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Physical Condition Analysis of Junior High School Volleyball Players: A Study on the Extracurricular of Junior High School 3 Semarang

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Abstract

Physical conditioning is an essential of volleyball play, involving strenght, speed, endurance, agility coordination and flexibility. But the gym program of schools extracuricular is crushed in a below priority with respect to technical training. This research aimed to describe the reality of physical fitness in general on volleyball extracuricular participants at Junior High School 3 Semarang objectively, considering gender category. The purpose of this study was to determine the global physical fitness profile of students who participated in extracurricular volleyball and contrast athletic performance between male and female participants. This research was quantitative in nature with 62 students selected through total sampling technique. Physical accomplishment was measured in muscle strength, endurance, power, speed,flexibility,agility, coordination and balance. The raw scores of each subscale were transformed into T-scores and classified into five skill levels based on predefined normative criteria. The findings indicate that subjects had low physical fitness levels. For the women, 40% achieved a moderate level and 24% an inferior level; 20 and 8% reached the high and very high level respectively and only 8% were found to be at the very poor level. The trends for men were along the same line, as 34.2% reached to poor and 31.5% hit moderate weight classes. In contrast, 26.4% of them accomplished the High level while at the Very high level 7.9% and nobody attained to Very poor level. Extracuricular participants physical conditioning status is between fair to poor, suggest a more structured, comprehensive training program focusing on both physical and technical development in order to excel in maximal performance of vollyball.

How to Cite

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INTRODUCTION

Sports are activities that include games, competitions, and intensive pursuits aimed at achieving optimal victory and success (Yoda, 2020). Article 3 of Law Number 11 of 2022 concerning Sports explains that «Sports aim to benefit society, nurture athletes, improve health and physical fitness, enhancee performance, and maintain national sovereignty.»

From the above definition of sports, it can be concluded that sports are essential activities for everyone to maintain their health and physical fitness (Wirdati et al., 2025). In short, sports are not only beneficial for health and physical fitness but they can also serve as a competition to become champions at neither an individual level nor at team level. This exercise is very important for physical fitness, that is the ability of an individual to do various kinds of physical activities that require strength, endurance and flexibility (Sukmawati et al., 2024). Not only is sport good for health and strengthens the body, it has also become a source of diversion and competition. Credit of personal attainment in sports and organic growth is due to systematic organization occurring from early skills, learning techniques, tactics and strategy games to utilize the multi-organ involvement approach (Jumarin et al., 2024). In addition, sport performance is highly impacted by intrinsic and extrinsic factors.

In general, these factors are grouped into two categories; internal and external (Indrawathi et al., 2021). Internal factors are components that arise from the athletes themselves and reflect their potential, abilities. Typically the attributes that an athlete possesses are physical, technical, tactical and psychological. On the contrary, external factors are those not involved in athlete›s performance such as facility and infrastructure availability, coach factor, family support, financial support, organization support, climate also dietary consumption, etc (Nurajab, 2022). Within, there are four main areas that affect success: Physical condition, technique, tactics and mentality.

These four components are interrelated and cannot be separated, as all are required to produce the correct output (Haikal, 2017). One such component is physical fitness, which serves as the cornerstone of all athletes› technical, tactical, and psychological skills (Prima & Kartiko, 2021). Fitness is an important part of being an athlete. General Physical fitness is broken down into two categories: general and specific. General physical condition indicates the basic fitness of the body, the starting point for performance improvement, which includes general strength/speed/ endurance, and flexibility. In contrast, specialized fitness refers to physical capacities adapted for a particular sport (Antoni, 2021a).

Each exercise requires its own unique physical training to succeed. Optimal physical fitness is essential for player performance in volleyball, for example, since the sport demands a combination of physical traits such as strength, flexibility, endurance, and reaction speed (Antoni, 2021). When a volleyball player is in good physical condition, he is at reduced risk of injury. Overall, good fitness in a game allows athletes to perform better more frequently (Afilah & Supriatna, 2025).

