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# Utilizing Performance Measurement in Physical Testing for Volleyball Using an Application

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## Abstract

The study titled "Utilization of Physical Measurement Tests in Volleyball Using an Application for Palembang 13 Public Junior High School Students" aims to establish normative categories for assessing physical test results in volleyball through the use of a dedicated application. The critical components of physical fitness in volleyball, such as endurance, speed, strength, and explosive power, are investigated. This research adopts a quantitative approach with a descriptive research design. The participants consist of 30 students engaged in volleyball extracurricular activities at Palembang 13 Public Junior High School, comprising 16 male students and 14 female students. Data collection involves various test instruments for different physical components: the bleep test for endurance, the 30-meter run for speed, 1-minute push-ups for arm strength, sit-up test for abdominal muscle strength, and a vertical jump test for muscle explosive power. The research is conducted at Palembang 13 Public Junior High School in collaboration with a member of the MGMP PJOK (Physical Education, Sports, and Health) in the city of Palembang. The findings reveal that the average physical condition of volleyball extracurricular students at Palembang 13 Public Junior High School falls within the very good category (18.6%), good category (3.8%), fair category (21%), less than average category (28.8%), and very less than average category (26.4%). In summary, the overall physical condition of volleyball extracurricular students at Palembang 13 Public Junior High School is considered suboptimal, with a prevalence of 28.8% falling into the less than average category. The intention of this research is to serve as a basis for evaluation and to raise awareness among students, encouraging them to continually enhance and maintain their physical fitness for optimal performance.

## How to Cite

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## INTRODUCTION

Sports come from the word "exercise," meaning to train oneself or a group to become skillful in movements, while "body" refers to the body. Therefore, sports are a form of education aimed at training individuals or groups by consciously utilizing body movements. Sports encompass systematic activities that encourage, nurture, and develop physical, mental, and social potential. Besides being a necessity, sports play a role in nurturing and developing individuals in a planned, progressive, and continuous manner through competitions to achieve excellence.

According to the Basic Provisions of Sports Law of 1997, Article 1, sports are all physical activities motivated by the spirit of overcoming oneself or others, based on chivalry. Hence, sports serve as a means to enhance the quality and noble expression of life together with fellow human beings. Sports can be harnessed to elevate the dignity and pride of a nation because if a country excels in a particular sports discipline, it becomes recognized by other nations.

Volleyball is one of the sports widely enjoyed by people of all ages. Apart from being a competitive sport, volleyball is often played by teenagers and adults as a recreational activity to fill leisure time. Volleyball is a game played by two teams, each consisting of six members separated by a net. According to (Giartama et al., 2020), volleyball is a sport influenced by technological advancements and is supported by good physical conditions. Various methods are employed to enhance physical components, including activities aimed at improving speed, strength, agility, and more.

Physical condition is a holistic unity of several inseparable components, and the improvement of physical condition must be more focused to attain maximum capability during competitions. In the sport of volleyball, students need to possess excellent physical abilities to achieve the highest level of performance. This aligns with the viewpoint of (Saputra & Indra, 2019), who assert that students with good physical conditions and biomotor skills are more likely to excel. To determine whether a student has good physical condition, it is necessary to conduct physical tests and measurements. This allows for the identification of students with subpar physical abilities, enabling prompt steps to improve their physical capabilities toward a higher level.

Sports testing and measurement constitute the process of collecting information from the measured object, with the results presented as data or numerical values used for sports development evaluation. Physical condition tests reflect the abilities of individual students, providing insights into their initial proficiency levels in that particular sports discipline. According to (Hartati et al., 2022), tests are crucial in gathering information about objects. Meanwhile, (Gumantan, 2020) define measurement as the process of collecting data or information about a specific individual or object. In conclusion, tests and measurements serve as tools or instruments used to obtain and collect data or information from an individual or object, which can be utilized for evaluation purposes.

