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The Relationship between Arm Muscle Strength and Arm Length with Overhand Serve Performance in Male Volleyball Extracurricular at SMAN 1 Muara Padang, Banyuasin

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Abstrak

Penelitian ini bertujuan untuk mengetahui hubungan antara kekuatan otot lengan dan panjang lengan dengan hasil servis pada siswa ekstrakurikuler bola voli putra di SMA Negeri 1 Muara Padang. Sampel penelitian berjumlah 16 siswa dengan metode korelasi. Hasil penelitian menunjukkan kekuatan otot lengan memiliki hubungan signifikan kuat dengan hasil servis (r = 0,740 > r tabel = 0,518), sedangkan panjang lengan memiliki hubungan signifikan sedang (r = 0,565 > r tabel = 0,518). Kombinasi kekuatan otot dan panjang lengan juga berhubungan signifikan sedang dengan hasil servis (r = 0,562 > r tabel = 0,518). Kontribusi simultan kedua variabel terhadap hasil servis sebesar 58%, sedangkan 42% dipengaruhi faktor lain. Penelitian ini menegaskan bahwa kemampuan fisik lengan berperan penting dalam meningkatkan performa servis siswa bola voli.

Kata kunci: *kekuatan otot lengan, panjang lengan, hasil servis, bola voli, siswa ekstrakurikuler.*

Abstract

This study aims to examine the relationship between arm muscle strength and arm length with service performance of boys' extracurricular volleyball students at SMA Negeri 1 Muara Padang. The sample consisted of 16 students using a correlational method. Results show that arm muscle strength has a strong significant correlation with service performance (r = 0.740 > r table = 0.518), arm length has a moderate significant correlation (r = 0.565 > r table = 0.518), and their combination also shows a moderate significant correlation (r = 0.562 > r table = 0.518). The simultaneous contribution of both variables to service performance is 58%, while 42% is influenced by other factors. This study confirms that arm physical ability is important for improving volleyball service performance.

Keywords: Arm muscle strength, arm length, service performance, volleyball, extracurricular students

1. INTRODUCTION

Sports are structured physical activities undertaken to promote a healthy and strong body while also providing enjoyment and entertainment. The term "sport" itself implies the cultivation or perfection of the physical body, reflecting the long-standing recognition of sports as a critical element of human development throughout history. The advancement and widespread adoption of sports are closely linked to factors such as education, public health, development programs, and the era of technological progress. According to Cholik Mutoir (2020), sports can be understood as a systematic process comprising various activities and efforts that aim to develop and nurture both the physical and spiritual potential of individuals, whether conducted individually or as part of a community. Generally, participation in sports not only strengthens the body but also fosters resilience, builds strong character in facing challenges and competition, and encourages creativity in solving complex problems.

Physical activity and sports play a vital role in the holistic development of children and adolescents. Regular participation in exercise contributes not only to improved physical

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fitness but also to enhanced cognitive function, mental health, and academic achievement (Bailey, Hillman, Arent, & Petitpas, 2018; Biddle, Ciaccioni, Thomas, & Vergeer, 2019). School-based physical activity programs have been shown to produce positive outcomes in students' health, including cardiovascular endurance, muscular strength, and optimal body composition (Chen, Yang, & Li, 2020; Warburton & Bredin, 2017). Moreover, involvement in organized sports such as volleyball offers structured opportunities for students to develop teamwork, discipline, and motor skills while simultaneously supporting psychological well-being (Donnelly et al., 2016; Lubans et al., 2016). Empirical evidence also suggests that participation in extracurricular sports activities is associated with reduced stress levels, improved mental health, and the cultivation of lifelong healthy habits that enhance both physical and psychological resilience (Anggiana & Indahwati, 2023; Fatoni & Raswadi, 2024; Riyanto, Gunawan, & Tambaip, 2025; Anwar, 2025). Consequently, integrating systematic physical activity and sports programs within school curricula is essential for supporting the holistic development of students, preparing them for success both academically and personally.