Physical education includes various learning materials, including physical activities such as aerobic and anaerobic sports (Candra et al., 2023). One example of an anaerobic sport is volleyball. This sport is also often used in extracurricular programs at some schools, through activities held outside regular class hours, with training three times a week. This extracurricular program is part of the school agenda, designed to enrich students› insights and develop their potential, talents, and skills (Eli Masnawati et al., 2023). According to Rambe & Fadhli (2024), extracurricular programs provide students with opportunities to actualize their abilities through activities aligned with their talents and interests. Through this activity, it is hoped that students will not only master the technique of playing volleyball but also achieve good results.

Based on observations with the volleyball extracurricular coach, there are many obstacles, including the unknown physical condition of extracurricular participants, the lack of school-owned training facilities and infrastructure, and the school›s training program that focuses more on improving technical skills. In contrast, the development of physical condition has not received its fair share of attention.

The novelty of this research lies in its focus on junior high school students with developmental characteristics distinct from those of adult athletes and high school students. This is in contrast to previous studies that have examined other sports or professional athlete populations. The specific context at Junior High School 3 Semarang makes the research findings more applicable, enabling them to be directly used to develop structured training programs that align with the school›s real conditions. The purpose of this study was to analyze and determine the physical conditions possessed by male volleyball extracurricular participants at Junior High School 3 Semarang by conducting tests and measurements of physical

condition components.

METHOD

This research uses a descriptive quantitative approach that aims to provide an objective description of actual conditions without testing hypotheses. The data collection method used test techniques, with the primary focus on assessing the physical condition of extracurricular activities at Junior High School 3 Semarang. The variable studied was the physical condition profile of students at the school. The research population was all students of Junior High School 3 Semarang who participated in volleyball extracurricular activities. The research sample was determined using a total sampling technique, so all extracurricular members (63 students) were included as research respondents.

The instrument used in this study is to use several tests consisting of Strength (Push-up / Sit-up Test), Endurance (Beep Test), Power (Vertical Jump), Speed (40 Meter Sprint Test), Flexibility (Sit and Reach Test), Agility (Illinois Agility Test), Coordination (Catch and Throw Ball Test), Balance (Stork Stand Test) (Brian, Sulistyorini, 2022) . The test was carried out in the field of Junior High School 3 Semarang accompanied by a Physical Education teacher and extracurricular coach as a supervisor

Raw scores for each physical fitness component were converted to T-scores using a predetermined formula to standardize student performance across tests. The T-scores were then aggregated and averaged to determine each student's overall physical condition level. Based on the final scores, participants were classified into five ability categories: Very High, High, Medium, Low, and Very Poor. These classifications were determined using the assessment norms presented in **Table 1**, which categorized performance based on the following interval criteria:

Tabel 1. Assessment Norms

Interval Class	Category
X ≥ M+1,5 SD	Very High
M+0,5 SD ≤ X < M+1,5 SD	High
M-0,5 SD ≤ X < M+0,5 SD	Medium
M-1,5 SD ≤ X < M-0,5 SD	Less
X ≥ M-1,5 SD	Very Poor

RESULTS AND DISCUSSION

The characteristics of the research subjects include gender, age, and body mass index, which are described in the following discussion.

Tabel 2. Characteristics of Research Subjects

Group	Characteristics	F	Frequency
Gender	Male	38	60,3%
	Female	25	39,7%
Age	12	9	14,3%
	13	38	60,3%
	14	16	25,4%
Body Mass Index	Less	27	42,85%
	Normal	27	42,85%
	Overweight	8	12,7%
	Obesity	1	1,6%

Table 2. Characteristics of the subjects in the study according to their gender, age, and BMI. The majority of subjects were male (38, 60.3%) and 25 were female (39.7%). In terms of age, about two thirds were 13 years old (38 persons, 60.3%), followed by those who were 14 years old (16 persons, 25.4%) and those who were 12 years old (9 persons, 14.3%). Regarding the BMI, 27 subjects in both Less and Normal made up the highest percentage (42.85%) from each category. For comparison, the Overweight group included 8 individuals (12.7%), and in the Obesity as few as 1 person (1.6%)