The advancement of technology is an inevitable aspect of life as it progresses in tandem with scientific advancements. Every innovation is created to bring positive benefits to human life, providing convenience and introducing new ways of conducting human activities, including in the field of sports. The synergistic implementation of technology in line with highly skilled human resources in sports is expected to be a potent formula for achieving a common goal—maximal achievement. This presents an increasing challenge for the academic community, particularly in the realm of sports, to work to their maximum potential. According to (Hartati et al., 2019), technological developments in sports have progressed, encompassing coaching sciences, physical tests, and measurements. In the current era of globalization, physical test measurements ideally should utilize computer applications or software that can record and calculate the entire sequence of tests participated in by students, thereby determining each student's level of physical fitness.

A recurring issue in physical testing and measurement activities for students is the manual calculation of data from physical test results. Operating physical test measurements manually often leads to human errors or inaccuracies in data management. Another challenge encountered is the time-consuming nature of manual calculations, rendering the process ineffective and inefficient in terms of time. Ideally, in sports testing and measurement, teachers should employ tools to facilitate the monitoring of students' physical component development, record-keeping, diagnosing weaknesses in students, and determining training programs specific to certain sports branches.

Research conducted by (M. S. Putra & Solikin, 2021) titled "Implementation of a Mobile Web-Based Physical Condition Measurement Application for Soccer Players" addresses this challenge. The application measures the abilities and biomotor skills of soccer players and is built

on a mobile web platform. The implementation of this application streamlines the coach's ability to understand the historical physical condition of soccer players, identifying whether there is improvement or decline. This application accelerates the monitoring process of soccer players' physical conditions.

Based on the explanation above, the reason the researcher chose the title "Utilizing Physical Test Measurement in Volleyball Using an Application for Students at Palembang 13 Public Junior High School " is due to the need for innovative ideas in employing technology that can assist in the implementation of physical test measurements. By utilizing a physical test measurement application, the researcher aims to enhance the effectiveness, practicality, and measurability of physical test measurements, ultimately positively impacting the physical development of students.

This study aims to improve understanding of how physical tests can aid teachers in developing their skills, and a better understanding of physical test results can assist teachers or coaches in designing training programs tailored to the physical needs of students in the sport of volleyball. The advantage of this application lies in simplifying the calculation of physical test results and providing procedural instructions for conducting physical condition tests in the Indonesian language. In the context of utilizing technology in the sport of volleyball, this research requires an application that can process physical test results in students to determine their physical condition, categorizing them as either good or not yet optimal.

## METHODS

The research design employed in this study is quantitative descriptive. Quantitative descriptive research aims to describe, examine, and explain a subject as it is, drawing conclusions from observable phenomena using numerical data. The research subjects are the objects, entities, individuals, or locations where data for the research variables are inherent and are the focus of the study. In this research, the subjects are 30 students participating in the extracurricular volleyball program at Palembang 13 Public Junior High School, The research activities for this study were conducted over a span of two days. The first day involved the collection of physical test data from students on Friday, November 29, 2023, at Palembang 13 Public Junior High School. The second day consisted of measuring and recording the physical test data using the application on Monday, December 1, 2023, at the Multimedia Laboratory of the Faculty of Education and Teacher Training (FKIP) kilometer 5 Palembang.

Research instruments are tools or facilities used by researchers to search for and collect data, making the data collection process or work easier and ensuring accurate, precise, comprehensive, and systematic results. The method to assess students' physical condition involves the use of instruments such as tests and measurements.

**30-Meter Sprint Test**

Objective: To measure the speed of volleyball players.

Equipment: Running track, whistle, stopwatch.

Execution:

a. The testee positions themselves behind the starting line and assumes a ready position to run.
b. The sprint begins from a crouched start.
c. Upon the command "ready," the testee gets ready to sprint from a standing start.
d. Upon the command "go," the testee sprints as quickly as possible, covering a distance of 30 meters past the finish line.
e. The sprint speed is measured from the "go" command.
f. Time recording is done up to tenths of a second (0.1 seconds) and, if possible, up to hundredths of a second (0.01 seconds).
g. The testee performs the test twice, with the next sprint occurring after a minimum interval of one runner. The best sprint speed is recorded.
h. The testee is deemed unsuccessful if they cross or step over the designated track.

