



The Level of Physical Strength Towards The Endurance of Volleyball Players at Senior High School 2 Martapura Using The Pacer Test

Muhammad Hamka Ferdiansyah^{1✉}, Mita Erliana², Norma Anggara³

Physical education study program, Faculty of Teacher Training and Education, Gastric Mangkurat University, Banjarbaru, Indonesia¹²³

Article History

Received May 2025

Accepted May 2025

Published Vol.14 No.(2) 2025

Keywords:

Physical Strenght; Endurance; Players Volleyball

Abstract

The purpose of this study was to determine the level of physical endurance of students who participate in extracurricular volleyball at Senior High School 2 Martapura. The method used in this study is quantitative descriptive. The sample and population amounted to 26 students using the total sampling technique, with the pacer test instrument. The results of the study on the level of physical strength towards the endurance of volleyball players at Senior High School 2 Martapura using the pacer test showed that the physical strength endurance of 26 male and female students, there were 7 sons (54%) and 12 daughters (92%) including very low classification, 3 sons (23%) and 1 daughter (8%) are classified as low, 3 sons (23%) and 0 daughters (0%) are classified as sufficient, and none of the male or female students (0%) were classified as good or very good. Conclusion of the research results (1) based on the results of this research, the average level of physical endurance of male and female students who participate in extracurricular volleyball at Senior High School 2 Martapura is very low. (2) Lack of physical training programs provided to students who participate in extracurricular volleyball at Senior High School 2 Martapura. Physical endurance is very influential when performing techniques in volleyball, so there are obstacles when performing certain techniques.

How to Cite

Ferdiansyah, M. H., Erliana, M., & Anggara, N. (2025). The Level of Physical Strength Towards The Endurance of Volleyball Players at Senior High School 2 Martapura Using The Pacer Test. *Journal of Physical Education, Sport, Health and Recreation*, 14 (2), 483-487.

© 2025 Universitas Negeri Semarang

✉ Correspondence address :
E-mail: 2110122310009@mhs.ulm.ac.id

INTRODUCTION

Physical education is a learning process through activities designed to improve physical fitness, develop motor skills, knowledge and healthy living behavior, sportsmanship, and emotional intelligence. Samsudin (in Supriatna & Suhairi, 2021). Physical Education is essentially an educational process that utilizes physical activity to produce holistic changes in the quality of individuals, both physically, mentally and emotionally Baidawi and Maidarman (in Sahabuddin et al., 2021)

Physical education has a strategic role in efforts to form physically, spiritually, and socially healthy people (Mashuri, 2019.). In the school environment, volleyball has been played by students from elementary, middle, high school and even college. Thus, mastery of basic techniques and strength or physical endurance in individual volleyball games is very necessary to be able to play optimally. To be able to perform maximum techniques, it is necessary to master the techniques and strong physical condition so that you can do it optimally.

(Slamet Riyadi, n.d.) states "Volleyball is a sport played by two teams on the field. The goal of the game is to get the ball into the opponent's area through an obstacle in the form of a rope or net and try to win the game by getting the ball into the opponent's area", Meanwhile, according to (Sari & Guntur, 2017) it is stated that "Basically the principle of playing volleyball is to play the ball with any part of the body before the ball touches the floor, the ball is played three times alternately in one's own court with the aim that the ball that is touched is crossed over to the opponent's court over the net and trying to make it as difficult as possible for the opponent to receive the ball."

In addition to mastering techniques, physical endurance is the most dominant basic preparation to be able to perform physical performance to the maximum (Pendidikan et al., 2020). In volleyball, players will appear prominent if supported by good physical condition, because physical condition is the functional capacity of the body system that allows players to achieve better performance. General physical condition is the basic ability to develop the body's ability to achieve which consists of components of endurance, muscle strength, flexibility, speed, stamina, agility, and power (Amirudin & Abdillah, 2020).

The physical condition component that is very necessary in athlete development is VO2max endurance, because VO2max endurance is one of

the physical condition components that must be developed first before developing other physical condition components or techniques. VO2max endurance is very much needed and considered in order to be able to participate in training and matches without feeling excessive fatigue and still be able to focus on playing.

We know that currently schools have implemented extracurricular activities for their students to improve their physical fitness. Schools do not only focus on academic education, but also provide space to study physical education. This aims to improve students' health and physical fitness. The benefits do not stop there, because the school also supports and develops health through extracurricular activities.

