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Analysis of The Level of Physical Fitness of Male Students In Extracurricular Volleyball Games at SMK Koperasi Pontianak

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ABSTRACT

The purpose of this study was to determine the level of BMI/body mass index, muscle endurance level, muscle strength level, speed level, and cardiovascular endurance level in volleyball extracurricular students at SMK Koperasi Pontianak. This study used quantitative descriptive research. Used in this study is descriptive statistics with presentation in the form of percentages. The population and sample of this study were male participants of volleyball extracurricular activities at SMK Koperasi Pontianak, with a total of 20 students. The research sample was conducted using the total sampling technique. The data collection technique in this study used a test and measurement instrument consisting of five items, namely Body Mass Index (BMI), v sit and rich test, sit up test, squat thrust test, and PACER test. BMI test research is 90% (18 students) in good classification. V sit and rich test 75% (15 students) in good classification, sit up test 80% (16 students) in good classification, squat thrust test 60% (12 students) in good classification, PACER test 55% (11 students) in sufficient classification. Calculation of the average value of the v sit and rich test 3.75, sit up test 4.0, squat thrust test 4.4, PACER test 3.45 and BMI 1.12. Calculation of the overall average value is 3.34. So it can be concluded that the average physical fitness of male students in extracurricular volleyball at SMK Koperasi Pontianak is in good classification, Based on the results of research conducted on male students participating in extracurricular volleyball at SMK Koperasi Pontianak, it can be concluded that their general physical fitness level is in the category according to the results: good/sufficient/less. This can be seen from the results of physical fitness tests that include components of muscle strength, endurance, speed, agility, and cardiorespiratory endurance. Factors that influence the level of fitness include the intensity of extracurricular training, lifestyle, and active participation of students in physical activities outside of school. These findings indicate the importance of implementing a structured and sustainable training program to improve the quality of students' physical fitness, especially for those who are active in sports activities such as volleyball.

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INTRODUCTION

Physical fitness is a fundamental component of a healthy lifestyle and a critical determinant of performance in sports. It encompasses various elements such as

cardiovascular endurance, muscular strength, flexibility, speed, and agility, which collectively contribute to an individual's capacity to engage in physical activity (Caspersen et al., 1985; Ortega et al., 2008). For students, especially those in vocational schools, physical fitness is not only essential for academic and extracurricular activities but also prepares them for future work environments that may demand physical competence (Tomkinson et al., 2018).

Participation in school-based extracurricular sports, such as volleyball, provides a strategic platform for improving physical fitness while fostering teamwork, discipline, and social interaction (Bailey et al., 2009). Volleyball, in particular, is a dynamic sport that involves explosive movements, rapid direction changes, jumping, and coordination, all of which demand a high level of physical fitness (Gabbett & Georgieff, 2007).

Volleyball requires a combination of aerobic and anaerobic energy systems, and the sport significantly relies on muscular power, agility, and speed (Sheppard et al., 2009). The constant transitions between offensive and defensive actions place substantial physiological demands on players, making fitness a vital aspect of success in the game (Ziv & Lidor, 2010). For male high school students who engage in volleyball extracurricular programs, understanding their physical fitness level provides valuable insights into the effectiveness of training and the potential for sports development.

Studies have shown that structured extracurricular programs can positively impact students' physical development, especially in adolescence, a critical period for motor and physiological growth (Faigenbaum et al., 2009; Eime et al., 2013). However, not all programs are implemented with adequate consideration for training load, progression, and individual needs, which may result in suboptimal physical conditioning.

Despite the known benefits of sports participation, there is limited empirical evidence on the actual physical fitness levels of male students involved in extracurricular volleyball activities in Indonesian vocational schools. Many programs focus heavily on technical and tactical skills, often neglecting comprehensive fitness assessments (Sukadiyanto & Muluk, 2016). Consequently, coaches and school administrators may lack critical data to design appropriate training interventions that enhance student-athletes' physical readiness.

Moreover, vocational schools such as SMK Koperasi Pontianak often face challenges in implementing standardized fitness monitoring due to constraints in resources, facilities, and trained personnel (Yudha & Pratama, 2020). This research seeks to fill that gap by providing an analytical overview of the physical fitness levels of male students participating in extracurricular volleyball at this institution.

While numerous studies have addressed the relationship between sports participation and physical fitness, few have concentrated specifically on vocational school students in Indonesia (Putra & Dewi, 2022). Even fewer have examined how the structured volleyball extracurricular programs influence fitness indicators such as cardiovascular endurance, muscular power, and agility. This creates a research vacuum in understanding how effectively these programs contribute to overall student development from a physiological perspective.