Assessment: Record the sprint results in correlation with the time taken. (Source: Harsuki, 2017)

**Table 1.** 30 Meter Sprint Test Norms

| Norms | Man | Woman |
|---|---|---|
| Excellent | ≥ 3.9 | ≥ 4.5 |
| Good | 4.0 - 4.3 | 4.6 – 4.9 |
| Adquate | 4.4 - 4.7 | 5.0 – 5.4 |
| Inadequate | 4.8 – 5.0 | 5.5 – 5.9 |
| Very Poor | < 5.0 | < 5.9 |

(Source: Harsuki, 2017)

**Endurance Test (Bleep/Multi-Stage Method)**

Objective:To measure the endurance of athletes.

Equipment: Flat track, measuring tape, cassette and tape recorder, cones, stopwatch; Personnel: Distance measurer, Start official, Track supervisor, Score recorder.

Execution:

a. The bleep test involves running back and forth over a distance of 20 meters.
b. It begins with a gradual increase in running speed, starting slowly and progressively accelerating until the athlete is unable to maintain the pace in sync with the time rhythm.
c. The maximum endurance level is determined based on the back-and-forth running at which point the athlete can no longer keep up.

Assessment: Record the distance covered by the student in the back-and-forth run.

This endurance test, utilizing the Bleep/Multi-Stage method, is designed to gauge an athlete's ability to sustain effort over time. It involves progressively challenging running speeds to determine the point at which the athlete's endurance reaches its maximum level. The recorded distance covered during the back-and-forth run serves as an indicator of the athlete's endurance performance. (Source: Harsuki, 2017)

**Table 2.** Bleep Test Norms

| Category (Man) | Age (Year) | | | | | |
|---|---|---|---|---|---|---|
| | 10 -14 | 15-19 | 20-29 | 30-39 | 40-49 | 50-59 |
| Excellent | ≥ 52 | ≥ 48 | ≥ 43 | ≥ 36 | ≥ 31 | ≥ 26 |
| Good | 46-51 | 42-47 | 37-42 | 31-35 | 26-30 | 22-25 |
| Adquate | 41-45 | 38-41 | 33-36 | 27-30 | 22-25 | 18-21 |
| Inadequate | 35-40 | 33-47 | 29-32 | 22-26 | 17-21 | 13-17 |
| Very Poor | ≤ 36 | ≤ 32 | ≤ 28 | ≤25 | ≤ 16 | ≤ 12 |
| Category (Woman) | Age (Year) | | | | | |
| | 10 -14 | 15-19 | 20-29 | 30-39 | 40-49 | 50-59 |
| Excellent | ≥ 48 | ≥ 42 | ≥ 36 | ≥ 29 | ≥ 25 | ≥ 19 |
| Good | 42-47 | 36-41 | 31-35 | 24-28 | 20-24 | 12-18 |
| Adquate | 36-41 | 31-35 | 25-30 | 20-23 | 15-19 | 5-11 |
| Inadequate | 33-35 | 27-30 | 21-24 | 15-19 | 7-14 | 3-4 |
| Very Poor | ≤ 32 | ≤ 26 | ≤ 20 | ≤ 14 | ≤ 6 | ≤ 2 |

(Source: Harsuki, 2017)

**Sit-Up Test**

Objective: To measure the abdominal muscle strength of an athlete.

Equipment: Flat surface, can use a mat or carpet, and two stopwatches. Partner to hold the feet and count.

Execution:

a. Lie down with knees bent, feet flat on the floor, and hands folded across the chest.
b. Start the sit-up with the back on the floor.
c. Lift yourself to a 90-degree position and return to the floor.
d. Your partner can hold your feet during the exercise.

Assessment: Record the number of sit-ups completed within 60 seconds. (Source: Harsuki, 2017)

The Sit-Up Test aims to evaluate an athlete's abdominal muscle strength. This exercise involves lying down, performing sit-ups with the back on the floor, lifting the upper body to a 90-degree position, and returning to the floor. The partner holds the feet during the exercise. The assessment involves recording the number of sit-ups completed within a 60-second timeframe.

