity to improve physical fitness, develop motor skills, get used to a healthy and active lifestyle, sportsmanship, and emotional intelligence. Physical education is a part of education in general. Physical education is also an educational subsystem that has a role in developing human quality. Physical education, sports and health is the interaction of students with educators with learning resources in the form of physical activities, sports and health which curriculum is available in schools with the aim of guiding a completely healthy lifestyle. The provision of learning experiences is directed at fostering physical development, psychological development, motor skills, knowledge and reasoning, appreciation of values (attitudes, mental emotional, sportsmanship, spiritual, social) as well as fostering lifelong patterns of life, balanced physical and psychological development [9].

The real contribution of Physical Education, Sports, and Health (PJOK) is to develop skills (psychomotor). In this case, it can be said that Physical Education, Sports, and Health (PJOK) is a unique learning because it provides opportunities to build more skills than other subjects. The most important task in carrying out physical education is how to help students to be able to undergo the process of optimal growth and development both physically, motorically, mentally and socially(10) . There are three important things that can be a unique contribution from learning physical education, namely (a) improving students 'physical fitness and health, (b) increasing the power of physical skills and (c) increasing students' understanding in principles as well as how to apply in practice [11].

## 1.3 Physical fitness

Physical fitness is an important factor in carrying out daily activities in order to not experience excessive fatigue. Physical fitness is the ability to perform daily tasks vigorously without feeling too tired and full of energy doing and enjoying activities in spare time that can face emergencies when it comes [2]. Physical fitness is the ability and ability of the body to make adjustments (adaptations) to the physical liberation that is given to it (from daily work) without causing excessive fatigue [12] .

Physical fitness is the ability of a person to be able to do daily work efficiently without causing excessive fatigue so that he can still enjoy his spare time. Physical fitness gives a person the ability to carry out daily activities without excessive fatigue. This also means that a person still has energy reserves to enjoy his spare time to do sudden work properly. The bolder / fresher a person is, the greater their physical work ability and the less fatigue will occur [13].

Physical fitness is composed of various elements as indicators of overall physical fitness achievement. There are two aspects of physical fitness, namely physical fitness related to health and physical fitness related to skills. Physical fitness related to health includes: a) endurance of the heart and lungs; b) muscle strength; c) muscle endurance; d) flexibility; e) body composition. Physical fitness related to skills includes: a) speed; b) power; c) balance; d) agility; e) coordination; f) reaction speed [14]. There are several factors that can affect a person's physical fitness including 3 factors, namely nutrition, rest, and exercise [15].

There are many ways that people do to get physical fitness, for example by doing massage, taking a steam bath, and practicing sports. Exercising is one of the most effective and safe alternatives to physical fitness because it has multiple benefits, including physical benefits (increasing physical fitness), psychological benefits (more resistant to stress and better able to concentrate) and social benefits (it can increase self confidence, a medium of interacting and socializing). The other benefits of physical fitness training are increased strength and endurance to help carry out daily tasks because they don't tire quickly, exercise helps maintain heart and blood vessel health, good movement benefits the human body.

Physical fitness has many benefits, especially for carrying out daily activities. A body that has a good level of physical fitness will not tire easily so that activities can be carried out properly without any obstacles. Physical fitness functions in addition to showing physical condition can be divided into three. Physical fitness will bring benefits, those are, 1) developing muscle strength and endurance such as bone strength, joints which will support performance in both sports and non-sports activities; 2) Increasing aerobic resistance; 3) Increasing flexibility; 4) Burning calories which allows the body to avoid obesity; 5) Reducing stress; 6) Increasing passion for life [16].

#### **1.4 Sport activities**

According to the Indonesian Big Dictionary, activities are activities that are busy, active, work or one of the work activities carried out in each division of the organization or institution [17]. Sports are all systematic activities to encourage, foster, and develop physical, spiritual and social potential [18]. Sports can be defined as form of physical activity that is planned and structured by involving repeated body movements to get good results, for example to improve physical and spiritual fitness.

Sports can be grouped into modern sports and traditional sports. Modern sports include fencing, weightlifting, athletics, volleyball, basketball, biking, badminton, swimming, gymnastics, soccer. Traditional sports (native sports from several regions in Indonesia) include forts, stilts, tops, playing hadang, congklak [19].

Sports activities are activities or activities carried out by someone in a planned and structured manner by involving repeated body movements through sports (gymnastics, athletics, swimming, etc.) to get good results, for example to improve physical and spiritual fitness.

## 2 Methods

This research is a descriptive quantitative study, using the survey-test method. The variables in this study were sports activities carried out by students of class XII SMK in Brebes Regency during the Covid-19 pandemic. The population in this study were all students of class XII SMKN 1 Tonjong Brebes Regency as many as 459 students. The research sample was taken by using the total sampling technique. The research data was taken using a questionnaire with google form format. Analysis of research data used percentage descriptive analysis.

## 3 Result and Discussion

### 3.1 Result

The results of research related to sports activities of class XII students of SMK Negeri Tonjong during the 2020 pandemic include: did students do activities during the pandemic?; sports activities carried out in the last 3 months; the number of sports activities in a week; time in any sporting activity; type of sports activity carried out; the purpose of doing sports activities; and four sports activities were carried out. The research results are presented in the following table:

**Table 1.** Sport activities during Covid-19 pandemic

No	Sport Activities	Total	%
1	During pandemic, do sport activities	338	85
2	During pandemic, not do sport activities	71	15
Total		459	100

Based on table 1 above, it shows that during the Covid-19 epidemic, 338 or 85% of students do sports activities, and 71 or 15% of students do not do sports activities.