Extracurricular activities are activities carried out outside of school hours to increase students' insight and knowledge. With the existence of extracurricular activities for students, it is the right place for students to develop their talents or abilities outside of academics, and also with the existence of extracurricular activities, it provides an environment for students to develop their potential, talents, interests, personality, cooperation and independence (Lestari, 2016).

Several young athletes from high schools, one of whom came from Senior High School 2 Martapura, this school is located in Martapura District, Banjar Regency, South Kalimantan. This school has produced many young volleyball athletes who participate as representatives in regional volleyball competitions. However, lately there has been a decrease in the number of athletes produced in the school environment. In several training sessions at the school, several athletes who participated in the training were very easily exhausted when running the training program given by the coach so that when running certain techniques the athletes were unable to do them well. After conducting a question and answer observation with several students, it turned out that they had never done physical training to improve their endurance.

(Erliana & Arisman, 2017) stated that "at this time, training is not just training, but it is a sophisticated process to achieve maximum performance goals and many factors influence and require a lot of knowledge from trainers to be able to modify modern training programs". The training program that is often applied in volleyball training activities at Senior High School 2 Martapura still focuses on technical and tactical training only, so there is a lack of training for physical endurance strength. It is very important for volleyball extracurricular coaches or trainers

at Senior High School 2 Martapura to know the physical fitness or physical endurance of extra-curricular participants, because with the different levels of physical fitness or physical endurance of students, it requires different training programs. Therefore, students really need to improve their physical strength endurance (VO2max) in order to get maximum results.

Previously, in the volleyball extracurricular, no one had ever conducted research on the level of physical strength and endurance of volleyball players. Therefore, the researcher conducted a study on the level of physical strength towards the endurance of volleyball players at Senior High School 2 Martapura because it was seen from several matches that the school had participated in that the players got tired very easily. This causes players to be less than optimal when performing certain techniques while playing. In addition, during training sessions for physical programs, training is rarely carried out so that the physical endurance of the players is very lacking.

This study aims to measure the level of physical strength of students using a progressive test (Pacer Test), especially students who participate in extracurricular volleyball and it is hoped that this study can help the school to develop the talents and interests of students at Senior High School 2 Martapura. For trainers, this research can also be a reference for determining the right training program.

METHODS

This study uses a quantitative descriptive method (Communication Research Methods Book, n.d.) with a measurement test to describe and analyze the level of physical strength towards the endurance of volleyball players at Senior High School 2 Martapura. Quantitative methods can be interpreted as research methods used to examine population data or certain samples in the form of numbers or analysis, data collection using research instruments, data analysis is quantitative or statistical, with the aim of describing and testing established hypotheses Sugiyono (in Imron, 2019). Population is defined as a generalization area consisting of objects/subjects that have certain qualities and characteristics that are determined by researchers to be studied and then conclusions drawn (Suriani et al., 2023). The population and sample of this study were 26 students who participated in extracurricular volleyball at Senior High School 2 Martapura, including 13 boys and 13 girls using the total sampling

technique.

The data collection instrument uses a progressive measurement test (Pacer Test) where the data is in numerical form and then analyzed using percentage values. After obtaining the data, the next step is to analyze the data using purposive sampling techniques (player willingness) and quantitative descriptive statistics using the following formula:

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

Information ;

P: Percentage sought

F: Frequency

N: Number of Respondents

Table 1. PACER Test Norm Table (Progressive Aerobic Cardiovascular Endurance Run) Age 16-18 years – KEMENPORA 2022

Age	Gender	Very Low	Low	Enough	Good	Very Good
16 Years	M	≤ 61	62 – 72	73 – 87	88 – 93	≥ 94
	W	≤ 32	33 – 42	43 – 50	51 – 60	≥ 61
17 Years	M	≤ 61	62 – 77	78-92	93-105	≥ 106
	W	≤ 32	33-42	43-50	51-60	≥ 61
18 Years	M	≤ 72	73-84	85-95	96-105	≥ 106
	W	≤ 41	42-52	53-62	63-71	≥ 72

RESULTS AND DISCUSSION

Based on the results of field research conducted in 2025 with a research period of one day by students of the Department of Physical Education, Sports and Health referring to testing the level of physical strength against the endurance of extracurricular volleyball participants at Senior High School 2 Martapura using a pacer test measurement test with a population of 26 students, including 13 boys and 13 girls who were the samples. The data collected were the results of physical strength endurance tests using the Pacer Test instrument.