At SMA Negeri 1 Muara Padang, volleyball is among the most popular sports for both male and female students. The school organizes volleyball extracurricular activities once a week, on Wednesdays, providing a platform for students interested in the sport. Interviews with Mr. Pandu, a physical education teacher, revealed that volleyball has overtaken soccer in popularity, with more students choosing to participate in volleyball. The school actively participates in local tournaments, particularly during Independence Day celebrations at the sub-district level, although the results have yet to meet expectations.

In volleyball, the serve is a fundamental skill that initiates attacks and creates scoring opportunities. Performance in serving depends not only on technical proficiency but also on physical factors such as arm muscle strength and arm length, both of which play a critical role in generating powerful and accurate overhand serves. Previous studies have demonstrated that arm muscle strength is strongly correlated with serving performance among extracurricular volleyball students (Kuncoro, 2020; Yono, Prasetyo, & Santoso, 2019). Additionally, longer arms are associated with higher serving accuracy, suggesting that anthropometric factors also influence serve outcomes (Mardiana & Hidayat, 2018). Research considering both arm strength and arm length provides a theoretical foundation for investigating their combined effects on overhand serve performance in male extracurricular volleyball students at SMA Negeri 1 Muara Padang.

During skill assessments, many students were observed to struggle with executing the overhand serve correctly. Common errors included serves that failed to reach the target, lacked sufficient force, or were inaccurately directed. The success of a serve is influenced by multiple factors, including ball speed, precision of contact, ball rotation, and placement in open areas of the opponent's court. Anthropometric considerations are also relevant; generally, taller individuals tend to have longer arms, and long, slender muscles enable faster and broader movements. A longer arm acts as a lever, increasing movement speed and resulting in greater ball velocity.

Recent studies have reinforced the importance of both arm muscle strength and arm length for overhand serve performance. Students with stronger arm muscles demonstrate faster and more accurate serves (Prasetyo et al., 2025), while longer arms allow players to generate more effective movements and achieve greater ball distance (Armansa et al., 2025). Furthermore, the combination of arm strength and arm length has been shown to have a significant impact on serve performance, highlighting the need to develop tailored strength training programs while considering individual anthropometric characteristics (Hasan et al., 2026; Universitas Sriwijaya, 2025). Strengthening arm muscles has been empirically shown

to improve overhand serve performance among volleyball extracurricular students, emphasizing the critical role of physical conditioning in technical skill development (Tiro, Kardi, & Nurhidayah, 2023).

Therefore, systematic training programs that enhance arm muscle strength while accounting for arm length are crucial for optimizing overhand serve performance in school-level volleyball players (Yusup, Nurudin, & Bachtiar, 2023; Setiawan, Mulyani, Kharisma, & Oktriani, 2025; Izah, Purwoto, Hidayatullah, Handayani, & Utami, 2025). Based on these considerations, this study aims to examine the extent to which arm muscle strength and arm length contribute to overhand serve performance in male extracurricular volleyball students at SMA Negeri 1 Muara Padang.

2. METHOD

This study utilized a correlational research method, which is specifically designed to examine the relationships between two or more variables, including the direction and strength of these relationships (Arikunto, 2020). The correlational approach is particularly useful in situations where the researcher seeks to identify whether certain variables are associated without manipulating the variables experimentally. This method allows for an in-depth understanding of naturally occurring relationships, making it especially suitable for educational and sports research, where experimental control is often limited and the ethical or practical feasibility of interventions may be constrained (Salkind, 2017). By using a correlational design, researchers are able to determine not only whether a relationship exists between variables but also the degree to which one variable may influence or predict another, providing valuable insights for both theory and practice (Creswell & Creswell, 2018; McLean et al., 2021; Fraenkel et al., 2019).

The population in this study consisted of 16 male students who participated in the volleyball extracurricular program at SMA Negeri 1 Muara Padang, Banyuasin. Because the population was relatively small and accessible, the study employed a total sampling technique, in which all members of the population were included as participants in the research. This approach ensured that the data represented the entire group, allowing for a more accurate and comprehensive assessment of the relationships between the variables under investigation.

