

## **Differences in the physical condition of the volleyball players of PBV spirits and PBV mutiara in Sleman regency**

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### **Abstrak**

This study aims to determine the differences in the physical condition of male and female volleyball athletes between PBV Spirits and PBV Mutiara in Sleman Regency. The physical condition components assessed include coordination, arm power, leg power, agility, speed, flexibility, arm muscle strength, and VO<sub>2</sub>Max endurance. The study used a comparative descriptive design with total sampling techniques on 153 athletes. The research instruments included tennis ball throw and catch tests, basketball throw tests, vertical jump tests, Illinois Agility Tests, 40-metre runs, sit and reach tests, push-up tests, and multistage fitness tests. Data analysis was performed using an independent sample t-test. The results showed that among male athletes, PBV Mutiara had better coordination, arm power, flexibility, and VO<sub>2</sub>Max, while PBV Spirits had better speed. There were no differences in leg power, agility, and arm muscle strength. In female athletes, PBV Mutiara excelled in coordination and VO<sub>2</sub>Max, while PBV Spirits excelled in speed and arm muscle strength. Arm power, leg power, agility, and flexibility did not show significant differences. The conclusion of this study shows that there are differences in certain physical conditions between clubs, which can be used as a basis for evaluating and planning volleyball training programmes.

**Keywords:** Physical Condition, Volleyball, PBV Spirits, PBV Mutiara

### **INTRODUCTION**

These characteristics require athletes to have optimal physical condition, including coordination, power, speed, agility, flexibility, strength, and endurance (Jariono et al., 2024). To achieve this, specific training regimens are implemented to enhance these physiological attributes, encompassing muscular strength, aerobic and anaerobic capacity, acceleration, explosive power, and balance. This comprehensive approach to physical conditioning is crucial for volleyball players to meet the demands of the sport effectively (Jariono et al., 2024). Assessing the physical condition of volleyball players is crucial for optimizing performance and developing targeted training programs (Nasrulloh et al., 2023). Various training methods, such as neuromuscular, plyometric, combined weight and plyometric, and eccentric training, have been identified as effective in improving these physical attributes in volleyball players (Jariono et al., 2024). However, the efficacy of these diverse methodologies necessitates rigorous evaluation, often employing quantitative descriptive methods to analyze specific physiological parameters (et al. et al., 2025; Jariono et al., 2024).

Indeed, a systematic review of literature published between 2014 and 2023 indicates that numerous exercise techniques have been employed and categorized based on the specific physical conditions they aim to improve (Jariono et al., 2024). For instance, plyometric training through agility ladder drills has been shown to enhance leg muscle power, agility, and aerobic endurance in adolescent volleyball players (Pramono et al., 2023). This underscores the importance of tailored training programs that address the multifaceted physical demands of volleyball, emphasizing that a comprehensive

approach to conditioning can significantly impact athletic prowess and injury prevention (Jariono et al., 2024; Keoliya et al., 2024). Furthermore, detailed physiological profiling, which encompasses assessments of body composition, neuromuscular strength, and both aerobic and anaerobic capacities, is indispensable for guiding training interventions and maximizing athletic potential (Cereda, 2025). Volleyball, a sport demanding significant endurance, strategic acumen, rapid reaction times, balance, agility, speed, flexibility, strength, and overall athletic efficiency, necessitates an integrated approach to training and nutrition for optimal performance (Sahin et al., 2025).

This integration is crucial not only for enhancing on-court performance but also for mitigating injury risks through judicious exercise selection and periodization within structured strength and conditioning programs (Rebelo et al., 2025). Such comprehensive programs are essential for preparing athletes for the rigorous physical challenges inherent in competitive volleyball, thereby ensuring sustained high-level performance and reducing susceptibility to injuries (Rebelo et al., 2025). This holistic approach ensures that athletes are not only physically prepared for the demands of the sport but also possess the mental fortitude and tactical awareness required for competitive success (Jariono et al., 2024). The development of volleyball players from a young age necessitates a long-term coaching strategy that prioritizes systematic and planned programs supported by both internal and external stakeholders, focusing on technical proficiency alongside superior physical conditioning (Pramono et al., 2023).