Table 2. Physical Endurance Test Results for Men's Volleyball Extracurricular Participants

Norm	Frequency	Percentage
Very Low	7	54%
Low	3	23%
Enough	3	23%
Good	0	0%
Very Good	0	0%
Total	13	100%

From **Table 2** the results of the data pro-

cessing test above, it can be seen that the physical endurance of the 13 male students, 7 of whom are classified as very low (54%), 3 students are included in the low classification (23%), and 3 students are included in the sufficient classification (23%), and not a single student (0%) was included in the good or very good classification.

From the data obtained, male students who returned less than 72 times in the test results, then the physical strength norm they have is very low. To achieve low norms, students must be able to achieve 73 or more reversals. Likewise, to achieve sufficient norms, students must be able to do 85 reversals and so on.

From the test results that have been carried out, the norms for male volleyball athletes who participate in extracurricular activities have not yet reached the good or very good classification or none have reached as many as 96 reps and so on. The average level of physical strength in male athletes is very low.

Table 3. Physical Endurance Test Results for woman's Volleyball Extracurricular Participants

Norm	Frequency	Percentage
Very Low	12	92%
Low	1	8%
Enough	0	0%
Good	0	0%
Very Good	0	0%
Total	13	100%

From **Table 3** the results of the data processing test above, it can be seen that the physical endurance of 13 female students, 12 of whom are classified as very low (92%), 1 student was included in the low classification (8%), and no students (0%) were included in the sufficient, good or very good classification.

From the data obtained, female students who are less than 41 times back on the test results, then the physical strength norm they have is very low. To achieve a low norm, students must be able to achieve as many as 42 backs or more. Likewise, to achieve sufficient norms, students must be able to do as many as 53 reversals and so on.

From the test results that have been carried out, the norms for female volleyball athletes who participate in extracurricular activities have not yet reached the classification of sufficient, good or very good or none have reached as many as 63 replies and so on. The average level of physical strength in female athletes is very low.

From the results of the data obtained using the pacer test measurement test, it can be

concluded that in students who take part in the volleyball extracurricular at Senior High School 2 Martapura there were 7 (54%) sons and 12 (92%) daughters in the very low category, 3 (23%) sons and 1 (8%) daughter in the low category, 3 (23%) sons and 0 (0%) daughters in the moderate category, and not a single student (0%) was included in the good or very good category.

Based on these results, the physical endurance of students who participate in extracurricular volleyball at Senior High School 2 Martapura must be further improved because physical endurance is very important for all types of physical activities, especially Mangindaan volleyball (Rasyid Ridho et al., n.d.). Physical endurance is very necessary because good physical endurance will improve the performance of students in playing volleyball so that they can perform certain movements or techniques optimally and make it possible to win when competing. If students have low physical endurance, it will affect them when performing certain techniques or they will quickly become tired when playing. (Ihsanti & Haryoko, 2022)

General physical exercise needs to develop cardiovascular and pulmonary endurance, speed, and power. For the sport of volleyball, almost all of the physical components above must be possessed by every athlete, however, the concept of developing them must of course go through training stages, in other words, there are more dominant components to be trained in the general preparation section.

The physical condition of the player will also affect the psychology of the player, and vice versa the psychology of the player will also affect the physical condition and the method and strategy of the player. Method, strategy, psychology and physical condition are the main factors to produce a good game. (Bahauddin & Sulistyarto, n.d.). Good cardiovascular endurance will increase human work capacity with greater intensity and longer time. Good cardiovascular endurance will also allow you to build greater resistance to fatigue so you can perform activities for longer periods of time. (Ni Kadek Febriyanti et al., n.d.).

CONCLUSION

Based on the results of the study using a pacer test measurement instrument with a population of 26 students as a sample, the following conclusions can be drawn, The average level of physical strength of extracurricular volleyball

students at Senior High School 2 Martapura in terms of endurance of volleyball players at Senior High School 2 Martapura is in the very low category, there are some that are included in the category of less and enough. Therefore, from the results of the analysis of the level of physical strength against the endurance of volleyball players at Senior High School 2 Martapura using the pacer test instrument, overall it is in the very low classification.