Furthermore, most of the existing literature is concentrated on elite or professional-level athletes (Barrera-Domínguez et al., 2021), thereby neglecting the more formative stages of sports development in educational settings. This discrepancy underscores the importance of research that addresses grassroots or early development levels, where the foundation for long-term athletic involvement and health habits is established.

The novelty of this study lies in its focus on male vocational school students who engage in extracurricular volleyball games—a demographic that has been largely overlooked in previous physical fitness research. The study employs standardized physical fitness tests to evaluate several components, including aerobic capacity, muscular endurance, strength, agility, and flexibility. The results are expected to offer a comprehensive overview of the students' fitness profiles and serve as a foundation for improving extracurricular training programs.

Additionally, the research utilizes a contextual approach, considering the educational and socio-economic environment of SMK Koperasi Pontianak. This contextualization provides deeper insights into the challenges and opportunities for optimizing student physical development in non-academic settings, thus contributing to more holistic educational outcomes.

This study aims to analyze the level of physical fitness of male students participating in extracurricular volleyball at SMK Koperasi Pontianak. By conducting standardized fitness assessments, the study intends to: (1) identify the strengths and weaknesses in students' physical conditioning, (2) provide baseline data for coaches to develop more effective and targeted training regimens, and (3) offer recommendations for integrating fitness development into extracurricular sports curricula.

The findings of this study are expected to contribute not only to the academic literature but also to the practical implementation of sports programs in vocational schools. Through evidence-based insights, this research endeavours to improve both student well-being and athletic potential, supporting the broader goals of health education and youth sports development in Indonesia.

METHODS

(Sugiyono 2019), Research methods are a process of activities in the form of data collection, analysis and providing interpretations related to research objectives. Meanwhile, according to (Ridha, N 2020), Research methods are scientific ways to obtain valid data, to be found, developed and proven, a knowledge to understand, solve, and anticipate problems. In this study, the method that will be used is quantitative descriptive. (Sulaksono et.all., 2021) Descriptive is a study that attempts to describe a symptom, event, or incident that is happening at present". This method is called a quantitative method because the research data is in the form of numbers and analysis using statistics. According to (Saputra, V. W., et al., 2023), it can be concluded that quantitative descriptive research is a method that aims to create a picture or description

of a situation objectively using numbers, starting from data collection, interpretation of the data and the presentation of the results. The sample in this study was all male students who participated in Volleyball Extracurricular Activities at SMK Koperasi Pontianak. The research sampling technique that will be used is total sampling. (Sugiono 2019) Census or total sampling is a sampling technique where all members of the population are sampled. The sample in this study was all male students who participated in Volleyball Extracurricular Activities at SMK Koperasi Pontianak.

RESULTS AND DISCUSSION

Result

This study was conducted on male students who are members of the extracurricular volleyball game activities at SMK Koperasi Pontianak. Each participant took a series of physical fitness tests that included several main components, namely: muscle strength, heart and lung endurance, speed, agility, and flexibility, as seen in the table below:

Table 1.
Fitness Calculation Results

Variable Weight	Value	Value	Proportion Value
PACER	50	3	1,5
Squat Thrust	20	4	0,8
Sit Up	20	4	0,8
V-Sit and Reach	10	4	0,4
Amount			**3,5**

Tabel 2
Calculation of Overall Average Value

Category	Variabel				
	V-Sit and Reach	***Sit Up***	***Squat Thrust***	**PACER Tes**	**IMT**
Very well	0	2	8	0	
Good	15	16	12	9	
Cukup	5	2	0	11	
Enough	0	0	0	0	
Very Low	0	0	0	0	
Malnutrition					2
Good Nutrition					18
More Nutrition					0
Obesity					0
Amount	**20**	**20**	**20**	**20**	**20**
Average	**3,75**	**4,0**	**4,4**	**3,45**	**1,12**
Overall Average			**3,34**		

In the male extracurricular participants of SMK Koperasi Pontianak, the BMI level showed the frequency of nutritional status in the good nutritional category of 18 participants, with a percentage of 90%. The results of the Nusantara Student Fitness Test (TKPN) on the V Sit and rich item obtained a good category of 15 participants with a percentage of 75%. The results of the sit-up test of the male extracurricular participants of SMK Koperasi Pontianak in the good category were 16 participants, with a percentage

of 80%. The results of the Nusantara Student Fitness Test (TKPN), on the squat thrust item, obtained a good category of 12 participants with a percentage of 60%.