**Table 2.** Sport activities in the last 3 months

No	Sport Activities in the Last 3 Months	Total	%
1	Active to do sport activities	221	48
2	Inactive to do sport activities	238	52
Total		459	100

Based on table 2 above, it shows that in the last 3 months, 221 or 48% of students are active in sports activities, and 238 or 52% of students do not do sports activities. Based on table 3 below, it shows that 168 or 37% of students sometimes do sports activities, 150 or 33% of students do 1 - 2 times sports activities, 80 or 7% of students do 2 - 3 times sports activities, and 61 or 13% of students do more than 3 times sports activities.

**Table 3.** Sport activities in the last 3 months

No	Sport activities in a week	Total	%
1	Sometimes do sport activities	168	37
2	1 - 2 times do sport activities	150	33
3	2 – 3 times do sport activities	80	17
4	More than 3 times do sport activities	61	13
Total		459	100

**Table 4.** Times to do sport activities

No	Total of times to do sport activities	Total	%
1	0 – 30 minutes to do sport activities	245	53
2	30-60 minutes to do sport activities	152	33
3	60–90 minutes to do sport activities	46	10
4	More than 120 minutes to do sport activities	16	4
Total		459	100

Based on table 4 above, it shows that the length of time in each sports activity, 245 or 53% of students do sports activities within 0-30 minutes, 152 or 33% of students do sports activities within 30-60 minutes, 46 or 10% of students do sports activities within 60 - 90 minutes, and 16 or 4% of students do sports activities for more than 120 minutes.

**Table 5.** Times to do sport activities

No	Types of Sport Activities Conducted	Total	%
1	Swimming activities	22	5
2	Athletics activities	299	65
3	Gymnastics activities	76	17
4	Biking activities	10	2
5	Jogging activities	52	11
Total		459	100

Based on table 5 above, it shows that the types of sports activities carried out by students during the pandemic period 22 or 5% of students do swimming sports, 299 or 65% of students do game sports activities, 76 or 17% of students do gymnastics activities, 10 or 2% students do biking sports and 52 or 11% of students do jogging.

**Table 6.** Purpose to sport activities

No	Purpose to sport activities	Total	%
1	Maintain health	341	74
2	Lose weight	41	9
3	Hobby	69	15
4	Etc	8	2
Total		459	100

Based on table 6 above, it shows that the purpose of doing sports activities is 341 or 74% of students do it with the aim of maintaining health, 41 or 9% of students do it with the aim of losing weight, 69 or 15% of students do it with the aim of a hobby and 8 or 2% of students do it for other purposes.

**Table 7.** Place to do sport activities

No	Purpose to sport activities	Total	%
1	Sport activities at home	254	55
2	Sport activities in public facilities	135	30
3	Sport activities in the field	24	5
4	Sport activities in clubs	20	4
5	Sport activities at school	25	6
Total		459	100

Based on table 7 above, it shows that where sports activities are done, 254 or 55% of students do sports activities at home, 135 or 30% of students do sports activities in public facilities, 24 or 5% of students do sports activities in the field, 20 or 4% of students do sports activities in clubs, and 25 or 6% of students doing sports activities at school.

### 3.2 Discussion

Based on the results of the research, it can be said that in general during the covid - 19 period where the learning process was carried out online, students of class XII SMKN 1 Tonjong Brebes regency continued to do sports. This certainly provides very good information, because class XII students who are about to graduate and are expected to work according to their competencies, have good physical fitness which is needed to be able to work well.

When it is viewed from sports activities during the pandemic, 85% of students do sports activities, 15% of students do not do sports activities. If you look at the sports activities that are carried out in the last 3 months, 48% of the students are active in sports activities, and 52% of the students do not do sports activities.

When it is viewed from the activities carried out every week 37% of students sometimes do sports activities, 33% of students do 1-2 times sports activities, 7% of students do 2 - 3 times sports activities, and 13% of students do more than 3 times. sports activity.

When it is viewed from the length of time spent doing sports activities, 53% of students do sports activities within 0-30 minutes, 33% of students do sports activities within 30-60 minutes, 10% of students do sports activities within 60 - 90 minutes. minutes, and 4% of students do sports activities for more than 120 minutes.

When it is viewed from the type of sports activities carried out, 5% of students do swimming sports, 65% of students do game sports, 17% of students do gymnastics, 2% of students do biking sports activities and 11% of students do jogging sports activities.

When it is viewed from the goal of doing sports activities, 74% of students do it with the aim of maintaining health, 9% of students do it with the aim of losing weight, 15% of students do it for the purpose of a hobby and 2% of students do it with other purposes.

When it is viewed from the places where sports activities are carried out, 55% of students do sports activities at home, 30% of students do sports activities in public facilities,

5% of students do sports activities in the field, 4% of students do sports activities in clubs, and 6% students do sports activities at school.

#### 4 Conclusion

Based on the results of research and discussion, it can be concluded that during the Covid-19 pandemic, the twelfth grade students of SMK Negeri 1 Tonjong continued to do sports activities. Sports activities are conducted 1 to 3 times a week with implementation times ranging from 30 minutes to 120 minutes. The purpose of doing sports activities in general is to maintain health and some to lose weight and because of hobbies. Most of the sports activities conducted are athletics sports activities, and some of them are swimming, gymnastics, biking, and jogging. Most of the sports activities conducted are doing sports activities at home, some are carried out in public facilities, fields and in clubs.

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