REFERENCES

- Amirudin, A., & Abdillah, S. (2020). Analysis of Physical Conditions of Aerobic Endurance or VO2Max. Proceedings of the 1st South Borneo International Conference on Sport Science and Education (SBICSSE 2019). <https://doi.org/10.2991/assehr.k.200219.033>
- Bahauddin, M. A., & Sulistyarto, S. (n.d.). Analisis Kondisi Fisik Atlet Bolavoli Putra Puslatda Jawa Timur.
- Erliana, M., & Arisman, A. (2017). Pengaruh Latihan E-Movement Cone Drill Terhadap Kelincahan Pemain Futsal Smpn 3 Banjarbaru. *Multilateral Jurnal Pendidikan Jasmani Dan Olahraga*, 16(2). <https://doi.org/10.20527/multilateral.v16i2.4250>
- Ihsanti, F. N., & Haryoko, H. (2022). Survei Daya Tahan VO2max Peserta Ekstrakurikuler Bolavoli di Sekolah Menengah Pertama (SMP). *Sport Science and Health*, 2(12), 613–619. <https://doi.org/10.17977/um062v2i122020p613-619>
- Imron, I. (2019). Analisa Pengaruh Kualitas Produk Terhadap Kepuasan Konsumen Menggunakan Metode Kuantitatif Pada CV. Meubele Berkah Tangerang. *Indonesian Journal on Software Engineering (IJSE)*, 5(1), 19–28. <https://doi.org/10.31294/ijse.v5i1.5861>
- Lestari, P. (2016). Membangun Karakter Siswa Melalui Kegiatan Intrakurikuler, Ekstrakurikuler, dan Hidden Curriculum di SD Budi Mulia Dua Pandeansari Yogyakarta. *JURNAL PENELITIAN*, 10(1), 71. <https://doi.org/10.21043/jupe.v10i1.1367>
- Mashuri. 2019. Analisis Kenikmatan Beraktifitas Fisik.... (n.d.).
- Ni Kadek Febriyanti, I Nyoman Adiputra, I Wayan Gede Sutadarma. (n.d.). Hubungan Indeks Massa Tubuh Dan Aktivitas Fisik Terhadap Daya Tahan Kardiovaskular Pada Mahasiswa Fakultas Kedokteran Universitas Udayana.
- Pendidikan, J., Olahraga, K., Olahraga, F., & Kesehatan, D. (2020). Latihan Fisik Untuk Kekuatan Dan Daya Tahan Olahraga Voli Physical Exercise For Power And Endurance Volleyball Sport Edy Dharma Putra Duhe. *Jambura Journal of Sports Coaching*, 2(1).
- Rasyid Ridho, M., Anggara, N., Studi Pendidikan Jasmani, P., Keguruan dan Ilmu Pendidikan, F., Praja, J., Sipai, S., & Kalimantan Selatan, B. (n.d.). Jurnal Ilmiah STOK Bina Guna Median Analisis Tingkat Kebugaran Jasmani Pada Peserta Didik Ekstrakurikuler Bola Voli Di Sma Negeri 1 Belawang Analysis Of The Level Of Physical Fitness In Volleyball Extracurricular Students At Sma Negeri 1 Belawang.
- Sahabuddin, Hakim, H., & Muslim. (2021). Kontribusi Kekuatan Otot Lengan, Daya Tahan Otot Tungkai, Dan Koordinasi Mata Tangan Terhadap Kemampuan Passing Bawah Bolavoli. *Journal Coaching Education Sports*, 2(2), 235–250. <https://doi.org/10.31599/jces.v2i2.748>
- Sari, Y. B. C., & Guntur, G. (2017). Pengaruh metode latihan dan koordinasi mata-tangan terhadap hasil keterampilan servis atas bola voli. *Jurnal Keolahragaan*, 5(1), 100. <https://doi.org/10.21831/jk.v5i1.12773>
- Slamet Riyadi. (n.d.).
- Supriatna, E., & Suhairi, M. (2021). Pengembangan bola soft untuk mengembangkan keterampilan teknik dasar dan koordinasi gerak bolavoli di sekolah dasar. *Multilateral : Jurnal Pendidikan Jasmani Dan Olahraga*, 20(2), 83. <https://doi.org/10.20527/multilateral.v20i2.10302>
- Suriani, N., Risnita, & Jailani, M. S. (2023). Konsep Populasi dan Sampling Serta Pemilihan Partisipan Ditinjau Dari Penelitian Ilmiah Pendidikan. *Jurnal IHSAN : Jurnal Pendidikan Islam*, 1(2), 24–36. <https://doi.org/10.61104/ihsan.v1i2.55>