**Table 3.** Sit Up Test Norms

| Norms | Man | Woman |
|---|---|---|
| Excellent | 56 - Ke atas | 49 - Ke atas |
| Good | 49 – 55 | 40 – 48 |
| Adquate | 44 – 48 | 35 – 39 |
| Inadequate | 39 – 43 | 30 – 34 |
| Very Poor | 38 ke bawah | 29 ke bawah |

(Source: Harsuki, 2017: 332)

**Push-Up Test**

Objective: To measure the arm muscle strength of an athlete.

Equipment: Carpet or flat floor, stopwatch.

Execution:

a. Participants lie on the carpet, and after receiving instructions, they are allowed to adjust to the most comfortable position for performing push-ups.
b. Establish hand spacing, placing them on the floor with a wider gap. Ensure that the thumbs are positioned straight in line with the chest. Position the fingers facing upwards and spread them apart.
c. Movements are counted if the participant, while lifting the body, passes the threshold, and when lowering, the arms remain straight.

Assessment: Record the number of push-up movements completed within 60 seconds.

The Push-Up Test is designed to assess an athlete's arm muscle strength. Participants lie on the carpet, adjusting to a comfortable position, and perform push-ups with specific hand placement and movement criteria. The assessment involves recording the number of push-up movements completed in a 60-second duration.

**Table 4.** Push Up Test Norms

| Norms | Man | Woman |
|---|---|---|
| Excellent | 56 - Ke atas | 35 - Ke atas |
| Good | 47 – 55 | 27 – 34 |
| Adquate | 35 – 46 | 21 – 26 |
| Inadequate | 19 – 34 | 11 – 20 |
| Very Poor | 18 ke bawah | 10 ke bawah |

(Source: Harsuki, 2017)

**Vertical Jump**

Objective: To measure leg explosive power.

Equipment: Measurement board, board eraser, chalk powder.

Execution:

a. The board is suspended on the wall at the testee's reachable height.
b. The testee stands beneath the measurement board, reaches upward with hands as high as possible, and marks the highest point on the board.
c. Jump without a preliminary step.
d. Beforehand, the testee's hands are dusted with chalk powder. The testee then stands beneath the measurement board, reaches upward with hands as high as possible, and marks the highest point on the board.
e. The chalk-marked handprint is read on the scale of the board (point A). Afterward, the testee retrieves the board hanging on the wall.

Assessment: The value is observed on the measurement tool. The best recorded value is taken.

**Table 5.** Vertical Jump Test Norms (cm)

| Norms Age | Man | | | | |
|---|---|---|---|---|---|
| | 12 | 13 | 14 | 15 | 16 |
| Excellent | 20” | 20” | 20” | 25” | 25” |
| Good | 17” | 17” | 17” | 23” | 23” |
| Adquate | 14” | 14” | 14” | 19” | 20” |
| Inadequate | 11” | 11” | 11” | 12” | 17” |
| Very Poor | 5” | 5” | 5” | 5” | 5” |
| Norms Age | Woman | | | | |
| | 12 | 13 | 14 | 15 | 17 |
| Excellent | 16” | 16” | 16” | 17” | 16” |
| Good | 14” | 14” | 14” | 15” | 13” |
| Adquate | 12” | 12” | 12” | 13” | 8” |
| Inadequate | 10” | 10” | 10” | 8” | 8” |
| Very Poor | 4” | 4” | 4” | 3” | 3” |

(Source: Harsuki, 2017)

The Vertical Jump test is conducted to evaluate the leg explosive power of the participant. It involves marking the highest point reached on a measurement board after a jump. The assessment considers the chalk-marked handprint on the board, and the best recorded value is used for evaluation.

Data analysis technique refers to a method used to manage data in order to draw accurate conclusions. In this research, the chosen technique is quantitative descriptive data analysis. The data obtained from each measurement represents raw data from the results obtained by students. The normality test aims to demonstrate that the sample data originates from a normally distributed population. In this study, the Shapiro-Wilk test is employed for normality testing, with the following criteria:

Significance level (α): 0.05

If the p-value > α, then the sample is derived from a normally distributed population.

If the p-value < α, then the sample does not originate from a normally distributed population.