Tabel 3. Test Item Measurement Results

Gender	Item	Min	Max	Mean ± Stdev	Category
Female	Push Up	17	50	32,04 ± 8,04	Good
	Sit Up	15	43	28,28 ± 7,63	High
	Vertical Jump	23	41	32,04 ± 6,1	Good
	Sit and Reach	9	20	14,4 ± 3,23	Less
	Sprint 40m	9,05	13,1	11,16 ± 1,24	Very Less
	Illinois Agility Run	12,12	17,69	14,12 ± 1,22	Excellent
	Ball Catch Throw	0	16	5,92 ± 4,76	Very Less
	Stand Strok Test	2,08	20,88	6,76 ± 4,89	Poor
	Beep Test	23,2	30,5	27,72 ± 2,26	Less
Male	Push Up	14	45	28,74 ± 7,27	Good
	Sit Up	18	47	31,82 ± 7,08	Very High
	Vertical Jump	24	67	39,21 ± 9,67	Very Good
	Sit and Reach	14	33	24,08 ± 4,67	Medium
	Sprint 40m	7,62	11,73	8,85 ± 0,92	Medium
	Illinois Agility Run	11,44	18,73	13,97 ± 1,27	Excellent

Ball Catch Throw	9	40	20,39 ± 4,76	Medium
Stand Strok Test	9,04	39,22	19,7 ± 7,87	High
Beep Test	35,8	41,5	38.82 ± 1,92	Medium

The data showed that the physical performance of the study participants differed between males and females on various test components. In the female group, push-up values ranged from 17 to 50 times with an average of 32.04 ± 8.04, sit-up 15-43 times with an average of 28.28 ± 7.63, vertical jump 23-41 cm with an average of 32.04 ± 6.1, and sit and reach flexibility 9-20 cm with an average value of 14.4 ± 3.23. The 40-meter sprint running speed was in the range of 9.05-13.1 seconds with an average of 11.16 ± 1.24, the Illinois Agility Run agility ability ranged from 12.12-17.69 seconds with an average of 14.12 ± 1.22, the ability to throw the ball catch 0-16 times with an average of 5.92 ± 4.76, balance through the Stand Stork Test 2.08-20.88 seconds with an average of 6.76 ± 4.89, and cardiorespiratory endurance through the Beep Test 23.2-30.5 with an average of 27.72 ± 2.26. In the male group, performance was generally higher, with push-ups 14-45 times and an average of 28.74 ± 7.27, sit ups 18-47 times with an average of 31.82 ± 7.08, vertical jump 24-67 cm with an average of 39.21 ± 9.67, and sit and reach 14-33 cm with an average of 24.08 ± 4.67. The 40-meter sprint speed was in the range of 7.62-11.73 seconds with an average of 8.85 ± 0.92, Illinois Agility Run agility of 11.44-18.73 seconds with an average of 13.97 ± 1.27, the ability to throw the ball catch 9-40 times with an average of 20.39 ± 4.76, Stand Stork Test balance of 9.04-39.22 seconds with an average value of 19.7 ± 7.87, and Beep Test ability which ranged from 35.8-41.5 with an average of 38.82 ± 1.92. Overall, male participants performed better than female participants across almost all test components.

Tabel 4. Results Of Women's Physical Conditions

Category	Value	F	Frequency
Very High	> 214,33	2	8%
High	193,31-214,32	5	20%
Medium	172,29-193,30	10	40%
Less	151,27-172,28	6	24%
Very less	< 151,27	2	8%
Total		25	100%

Table 4 shows that the majority of participants were at the Medium ability level, namely 10 participants (40%). Furthermore, 6 participants (24%) were in the Poor category, followed by 5 participants (20%) in the High category. Meanwhile, the Very High and Very Poor categories each had only 2 participants (8%).