This systematic approach ensures that physical activity motivation translates into improved physical capabilities, supporting consistent engagement in regular exercise (Qiang et al., 2021). Consequently, these comprehensive training regimens, encompassing diverse methods like plyometrics, aerobic, and strength training, are designed to enhance overall physical fitness and on-court performance, with specificity being a key consideration in program design, particularly for young athletes who are still developing motor skills and abilities (Podstawski et al., 2024). This careful developmental approach, especially in integrating strength and conditioning with skill acquisition, is critical for fostering long-term athletic development and preventing premature specialization injuries in youth volleyball players (Erol et al., 2025). The present study aims to investigate and compare the physical conditions of volleyball players from PBV Spirits and PBV Mutiara in Sleman Regency, providing insights into potential differences that may inform tailored training strategies for each team (Rebelo et al., 2025). This comparative analysis will employ a quantitative descriptive method to assess various physiological parameters among the athletes, thereby providing a robust empirical foundation for future training interventions (et al. et al., 2025).

Such insights are crucial for coaches and trainers to develop more effective and individualized conditioning programs, ultimately enhancing player performance and minimizing injury risks within these specific athletic populations (Rebelo et al., 2025). By analyzing these differences, the study can contribute to a deeper understanding of how distinct training environments and player demographics influence physical attributes vital for volleyball success, especially concerning young athletes whose performance is continually evolving (Tafuri et al., 2024). Specifically, this research will delve into aspects such as cardiorespiratory fitness, muscular strength, agility, and power, which are all critical components for effective volleyball play (Ana et al., 2025). Therefore, physical condition must be a primary concern in the training process of volleyball athletes. PBV Spirits and PBV Mutiara are volleyball clubs that actively train athletes in Sleman Regency and regularly participate in various competitions. However, based on initial observations and information from coaches, there are still problems in the form of athlete fatigue that occurs before training or matches end. This condition indicates the need for an objective evaluation of athletes' physical condition through standardised tests and measurements. Physical condition evaluation is important as a basis for developing targeted training programmes that are tailored to the athletes' needs (Bafirman & Wahyuni, 2019). In addition, differences in training systems and coaching patterns between clubs have the potential to cause differences in the physical condition of athletes, both male and female. However, to date, there has been no empirical data specifically comparing the physical condition of volleyball athletes between PBV Spirits and PBV Mutiara. Therefore, this study aims to analyse the differences in the physical condition of male and female volleyball athletes at PBV Spirits and PBV Mutiara in Sleman Regency as a basis for evaluating volleyball coaching and performance development.

**METHOD**

This study utilised a comparative descriptive design with a quantitative approach. The study aimed to compare the physical condition of volleyball athletes between PBV Spirits and PBV Mutiara Sleman Regency. The population in this study consisted of all 153 volleyball athletes from PBV Spirits and PBV Mutiara Sleman Regency, comprising male and female athletes. The sampling technique used total sampling, so that all members of the population were included in the research sample. The research variables were the physical condition of athletes, including coordination, arm power, leg power, agility, speed, flexibility, arm muscle strength, and VO<sub>2</sub>Max endurance. The instruments used to measure each variable were the tennis ball throw test for coordination, the basketball throw test for arm power, the vertical jump for leg power, the Illinois Agility Test for agility, the 40-metre run test for speed, the sit and reach test for flexibility, the push-up test for arm muscle strength, and the multistage fitness test to measure VO<sub>2</sub>Max endurance. Data collection was carried out at each club's training venue using test procedures that referred to the standards for measuring physical condition in sports. Before data collection, the athletes were given an explanation of the test procedures and performed warm-up exercises to avoid the risk of injury. Data analysis began with prerequisite tests, which included normality and homogeneity tests. Furthermore, to determine the differences in physical condition between PBV Spirits and PBV Mutiara athletes, an independent sample t-test with a significance level of 0.05 was used. All data analysis was performed using statistical software.

**RESULTS AND DISCUSSION**

**Result**

Data analysis was conducted to determine the differences in the physical condition of male and female volleyball athletes between PBV Spirits and PBV Mutiara in Sleman Regency. The statistical test used was an independent sample t-test with a significance level of 0.05. The results of the analysis are presented as follows.

