Jurnal Pendidikan Jasmani dan Olahraga

Journal homepage: http://ejournal.upi.edu/index.php/penjas/index

Effectiveness of Physical Fitness and Training Facilities in Enhancing Volleyball Athlete Performance: The Mediating Role of Mental Readiness

Irawati[1], M.Iqbal Hasanuddin[2], Harmita Sari[3] , Natan Senobua[4], Muhammad Firman Halip[5]*

[1,]Muhammadiyah University of Palopo, Indonesia
[2]Al Asyariah Mandar University, Indonesia
*Correspondence: E-mail: Irhagi07@gmail.com

ABSTRACT

This study investigated the contributions of physical fitness and training facilities to volleyball athlete performance within an integrated framework incorporating mental readiness. The research was motivated by suboptimal regional competitive achievements, highlighting the need for an evidence-based athlete development approach. A quantitative cross-sectional survey design was employed. The data were analysed using covariance-based Structural Equation Modelling (SEM) with AMOS. The samples consisted of 120 active volleyball athletes representing several clubs and competitive levels from 12 regencies and cities in South Sulawesi under the supervision of local PBVSI organizations. The instrument validity and reliability were confirmed through Confirmatory Factor Analysis prior to testing the structural relationships. The results revealed that physical fitness and training facilities had significant positive direct effects on athletic performance and also significantly influenced mental readiness. However, mental readiness did not demonstrate a statistically significant direct relationship with performance. The structural model achieved acceptable goodness-of-fit indices, indicating adequate model fit. Overall, the findings suggest that volleyball performance is primarily influenced by physiological capacity and infrastructural support, while psychological readiness serves as a complementary factor in athlete development.

ARTICLE INFO

Article History:
Submitted/Received March 2026
First Revised March 2026
Accepted March 2026
Publication Date April 2026

Keyword:
athletic performance, mental readiness, physical fitness, training facilities

INTRODUCTION

Volleyball performance represents an important indicator of the effectiveness of regional sport development systems. Although volleyball is widely recognized as one of the most popular sports and has received institutional support within South Sulawesi athletic development agenda, recent national competition results have not shown significant progress. During the last three editions of the National Sports Week (PON 2016 West Java, PON 2021 Papua, and PON 2024 Aceh–North Sumatra), the team was eliminated in the preliminary rounds. This recurring outcome suggests structural challenges within the regional athlete development system.

Local sport authorities have attempted to strengthen volleyball development through improvements in training facilities and the professional development of coaches and referees (Haetami et al., 2023; Roji et al., 2025). However, the absence of a consistently structured provincial competition system has limited athlete exposures to high-intensity competitive environments. Limited competition experience may reduce psychological resilience and competitive confidence, which are essential for managing performance pressure during matches (Fitriani et al., 2025; Sobko et al., 2024). These conditions indicate the need for a more comprehensive and empirically grounded approach to athlete development.

From a theoretical perspective, athletic performance is influenced by the interaction of physiological capacity, psychological readiness, and the training environment. In volleyball, physical fitness represents a fundamental determinant of performance because the sport requires muscular strength, endurance, speed, and neuromuscular coordination (Cereda, 2025; Martin et al., 2024; Rebelo et al., 2022). Previous studies show that conditioning programs can improve agility, speed, and explosive power, which are essential for technical skills such as spiking and serving (Jafar et al., 2023; Raiola et al., 2025; Xiao et al., 2025).

Training facilities also represent a critical environmental factor that supports athlete development. Adequate infrastructure provides a safe and structured training environment that can enhance motivation and the effectiveness of training programs (Fitri et al., 2022; Gregori-Faus et al., 2025). Nevertheless, disparities in facility standards remain a challenge in several regions, including South Sulawesi. Studies have reported that effective facility management is positively associated with improvements in the athlete physical performance (Ishak et al., 2025).

In addition to physical and environmental factors, mental readiness plays a crucial role in managing competitive pressure. Athletes with stronger psychological skills tend to demonstrate lower levels of competitive anxiety and greater emotional control during matches (Khoirunisa et al., 2024). Psychological interventions such as self-talk and emotional regulation training have also been shown to improve performance consistency and technical execution (Aulia et al., 2025; Ilham et al., 2022; Rogowska & Tataruch, 2024).

Despite growing research on physical fitness, training facilities, and mental readiness, most previous studies examine these variables separately. Empirical research integrating these three dimensions within a single analytical framework remains limited, particularly in the volleyball athletes. This limitation indicates a research gap in understanding how physiological, environmental, and psychological factors simultaneously influence athletic performance.