The normality test is conducted using computer software such as SPSS, and the percentage is calculated using the formula:

$$P = N/F \times 100\%$$

Source: Anas Sudijono (2011: 43)

Information:
P: persentase
F: frequency
N: number of cases.

## RESULTS AND DISCUSSION

This research was conducted at Palembang 13 Public Junior High School, located at Jl. Gubah No. 1, 29 Ilir, Kec Ilir Barat. II, Kota Palembang, South Sumatera 30162. The data collection in this study consisted of two processes: collecting physical test data for volleyball extracurricular students at Palembang 13 Public Junior High School and collecting data from the measurement of physical tests for volleyball using an application. The physical test instruments utilized included an endurance test using the bleep test, a speed test with a 30-meter run, strength tests involving push-ups and sit-ups, and an explosive power test using the vertical jump.

Based on the results presented in Table 6, the normality test of the measured data was conducted using SPSS statistics version 29. The Shapiro-Wilk test results in the table indicate that the data have degrees of freedom (df) for a sample size of 30 individuals. To determine whether

the data in the Shapiro-Wilk output are normally distributed or not, the criteria state that if the Significance value is > 0.05, the residual values are considered normally distributed; if the Significance value is < 0.05, the residual values are considered not normally distributed. The results of the endurance test were 0.208, the speed test was 0.063, push-up test was 0.317, sit-up test was 0.016, and vertical jump test was 0.448. All results indicate a significance value < 0.05, thus confirming that the normality test results are considered normal.

**Results of Data Analysis**

The data analysis was obtained through the calculation of each norm category and data from each component of the physical test. This process allows us to determine the average physical condition of volleyball extracurricular students at Palembang 13 Public Junior High School. For a clearer understanding, please refer to the **Table 6.**

**Table 6.** Data Analysis Results

| Indicator | Category | | | | |
|---|---|---|---|---|---|
| | Excellent | Good | Adquate | Inadequate | Very Poor |
| Endurance | 0 % | 3 % | 3 % | 16 % | 76 % |
| Speed | 0 % | 13 % | 46 % | 16 % | 23 % |
| Arm Muscles Strength | 0 % | 0 % | 13 % | 86 % | 0 % |
| Abdominal Muscles Strength | 0 % | 0 % | 40 % | 26 % | 33 % |
| Explosive Power | 93 % | 3 % | 3 % | 0 % | 0 % |
| Average | 18 % | 3 % | 21 % | 28 % | 26 % |

Based on **Table 6** the data analysis results indicate the physical condition of volleyball extracurricular students at Palembang 13 Public Junior High School as follows: Excellent Category: 18% Good Category: 3% Adquate Category: 21% Inadequate Category: 28% Very Poor Category: 26%. This information can be represented in the **Figure 2.**

From **Figure 2.** Diagram of the data analysis results, it can be concluded that the average physical condition of volleyball extracurricular students at Palembang 13 Public Junior High School falls into the "Inadequate" category with a percentage of 28%.

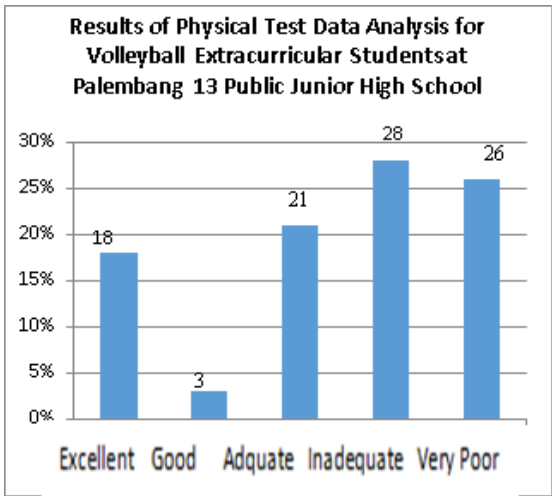


**Figure 2.** Diagrams Data Analysis Results

Based on the measurement data of the endurance of volleyball players at Palembang 13 Public Junior High School measured through the bleep test using an application, the results indicate that the majority of players are in the below-average category. Volleyball players need to have good endurance. According to Prayoga, & Wahyudi (2021), endurance is crucial for volleyball players because volleyball requires a considerable amount of time and extra energy, necessitating good endurance to support player performance. According to Ramli, A. C. (2021), Endurance is crucial throughout the entire match, and a team with insufficient endurance will struggle against a team with good endurance. The lack of endurance in the players at Palembang 13 Public Junior High School may be due to a lack of exercises that can improve endurance.