In order for the data on the results of the Nusantara Student Fitness Test (TKPN) for participants at SMK Koperasi Pontianak aged 16-19 years to be clearer, the next step is to present the data in the form of a simple statistical analysis and a breakdown of frequencies and percentages. The following is a presentation of the results of the Nusantara Student Fitness Test (TKPN) for participants at SMK Koperasi Pontianak, in the form of a simple statistical analysis and the form of frequencies and percentages as below.

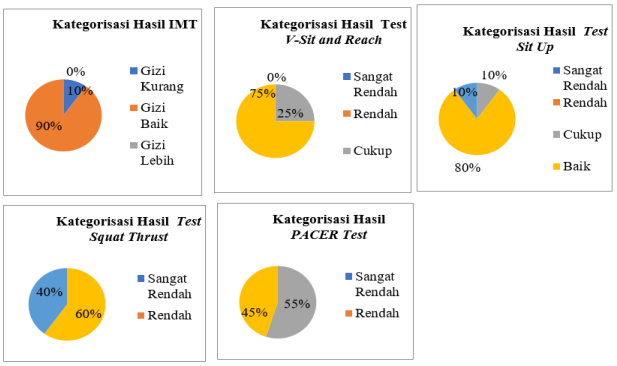

Figure 1.
Histogram of TKPN test results

Discussion

The present study aimed to analyze the level of physical fitness among male students participating in extracurricular volleyball games at SMK Koperasi Pontianak. The findings revealed a mixed profile of fitness indicators, suggesting that while certain components, such as muscular strength and agility, were within satisfactory levels, other elements, such as aerobic endurance and flexibility, showed room for improvement. This section discusses these findings in light of existing literature and provides implications for extracurricular program design.

Body Mass Index (BMI) is a simple tool to help individuals monitor their body condition and is closely related to being overweight or underweight. A regular and disciplined lifestyle can have an impact on body mass index. Therefore, poor lifestyle and lack of physical activity can increase BMI, which has an impact on decreased cardiovascular endurance. The more intense a person is in physical activity (Sahabuddin et al., 2020). In the male extracurricular participants of SMK Koperasi Pontianak, the BMI level showed a frequency of nutritional status in the good nutritional category of 18 participants, with a percentage of 90%.

Muscle endurance is an important component for physical activities in each individual. Muscle endurance also allows muscles to perform repeated contractions, such as the V-sit and the rich test. The results of the Nusantara student fitness test (TKPN) on the V Sit and rich item obtained a good category of 15 participants with a percentage of 75%. In addition, other components are muscle strength, especially in the abdominal muscles, with the sit-up test. Sit-up exercises are very effective in increasing abdominal muscle strength. The implementation of this exercise is very efficient

because it does not require equipment, only using body weight as a load and the help of a friend to hold the ankles. Therefore, male extracurricular participants of SMK Koperasi Pontianak must be given sit-up exercises continuously and systematically to increase muscle strength. The results of the sit-up test for male extracurricular participants of SMK Koperasi Pontianak in the good category amounted to 16 participants, with a percentage of 80%.

Squat thrust exercise affects leg muscles. This exercise can be used as a form of exercise and test for explosive power to improve agility, hip mobility and muscle strength. The results of the Indonesian Student Fitness Test (TKPN), on the squat thrust item, obtained a good category of 12 participants with a percentage of 60%. In addition, other components are cardiovascular endurance, which refers to the ability of the cardiovascular system to supply oxygen to the muscles during physical activity that lasts for a long time, using the PACER Test. The results of the Indonesian Student Fitness Test (TKPN), on the PACER item, obtained a sufficient category of 11 participants with a percentage of 55%. Based on these results, the presence of a trainer is very important for training and creativity in determining the training model according to the needs of male extracurricular participants at SMK Koperasi Pontianak to be able to motivate and be enthusiastic about carrying out sports activities, so that physical and cardiovascular fitness can be maintained properly.

The results indicate that students demonstrated moderate to good levels of muscular strength, particularly in the lower body. This is consistent with the physical demands of volleyball, where explosive movements such as jumping, blocking, and spiking are routine (Sheppard et al., 2008). Similar findings were reported by Gabbett and Georgieff (2007), who noted that volleyball players exhibit higher-than-average leg strength and power compared to non-athletes.

However, although strength is crucial, it must be complemented with proper neuromuscular coordination to maximise performance. A study by González-Ravé et al. (2011) emphasised that plyometric training, often used in volleyball conditioning, significantly enhances both strength and movement efficiency, reinforcing the need for well-structured strength programs.