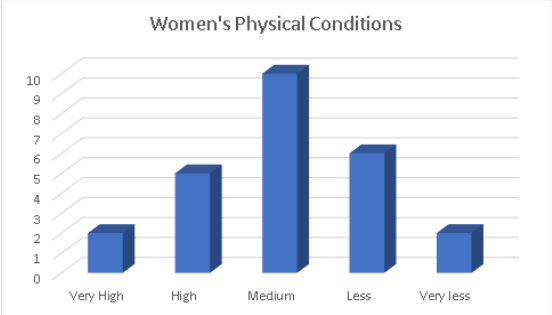

Figure 1. Distribution of Physical Condition Of Women

Tabel 5. Results Of The Physical Condition Of Men

Category	Value	F	Frequency
Very High	> 269.70	3	7,9%
High	242,25-269,70	10	26,4%
Medium	214,80-242,24	12	31,5%
Less	187,35-214,79	13	34,2%
Very less	<187,35	0	0%
Total		38	100%

Based on **Table 5**, the men's physical condition shows that the majority are in the Poor category (13 participants, 34.2%), followed by the Moderate category (12 participants, 31.5%). Furthermore, 10 participants (26.4%) are in the High category, while only 3 participants (7.9%) are in the Very High category. There are no participants in the Very Poor category. Overall, out of a total of 38 participants.

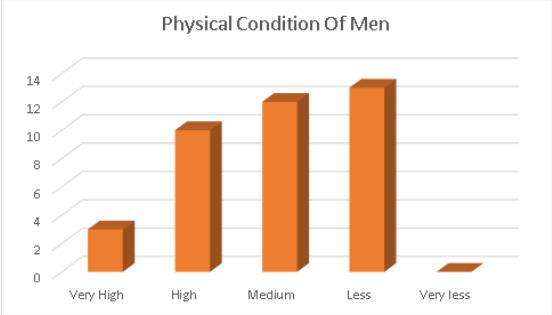

Figure 2. Distribution of Physical Condition Of Men

Based on field data, the analysis of 63 athletes' responses, and the results of the 30-meter running test, push-up test, sit-up test, and standing broad jump test has been carried out. The level of physical condition of volleyball extracurricular members at Junior High School 3 Semarang shows that, in general, the majority of students are still in the moderate to less category. This finding indicates that physical conditioning coaching in extracurricular activities has not been carried out effectively, so students' basic abilities to support volleyball playing skills have not developed. This situation can be influenced by various internal and external factors (Nurmajid et al., 2024). Internal factors come from the players themselves, such as a lack of understanding of the importance of fitness, a lack of knowledge about physical conditions, an irregular diet and rest, and low awareness of maintaining body fitness. Meanwhile, external factors come from outside the player, for example, coaches who have not provided an optimal portion of physical training and emphasize more on technical aspects and games, as well as the absence of a truly planned and consistent training program. In fact, physical condition is an important foundation in sports, especially volleyball, which demands strength, speed, endurance, agility, and good coordination (Taware et al., 2013)(Malikov et al., 2020).

Based on the results of the characteristics measurement, the majority of participants were male students (60.3%), while female students accounted for 39.7%. When viewed from the age perspective, most are 13 years old, representing 60.3%, which is the peak period for the development of basic motor abilities and increased physical capacity. Body mass index characteristics showed that most students were in the Less and Normal categories, at 42.85% each. This indicates that the majority of students have a relatively good nutritional status that supports optimal physical activity. This profile of basic characteristics provides an important foundation for understanding the variations in participants' physical abilities and how these affect sports performance.