Regarding the speed measurement results conducted on volleyball players at Palembang 13 Public Junior High School using the 30-meter run test with an application and measured based on gender, the research results show that the speed of male volleyball players at Palembang 13 Public Junior High School is in the fair category. Speed, according to Simbolon & Siahaan, (2020), is the ability to perform similar movements sequentially in the shortest possible time or the ability to cover a distance quickly. According to Hartati, (2019), speed in volleyball is essential for launching attacks and quickly varying attacks to make it difficult for opponents to block, and conversely, speed is also crucial for defensive actions such as quick blocks, making it challenging for opponents to attack. The lack of speed in the players at Palembang 13 Public Junior High School may be influenced by a lack of training, such as sprinting, and a focus only on the techniques and tactics of

the game.

Based on the research results of arm muscle strength using the push-up test instrument for 1 minute conducted on male volleyball players at Palembang 13 Public Junior High School using the application, the results indicate that the average arm muscle strength of male volleyball players at Palembang 13 Public Junior High School is in the below-average category. According to Pahrian, A., & Esser, B. R. N. (2017), Volleyball players need to have strong arm muscles because the sport requires a lot of hand usage, especially during smashes and jump serves, which demand maximal arm muscle strength. According to Hartati (2018) , arm muscle strength is mainly used for all techniques in volleyball, including overhand passing, underhand passing, smashing, serving, and blocking. The arm muscle strength can be considered below average, possibly because the strength of the players' arm muscles is not optimal when bearing loads during activities. This limitation may hinder the players' performance. The arm muscle strength can also be considered below average, possibly due to the lack of appropriate training to improve arm muscle strength. Lastly, it may be caused by a coach who is still focused on technical training and has not balanced the proportion of technical and physical conditioning exercises.

Based on the research results of the abdominal muscle strength test using the sit-up test instrument for 1 minute conducted on male volleyball players at Palembang 13 Public Junior High School using the application, the data obtained indicate that the average abdominal muscle strength of male volleyball players at Palembang 13 Public Junior High School is in the fair category. Dwijayanti, K. (2017), states that arm muscle strength is the ability of arm muscles to perform movements related to arm muscles. According to Pranata et al., (2019), abdominal muscle strength in volleyball is used when players perform smashes, adding speed to the smash strokes. If abdominal muscle strength is still in the less category, it may be because abdominal muscle strength is not optimal, affecting smash results. In addition to enhancing smash power, abdominal muscles also contribute to body aesthetics. Therefore, after this research, it is expected that players and coaches will reevaluate so that the abdominal muscle strength of players is in optimal condition in the future.

Based on the research results of the explosive power test using the vertical jump test instrument in accordance with the theory from Sovensi (2019), using an application, the research results show that the leg muscle explosive power of male volleyball players Palembang 13 Public Junior High School is on average in the very good category. According to Putra, A., & Rifki, M. S. (2021), leg muscle explosive power is a combination of several physical elements, namely Speed multiplied by Strength. It means that the ability of muscle explosive power can be seen from the results of work done using strength or speed. Volleyball players need to have explosive power in their leg muscles. According to Utama Bandi (2018), explosive power is the ability of muscles to direct force quickly in a short time to provide the best momentum to the body or object in a complete explosive movement to achieve the intended goal. In volleyball, leg muscle explosive power is crucial when players perform smashes and blocks, especially in the current era where many players have tall body postures, and high jumps are required to compete with tall players. The better the quality of a player's leg muscle explosive power, the better the player's jumping results. The lack of explosive power in the leg muscles of players is due to a lack of exercises or exercises with no added weight. Therefore, after this research, it is expected that coaches, teachers, and players will prioritize their physical quality.