For data collection, three specific types of tests were implemented to measure the independent and dependent variables. First, the Arm Muscle Strength Test was conducted using the push-up test, which is a widely recognized method for evaluating upper body muscular endurance and strength (Widiastuti, 2025). Second, arm length was measured using a standard measuring tape to obtain precise anthropometric data for each student. This measurement was intended to provide an objective indicator of one of the physical factors that may influence overhand serve performance. Third, the Overhand Serve Test was administered to assess students' volleyball skills, particularly their ability to perform overhand serves with accuracy, power, and control. The results of this test served as the dependent variable, reflecting the overall effectiveness of the students' serving abilities.

The data collected from these tests were analyzed using quantitative techniques. Initially, normality tests were conducted to ensure that the data for all variables were normally distributed, which is a prerequisite for parametric statistical analysis. Linearity tests were also performed to verify that the relationships between the independent variables (arm muscle strength and arm length) and the dependent variable (overhand serve performance) followed a linear pattern. Finally, hypothesis testing was carried out using correlation analysis, specifically the product-moment correlation coefficient, to examine the strength and significance of the relationships between the variables. This rigorous data analysis process enabled the researcher to determine not only the existence of relationships but also the extent

to which arm muscle strength and arm length contributed individually and collectively to overhand serve performance in male students participating in volleyball extracurricular activities at SMA Negeri 1 Muara Padang.

3. RESULT AND DISCUSSION

Result

3.1 Data Normality and Linearity

The results of the normality tests indicated that the significance values for arm muscle strength (X_1) and arm length ($_2$) were both 0.200, while the significance value for overhand serve performance (Y) was 0.083. Since all these values exceeded the alpha threshold of 0.05, it can be concluded that the data for all variables were normally distributed, fulfilling the prerequisite for parametric analysis.

Table 1. *Normality and Linearity of Variables*

Variable	Normality p-value	Linearity F_calculated	F_table	Linearity	Interpretation
Arm Muscle Strength (X_1)	0.200	1.098	3.81	Linear	Data normal, relationship with Y is linear
Arm Length (X_2)	0.200	1.257	3.81	Linear	Data normal, relationship with Y is linear
Overhand Serve Performance (Y)	0.083	-	-	-	Data normal

Linearity tests were subsequently conducted to assess whether the relationships between the independent variables and the dependent variable were linear. The analysis revealed that the F_calculated for the relationship between arm muscle strength (X_1) and overhand serve performance (Y) was 1.098, which is less than the F_table value of 3.81. Similarly, the F_calculated for arm length (X_2) in relation to overhand serve performance (Y) was 1.257, also below the F_table value of 3.81. These results confirm that the relationships between X_1 and Y, as well as X_2 and Y, are linear, thereby justifying the use of correlation and regression analyses.

3.2 Hypothesis Testing

Hypothesis testing was performed using the product-moment correlation coefficient. For Hypothesis 1, which examined the relationship between arm muscle strength (X_1) and overhand serve performance (Y), the calculated correlation coefficient (r_calculated) was 0.740, exceeding the critical r_table value of 0.514. This indicates a strong, positive, and significant relationship between arm muscle strength and the ability to perform an overhand serve.

Table 2. *Correlation between Variables and Overhand Serve Performance*

Hypothesis	Independent Variable(s)	Dependent Variable	r_calculated	r_table (α = 0.05)	Correlation Strength	Significance	Interpretation
H1	Arm Muscle Strength (X_1)	Overhand Serve (Y)	0.740	0.514	Strong	Significant	Strong positive relationship; higher muscle strength → better serve
H2	Arm Length	Overhand	0.565	0.514	Moderate	Significant	Moderate

	(X_2)	Serve (Y)					positive relationship; longer arms → better serve angle and reach
H3	$X_1 + X_2$ (combined effect)	Overhand Serve (Y)	0.562	0.514	Moderate	Significant	Combined variables positively affect serve performance; X_1 is dominant factor

Hypothesis 2 investigated the relationship between arm length (X_2) and overhand serve performance (Y). The results showed an r_calculated of 0.565, which is also greater than r_table (0.514), demonstrating a moderate and significant positive correlation. This finding suggests that students with longer arms tend to achieve better results in overhand serving.

Hypothesis 3 examined the combined influence of arm muscle strength and arm length on overhand serve performance. The product-moment correlation coefficient for this combined effect was 0.562, again exceeding the critical value of 0.514. This confirms that together, arm muscle strength and arm length have a significant positive effect on overhand serve performance, highlighting the importance of both physical strength and anthropometric characteristics in achieving optimal serve results.