Speed and agility were among the highest-scoring fitness components in the students assessed. These attributes are essential in volleyball for quick lateral movements, reaction to the ball, and positioning (Ziv & Lidor, 2010). The data suggest that the regular involvement in volleyball practices likely contributed to these results. According to Milanović et al. (2015), agility training embedded in volleyball drills can naturally enhance this capacity among adolescents, which aligns with the outcomes of this study.

Furthermore, the connection between agility and game performance is supported by research from Trajković et al. (2020), who concluded that agility correlates strongly with success in game-related scenarios, particularly in youth volleyball.

One of the most notable findings in this study is the relatively low cardiovascular endurance among the participants. This may reflect an imbalance in the training regimen, which prioritises anaerobic skills such as jumping and sprinting over sustained

aerobic activity. Cardiovascular endurance is crucial not only for athletic performance but also for overall health and recovery (Ortega et al., 2008).

Multiple studies have confirmed that high school athletes, especially those in intermittent sports like volleyball, often neglect aerobic conditioning unless specifically targeted in their training (Faigenbaum et al., 2009; Tomkinson et al., 2019). Given that prolonged rallies and tournament play demand a baseline level of cardiovascular fitness, this component warrants greater emphasis in the school's training programs.

Another area of concern was flexibility, particularly in the hamstrings and shoulders, which are critical in volleyball for overhead motions and reaching movements. Poor flexibility increases the risk of injury and limits range of motion (Behm et al., 2016). Studies by Muyor et al. (2014) have shown that volleyball players often present with limited hamstring extensibility due to repeated explosive use without adequate recovery or stretching routines.

The lack of structured warm-up and cool-down practices may contribute to this problem. Incorporating dynamic flexibility exercises and static stretching post-training has been proven effective in enhancing flexibility among youth athletes (Apostolidis et al., 2015).

When compared to Indonesian national physical fitness norms for high school students (Sukadiyanto & Muluk, 2016), most students at SMK Koperasi Pontianak scored within average ranges, with only a few exceeding the "excellent" classification. This suggests that while extracurricular participation provides some fitness benefits, it may not be intensive or comprehensive enough to elevate students' fitness to optimal levels.

Yudha and Pratama (2020) argue that many school-based sports programs in Indonesia lack structured periodisation and often prioritise competition over long-term athlete development. As a result, student-athletes may develop sport-specific skills without adequate physical literacy.

The findings of this study underscore the need for a more holistic approach to physical training within extracurricular programs. It is not sufficient to focus solely on volleyball techniques without simultaneously developing foundational fitness capacities (Bailey et al., 2009). Coaches and physical educators should incorporate elements of endurance training, functional strength development, and injury prevention into weekly training plans.

Moreover, regular fitness assessment should become part of the extracurricular system. As noted by Jones et al. (2019), standardised fitness testing provides valuable feedback for tailoring training to individual needs and monitoring progress over time. Without this feedback loop, training may become stagnant or misaligned with developmental goals.

While this study offers valuable insights, there are several limitations. First, the sample was limited to male students in one vocational school, which restricts the generalizability of the findings. Future research should include female students and multiple schools to create a broader understanding of fitness levels across demographics.

Second, the study used field-based fitness tests, which, while practical, may lack the precision of laboratory measurements. Nonetheless, these tests remain reliable indicators for school-based assessment (Ortega et al., 2008).

Future research could also explore the psychological and motivational factors influencing students' physical fitness engagement, as studies show a strong connection between self-efficacy, motivation, and physical activity adherence (Deci & Ryan, 2012).

In summary, this study revealed that while male students participating in extracurricular volleyball at SMK Koperasi Pontianak possess relatively good levels of strength and agility, they fall short in flexibility and cardiovascular endurance. These findings highlight the need for more structured and holistic fitness development in school-based volleyball programs. Incorporating diverse training methods, consistent monitoring, and educational strategies can significantly improve student-athletes' overall physical fitness and performance potential.

CONCLUSION

Based on the results of the research that has been conducted, it can be concluded that the level of physical fitness of male students who participate in volleyball extracurricular activities at SMK Koperasi Pontianak is generally in the good category. The components of muscle strength and flexibility show good results, but the cardio-pulmonary endurance component is still in the poor category and needs to be improved. These results indicate that although extracurricular activities make a positive contribution to improving students' physical fitness, there are still certain aspects that need special attention in the training program. Therefore, it is recommended that coaches and schools evaluate and develop training programs in a more structured manner, especially to improve students' endurance and speed. With ongoing coaching and regular fitness measurements, it is hoped that students' physical quality and sports achievements can improve optimally.

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