Furthermore, based on the measurement data of the endurance of volleyball players at Palembang 13 Public Junior High School measured through the bleep test using an application, the results indicate that the majority of female volleyball players at Palembang 13 Public Junior High School are in the very poor category. According to Prayoga, A. S., & Wahyudi, A. N. (2021), endurance is crucial for volleyball players because volleyball requires a considerable amount of time and extra energy, necessitating good endurance to support player performance. According to Irawadi (2019), Endurance is crucial throughout the entire match, and a team with insufficient endurance will struggle against a team with good endurance. The lack of endurance in female volleyball players at Palembang 13 Public Junior High School may be due to a lack of exercises that can improve endurance, such as jogging and others.

Based on the measurement results of speed conducted on volleyball players at Palembang 13 Public Junior High School using the 30-meter sprint test with an application, the research indicates that the average speed of female volleyball players at Palembang 13 Public Junior High School is in harthe fair category. Speed, according to Simbolon (2020), is the ability to perform similar movements in succession in the

shortest possible time or the ability to cover a distance quickly. In volleyball, speed is essential for attacks and quick attack variations, making it difficult for opponents to block. The lack of speed in female volleyball players at Palembang 13 Public Junior High School may be influenced by insufficient training and a focus solely on technique.

Regarding the research results on arm muscle strength using the push-up test instrument for 1 minute conducted on male volleyball players at Palembang 13 Public Junior High School using the application, the strength of the arm muscles of male volleyball players at Palembang 13 Public Junior High School is on average in the less category. Volleyball players must have good arm muscle strength because in volleyball, players use their hands extensively, and most volleyball techniques involve the arms. According to Pranata et al., (2019), arm muscle strength plays a significant role in all volleyball techniques, including overhead passing, underhand passing, smashes, serves, and blocks. The arm muscle strength is still in the less category, possibly because the arm muscles are not ready to bear the load during matches.

Based on the research results of the abdominal muscle strength test using the sit-up test instrument for 1 minute conducted on female volleyball players at Palembang 13 Public Junior High School using the application, the average abdominal muscle strength of female volleyball players at Palembang 13 Public Junior High School is in the fair category. According to Pranata et al., (2019), abdominal muscle strength in volleyball is used when players perform smashes, adding speed to the smash strokes. If abdominal muscle strength is still in the less category, it may be because abdominal muscle strength is not optimal, affecting smash results.

Regarding the research results of the leg muscle explosive power test using the vertical jump test instrument in accordance with Sovensi's theory (2019) and measured using an application, the research results show that the leg muscle explosive power of female volleyball players at Palembang 13 Public Junior High School is on average in the very good category. Leg muscle explosive power is crucial for female volleyball players, especially in the current era, where players must have both a tall posture and high jumps to compete effectively. The lack of explosive power in the leg muscles of players is due to a lack of exercises or exercises without added weight. Therefore, after this research, it is expected that coaches, teachers, and players will prioritize their physical quality.

Overall, based on the entire series of tests, including the bleep test, 30-meter sprint, 1-minute push-up, 1-minute sit-up, and vertical jump, the research results show that the overall physical condition of volleyball players at Palembang 13 Public Junior High School is in the fair and less category. Physical activity is a combination of all physical components that cannot be separated from one another. Physical fitness is the foundation for improving individual performance, especially for volleyball players. In volleyball, physical activity is considered crucial for maintaining body fitness and improving players' physical conditions. However, the players at Palembang 13 Public Junior High School do not yet have a good overall physical condition, and many are in the fair or less category, which may be due to the inadequate and less-directed training program. Physical education teachers or coaches are still focused on players' techniques and tactics.

## CONCLUSION

Based on the research findings, it can be concluded that the physical condition of volleyball extracurricular students at SMP Negeri 13 Palembang falls into the very good category at 18%, good category at 3%, fair category at 21%, less than average category at 28%, and very less than average category at 26%. Considering all the mentioned categories, the overall average physical condition of volleyball extracurricular students at SMP Negeri 13 Palembang is categorized as less than average, with a percentage of 28%. The results of this research are expected to serve as an evaluation tool and foster awareness among students to continually improve and maintain their physical condition, aiming for optimal performance.

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