The study examined the relationship between arm muscle strength, arm length, and overhand serve performance in volleyball students. All variables were normally distributed, and linearity tests indicated linear relationships between the independent variables and serve results. Arm muscle strength showed a strong positive correlation with serve performance (r = 0.740), indicating that stronger muscles help generate more power and control. Arm length also had a significant correlation (r = 0.565), as longer arms improve reach and serving angle. Together, muscle strength and arm length significantly influenced serve performance (r = 0.562), with muscle strength being the dominant factor. These results suggest that improving arm strength and optimizing serving technique can enhance overhand serve performance.

Discussion

The findings of this study indicate that arm muscle strength has a stronger influence on overhand serve performance than arm length, which is consistent with previous research emphasizing the critical role of muscular power in generating serve speed and accuracy (Prasetyo et al., 2025). The moderate correlation between arm length and serve performance aligns with the biomechanical principle that longer arms provide a greater lever radius, thereby enhancing ball velocity and movement efficiency (Armansa et al., 2025).

Furthermore, the combined effect of arm muscle strength and arm length demonstrates that optimal overhand serve performance is achieved when both factors are considered. Strength training programs that focus on developing arm muscles, while taking into account individual anthropometric characteristics, can therefore significantly improve technical skill execution in volleyball (Hasan et al., 2026; Tiro, Kardi, & Nurhidayah, 2023). These results underscore the practical implication that coaches and physical education instructors should design training regimens that simultaneously enhance muscle strength and accommodate physical attributes to maximize serve effectiveness in school-level volleyball players.

Overall, this study confirms that physical factors, particularly arm muscle strength and arm length, are significant predictors of overhand serve performance. Developing targeted strength and conditioning programs for extracurricular volleyball students can help improve

both skill accuracy and ball velocity, thereby contributing to enhanced overall performance in competitive settings.

4. CONCLUSION

Based on the results of this study, it can be concluded that arm muscle strength and arm length play a significant role in determining overhand serve performance among male students participating in the volleyball extracurricular activity at SMA Negeri 1 Muara Padang. Specifically, the analysis revealed a strong positive correlation between arm muscle strength and serve performance, with a calculated correlation coefficient (r_calculated = 0.740) exceeding the critical value (r_table = 0.518), indicating that students with greater arm strength are more likely to achieve higher serve accuracy and power. Similarly, arm length was found to have a moderate positive correlation with overhand serve performance (r_calculated = 0.565 > r_table = 0.518), suggesting that students with longer arms tend to generate more effective lever mechanics, which contributes to improved ball speed and control. When examined together, arm muscle strength and arm length also demonstrated a moderate combined effect on serve performance (r_calculated = 0.562 > r_table = 0.518), highlighting that optimal serve execution is influenced by both muscular and anthropometric factors working in conjunction. The combined contribution of these two variables to serve performance was calculated at 58% (0.580), indicating that over half of the variation in overhand serve outcomes can be explained by arm strength and length, while the remaining 42% is likely affected by other factors, such as coordination, technique, flexibility, and mental focus, which were not examined in this study. These findings underscore the importance of incorporating both strength training and consideration of individual physical characteristics into volleyball coaching programs to maximize students' serving abilities, while also pointing to the need for further research to explore additional variables that may influence serve performance, thereby providing a more comprehensive understanding of the factors that contribute to success in school-level volleyball competitions.

5. ACKNOWLEDGEMENT

For teachers and coaches, it is essential to develop and implement effective training programs aimed at improving overhand serve performance, while also identifying students who have the potential to become competitive volleyball athletes. This approach should take into account anatomical factors, such as arm muscle strength and arm length, which have been shown to significantly influence serve performance. For students, consistent and focused practice is crucial to enhance overhand serve ability. Emphasis should be placed on exercises that strengthen the arm muscles, given their substantial contribution to both the power and accuracy of serves. For future researchers, it is recommended to further refine and enhance the measurement instruments utilized in this study. Addressing the current limitations will improve the accuracy and reliability of assessments and provide a stronger basis for examining the relationships between physical factors and volleyball performance.