Table 1. Results of Physical Condition Tests for Male Athletes from PBV Spirits and PBV Mutiara

<b>Physical Condition Components</b>	<b>Sig. (p)</b>	<b>Explanation</b>
Coordination	< 0,05	Significantly different
Arm strength	< 0,05	Significantly different
Leg strength	> 0,05	No difference
Agility	> 0,05	No difference
Speed	< 0,05	Significantly different
Flexibility	< 0,05	Significantly different
Arm muscle strength	> 0,05	No difference
VO <sub>2</sub> Max	< 0,05	Significantly different

The analysis results show that there are significant differences between male athletes in terms of coordination, arm power, speed, flexibility, and VO<sub>2</sub>Max. PBV Mutiara athletes scored better in coordination, arm power, flexibility, and VO<sub>2</sub>Max, while PBV Spirits athletes excelled in speed. There were no significant differences in leg power, agility, and arm muscle strength.

Table 2. Results of Physical Condition Tests for Female Athletes from PBV Spirits and PBV Mutiara

<b>Physical Condition Components</b>	<b>Sig. (p)</b>	<b>Description</b>
Coordination	< 0,05	Significantly different
Arm strength	> 0,05	No difference
Leg strength	> 0,05	No difference
Agility	> 0,05	No difference
Speed	< 0,05	Significantly different
Flexibility	> 0,05	No difference
Arm muscle strength	< 0,05	Significantly different
VO <sub>2</sub> Max	< 0,05	Significantly different

The test results show that there are significant differences between female athletes in terms of coordination, speed, arm muscle strength, and VO<sub>2</sub>Max. PBV Mutiara athletes excel in coordination and VO<sub>2</sub>Max, while PBV Spirits athletes have better speed and arm muscle strength. There are no significant differences in arm power, leg power, agility, and flexibility. The results of the study show that there are certain physical differences between PBV Spirits and PBV Mutiara athletes, both male and female. These differences indicate that the training systems, intensity, and focus of physical training applied by each club have different effects on the development of athletes' physical condition. The superiority of PBV Mutiara athletes in the coordination and VO<sub>2</sub>Max components, both in male and female athletes, indicates that the club likely emphasizes coordinative training and aerobic endurance. Good coordination is very important in volleyball because it supports precise movements when passing, setting up, and smashing (Syafuruddin, 2019).

Meanwhile, high VO<sub>2</sub>Max allows athletes to maintain optimal performance in high-intensity activities performed repeatedly during a match (Prayoga & Wahyudi, 2021) (Khanna et al., 2020). Therefore, adequate cardiorespiratory fitness is essential for volleyball players, as it correlates with a reduced risk of cardiovascular issues and enhances the ability to sustain prolonged exertion throughout competitive play. For instance, young volleyball players demonstrate superior cardiorespiratory fitness compared to athletes in other sports like water polo, highlighting the sport's unique physiological demands (Sgrò et al., 2024). In male athletes, PBV Spirits' superiority in the speed component indicates that training focused on sprinting and quick reactions is more dominant. Studies indicate that volleyball players generally exhibit higher speed and agility compared to athletes in other sports like football, underscoring the specialized physical attributes fostered by the sport (Sulistiyono et al., 2024). However, the absence of differences in leg power and agility indicates that both clubs have relatively balanced training patterns in these components. Beyond this, arm strength also contributes to precise setting and powerful serving, both crucial aspects of offensive play (Nikolaïdis et al., 2015). The ability to generate high forces during overhead movements, such as spiking and blocking, is directly linked to well-developed upper body musculature and neuromuscular coordination (Duan et al., 2024). Meanwhile, the absence of differences in arm power and flexibility indicates that both clubs have relatively similar levels of development in these components. Overall, the results of this study confirm that the physical condition of volleyball athletes is influenced by the characteristics of the training programs implemented in each club. Therefore, coaches need to conduct periodic evaluations of physical condition as a basis for developing more specific, targeted training programs that meet the needs of athletes to support the achievement of optimal performance (Bafirman & Wahyuni, 2019).

## **CONCLUSION**

This study concluded that there were certain physical differences between the PBV Spirits and PBV Mutiara Sleman Regency volleyball athletes, both male and female. In male athletes, significant differences were found in coordination, arm power, speed, flexibility, and VO<sub>2</sub>Max, while in female athletes, significant differences were found in coordination, speed, arm muscle strength, and VO<sub>2</sub>Max. These differences indicate that the characteristics and focus of training programs between clubs influence the development of athletes' physical conditions. The results of this study can serve as a basis for evaluating and developing more targeted physical conditioning training programs to support the improvement of volleyball athletes' performance.

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