Comparison of performance across all test elements showed that male participants performed significantly better than female participants across almost all fitness components. On strength tests such as push-ups and sit-ups, men performed better overall than women: 28. 74 versus 32. 04 for push up and 31. 82 versus 28. 28 at sit up. In terms of strength, men averaged 39.21 centimeters in the vertical jump test compared to only 32.04 cm for women. In tests like the sit-and-reach, women scored measurably worse than men. The average measurement for men was 24.49 cm, while it was 14.8 cm for females - a wider discrepancy than elsewhere. Men, in fact, also outperformed women in events like the 40-meter dash, recording a time of 8.85 seconds per person, compared with 11.16 seconds for women. The Illinois Agility Run test also showed that men were slightly faster, with a time of 13.97 seconds, compared to 14.12 seconds for women. The ball-throw coordination test also showed significant differences between the two sexes, with men taking 20.39 seconds and women 5.92 seconds. The stork balance test also showed that men were better than women, with an average of 19.7 seconds compared with 6.76 sec. Cardiorespiratory endurance increased significantly in men when measured by the BIP test men averaged 38.82 seconds, compared with 27.72 seconds for women.

For most female students, their ability level was Moderate (40%) and Deficient (24%). This shows that during extracurricular activities, although the implemented training program did not uniformly improve all aspects of physical condition, at best, 20% were in the High category and 8% in the Very High category, indicating that the training program must be adjusted, especially in speed, agility, and balance, which still show relatively low values. In addition, the presence of 8% of students in the Very Poor category indicates that some students need special attention through training programs or additional physical guidance products.

On physical ability types for males, nevertheless. Most of the students–34.2% were in the category of Less, whilst large numbers were in the other two (Moderate-31.5% and the rest as follows). The High Category carried 26.4%. The Very High Category accounted for only 7.9% of students, and no one fell into the Very Poor Category. This shows that, even though men's physical abilities are higher than women's, the majority of these abilities are still not even at a basic level. The dominance of Lack indicates that the current training programme has not provided sufficient stimulus to significantly improve physical fitness, especially endurance, strength, and agility.

The differences in physical abilities between men and women are attributed to various biological and physiological factors. Men have a higher percentage of muscle, a better physical endurance-power ratio, and greater lung and heart capacity (Fitra Nabila Ajirun, 2025; Lilis Setyowati, 2024). Moreover, in this music competition, due to faster physical maturation during the transition from adolescence to adulthood in males, he has both greater muscle mass and greater neuro-

muscular efficacy than girls or women at various levels of physical endurance.

The results of this study highlighted a lack of physical activity among the students. Especially note that while these individuals may have fine leg explosive power, weakness in speed, arm strength, and abdominal muscle strength limits them to being all-out participants in the end (Putri Isabella & Perwira Bakti, 2021). Antoni, (2021) believes that, given the condition is life, it should be developed thoroughly and continuously. This result also indicates that there are no significant changes in the quality of the current technology training, but physical education has not been adequately addressed. If this state continues, it may have miserable consequences for students; they will become more easily damaged in performing operations and will find that their goals cannot be achieved.

This study has several limitations that need to be considered in interpreting the results, including the use of test instruments that are limited to basic physical measurements without considering more specific biomechanical factors, the absence of a control group to compare the effectiveness of training programs that have been running, as well as variations in the level of biological maturity in adolescent participants that can significantly affect test results but were not measured in this study. In addition, the cross-sectional nature of this study did not allow for longitudinal identification of physical condition development, and psychological factors such as motivation and interest during the test were not controlled for, which may have influenced test performance. The limited facilities and infrastructure also affected the standardization of test implementation, as environmental conditions such as temperature, humidity, and field surface were not fully controlled during data collection.

CONCLUSION

Based on the results of the research conducted on 63 volleyball extracurricular participants at Junior High School 3 Semarang, it can be concluded that in general, is still dominated by the moderate to poor category, both in the male and female groups. The physical performance of male students is generally higher than that of female students in almost all test components, especially strength, explosive power, agility, speed, balance, and cardiovascular endurance. However, even though the boys' performance is better, the majority of them are still at a suboptimal level of ability indicating that the ongoing training program has not provided adequate stimulus to improve their overall physical condition. Internal factors such as students' lack of awareness of the importance of fitness, as well as external factors such as unstructured training programs and a lack of facilities, are the causes of their low physical condition. Therefore, it is necessary to improve physical training programs to be more planned, comprehensive, and tailored to the characteristics of student development in order to improve physical performance and support optimal volleyball playing ability.

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