6. REFERENCES

AlZubaidi, A. H. A. (2025). Speed strength training and its impact on overhand serve performance in volleyball. *Indonesian Journal of Physical Education and Sport Science, 5*(3), 377–384. https://doi.org/10.52188/ijpess.v5i3.1409

Anggiana, Y., & Indahwati, N. (2023). The influence of physical activity on mental health of junior high school students. *Jurnal Pendidikan Olahraga, 15*(1), 1–10. https://doi.org/10.37630/jpo.v15i1.2389

Anwar, N. I. A. (2025). The role of physical education in improving students' physical and mental health: A literature review. *Jurnal Muara Olahraga, 8*(1), Article 3783. https://doi.org/10.52060/jmo.v8i1.3783

Arifin, M. B. U., & Nurdyansyah. (2018). *Buku ajar metodologi penelitian pendidikan.* Umsida Press. https://doi.org/10.21070/2018/978-602-5914-19-5

Arikunto, S. (2020). *Prosedur penelitian: Suatu pendekatan praktik* (Revisi VI). Rineka Cipta.

Armansa, I., Iyakrus, & Destriana. (2025). The relationship between arm muscle strength and arm length to the accuracy of overall services in extracurricular volleyball students at State Vocational High School 4 Palembang. *COMPETITOR: Journal of Sports Coaching Education, 17*(3), Article 316. https://doi.org/10.26858/cjpko.v17i3.316

Bailey, R., Hillman, C., Arent, S., & Petitpas, A. (2018). Physical activity: An underestimated investment in human capital? *Journal of Physical Activity and Health, 15*(2), 85–95. https://doi.org/10.1123/jpah.2017-0298

Biddle, S. J. H., Ciaccioni, S., Thomas, G., & Vergeer, I. (2019). Physical activity and mental health in children and adolescents: A review of reviews. *British Journal of Sports Medicine, 53*(8), 466–472. https://doi.org/10.1136/bjsports-2019-100969

Chen, S., Yang, H., & Li, X. (2020). Effects of school-based physical activity programs on health outcomes in children and adolescents: A meta-analysis. *International Journal of Environmental Research and Public Health, 17*(15), 5350. https://doi.org/10.3390/ijerph17155350

Cohen, L., Manion, L., & Morrison, K. (2018). *Research methods in education* (8th ed.). Routledge. https://doi.org/10.4324/9781315456539

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.

Donnelly, J. E., Hillman, C. H., Castelli, D., Etnier, J. L., Lee, S., Tomporowski, P., … Szabo-Reed, A. N. (2016). Physical activity, fitness, cognitive function, and academic achievement in children: A systematic review. *Medicine & Science in Sports & Exercise, 48*(6), 1197–1222.

Fatoni, F., & Raswadi, M. D. (2024). Correlation between physical fitness level and mental health in adolescents. *Jurnal Edukasi Citra Olahraga, 5*(2), 5471. https://doi.org/10.38048/jor.v5i2.5471

Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2019). *How to design and evaluate research in education* (10th ed.). McGraw-Hill Education.

Hasan, B., Putra, I. P. E. W., & Prasetyo, M. T. (2026). The relationship between arm muscle strength and volleyball service results: A meta-analysis study. *Journal of Physical Education and Active Pedagogy, 1*(1).

Izah, B., Purwoto, S. P., Hidayatullah, F., Handayani, H. Y., & Utami, T. S. (2025). Relationship between arm muscle strength and volleyball overhead service accuracy in athletes PBV Hizbul Wathan. *COMPETITOR: Journal of Sports Coaching Education, 17*(1), Article 73647. https://doi.org/10.26858/cjpko.v17i1.73647

Karim, N. N. F., & Hambali, B. H. (2023). Improving adolescent mental health through physical activity: A systematic literature review. *SPRINTER: Jurnal Ilmu Olahraga, 5*(2), 519. https://doi.org/10.46838/spr.v5i2.519

Kuncoro, A. D. (2020). Hubungan kekuatan otot lengan dan panjang lengan dengan hasil servis atas bola voli. *Jurnal PORKES, 12*(2), 45–52. https://e-journal.hamzanwadi.ac.id/index.php/porkes/article/view/4661

Lubans, D. R., Richards, J., Hillman, C. H., Faulkner, G., Beauchamp, M. R., Nilsson, M., … Biddle, S. J. H. (2016). Physical activity for cognitive and mental health in youth: A systematic review of mechanisms. *Pediatrics, 138*(3), e20161642. https://doi.org/10.1542/peds.2016-1642

Mardiana, R., & Hidayat, F. (2018). Pengaruh panjang lengan terhadap akurasi servis bola voli pada siswa SMA. *Jurnal Ilmu Keolahragaan, 6*(3), 21–28. https://journal.tofedu.or.id/index.php/journal/article/view/833

McLean, S. F., Cabaniss, K., & Hasson, F. (2021). *Understanding research methods: An overview of the essentials* (2nd ed.). Oxford University Press.

Mualip, M. (2023). The relationship between arm muscle strength and arm length on serve skills in volleyball at SMA VIP Al Huda Kebumen. *Journal on Education (JOE), 7*(2), Article 8269. https://doi.org/10.31004/joe.v7i2.8269

Mulyaningsih, F., Sumhendartin, A., Pertiwi, N. C., & Utama, A. B. (2021). The relationship of physical activity and healthy lifestyle with physical fitness among school sport extracurricular participants. *Majalah Ilmiah Olahraga (MAJORA), 29*(1), Article 64506. https://doi.org/10.21831/majora.v29i1.64506

Prasetyo, D. E., Burhan, M. A., & Henita, J. (2025). The effect of arm muscle strength on overhand service performance in volleyball extracurricular activities at SMPN 01 Koto Baru. *TOFEDU: The Future of Education Journal, 4*(7), 3402–3404. https://doi.org/10.61445/tofedu.v4i7.833

Riyanto, P., Gunawan, A., & Tambaip, B. (2025). Optimizing mental and physical health of adolescents through mindfulness exercise and functional sport programs. *Jurnal Kolaborasi Pengabdian Masyarakat Fakultas Ilmu Administrasi.* https://doi.org/10.37950/jkpemasfia.v3i1.2333

Sadzali, M. (2025). Recreational sports participation and its role in promoting a healthy lifestyle among adolescents. *Journal Physical Health Recreation (JPHR), 6*(1), 5199. https://doi.org/10.55081/jphr.v6i1.5199

Salkind, N. J. (2017). *Statistics for people who (think they) hate statistics* (6th ed.). SAGE Publications.

Santoso, B. A., Wahyudi, A., Adi, S., & Darmanto, F. (2024). Contribution of arm muscle strength and arm length to overhand serve ability. *Indonesian Journal for Physical Education and Sport, 5*(2), Article 8443. https://doi.org/10.15294/inapes.v5i2.8443

Setiawan, A., Mulyani, S., Kharisma, Y., & Oktriani, S. (2025). Relationship of arm muscle strength with upper serve skills in volleyball. *Journal of Physical Activity and Sports (JPAS), 6*(1), 33–38. https://doi.org/10.53869/jpas.v6i1.315

Sugiyono. (2024). *Metode penelitian kuantitatif.* Alfabeta.

Tiro, O., Kardi, I. S., & Nurhidayah, D. (2023). The effect of arm muscle strength training on overhand serve ability in volleyball. *Jurnal Olahraga Papua, 6*(2), Article 4865. https://doi.org/10.31957/jop.v6i02.4865

Warburton, D. E. R., & Bredin, S. S. D. (2017). Health benefits of physical activity: A systematic review of current systematic reviews. *Current Opinion in Cardiology, 32*(5), 541–556.

Yono, T., Prasetyo, H., & Santoso, B. (2019). Hubungan latihan kekuatan otot lengan dengan ketepatan servis bola voli. *Bravo's: Journal of Physical Education and Sport Science, 7*(1), 33–40. https://bravos.upjb.ac.id/index.php/bravos/article/view/92

Yusup, M., Nurudin, A. A., & Bachtiar, B. (2023). The relationship between arm muscle strength, arm length, and hand-eye coordination on volleyball serve results. *Jurnal Bintang Pendidikan Indonesia, 2*(4), Article 3304. https://doi.org/10.55606/jubpi.v2i4.3304