DOI: https://doi.org/10.17509/jpjo.v11i1.91543
p- 2085-6180 e- ISSN 2580-071X

To address this gap, this study developed a structural model that integrates physical fitness, training facilities, and mental readiness in explaining volleyball athlete performance. Using Structural Equation Modeling (SEM), this research examined both direct and indirect relationships among these variables and evaluated the mediating role of mental readiness. The study contributes to sports science literature by providing an integrative empirical model that combines physiological, environmental, and psychological determinants of athletic performance.

METHODS

Research Design

The research adopted a quantitative cross-sectional research design using an explanatory survey approach to examine the relationships among the study variables. Data were collected at a single point in time from volleyball athletes to analyze the structural relationships among physical fitness, training facilities, mental readiness, and athletic performance. In the proposed framework, physical fitness and training facilities were treated as exogenous variables, athletic performance as the endogenous outcome variable, and mental readiness as a mediating construct.

The proposed hypotheses were tested using Structural Equation Modeling (SEM). This analytical technique was selected because SEM enables the simultaneous examination of multiple relationships among latent variables, including both direct and indirect effects within a single comprehensive model (Hair et al., 2018). Therefore, SEM is considered appropriate for evaluating the complex relationships among physical fitness, training facilities, mental readiness, and athletic performance.

Participants

The participants of this study were active volleyball athletes in South Sulawesi who were registered with local clubs or regional sport governing bodies. A total of 175 athletes were invited to participate in the online survey. However, only 120 responses met the inclusion criteria and were considered valid for analysis. All respondents were actively engaged in structured training programs and had participated in at least one competitive season.

The athletes represented several volleyball clubs and competitive levels within the South Sulawesi regional development system. Specifically, the participants originated from 12 regencies and cities under the supervision of the Indonesian Volleyball Association (PBVSI) at the regency/municipal level. Many of these athletes regularly participated in regional leagues and provincial-level tournaments organized within the provincial competition structure. This distribution allowed the sample to capture a variety of competitive experiences and training environments across the regional volleyball ecosystem. Consequently, the selected participants were considered sufficiently representative of actively competing volleyball athletes in South Sulawesi who were involved in structured coaching and competitive programs.

Sampling Procedures

A non-probability sampling technique was applied, combining convenience and purposive approaches. Athletes were selected based on predefined eligibility criteria, namely active participation in organized training programs and competitive involvement. The survey link was distributed through club administrators and coaches using Google Forms between November 1 and December 1, 2025.

Of the 175 athletes contacted, 120 provided complete and eligible responses. No financial incentives were offered for participation. Involvement in the study was entirely based on free consent, with respondents allowed to discontinue their participation at any stage of the survey process.

DOI: https://doi.org/10.17509/jpjo.v11i1.91543
p- 2085-6180 e- ISSN 2580-071X

The determination of sample size followed SEM methodological recommendations, which suggest a minimum of 5–10 respondents per observed indicator. With a total of 20 primary indicators were included in the measurement model. The final sample of 120 participants satisfied the minimum requirements for structural model estimation and hypothesis testing.

Materials and Apparatus

Information was collected using a structured questionnaire employing a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). All measurement constructs were adapted from previously validated instruments to ensure conceptual validity and measurement reliability.

Physical fitness was operationalized as an athlete perceived capacity to perform volleyball-related physical demands, including strength, endurance, agility, and recovery ability. This construct was measured using five items adapted from Keoliya et al. (2024). Example statements included "I regularly perform strength training such as squats, lunges, or plyometric exercises at least twice per week" and "my cardiovascular endurance allows me to compete effectively during a full match."

Training facilities were defined as the availability, quality, and adequacy of infrastructure and equipment supporting the training process. The construct consisted of five items adapted from Fitriyani et al. (2024) along with Martin et al. (2024). Sample statements included "the training court and equipment are consistently available and maintained in good condition during training sessions" and "the available facilities support the implementation of the training program recommended by the coach."

Mental readiness referred to an athlete psychological preparedness to manage competitive pressure, maintain focus, and regulate emotions during the training and competition. This variable was measured using five items adapted from Machado et al. (2023) in addition to Gajardo-Burgos et al. (2023). Example items included "I am able to maintain focus during important matches" and "I can control anxiety when facing strong opponents."

Athletic performance represented an athlete perceived competitive performance and contribution to team outcomes during the season. The construct included five items adapted from Costa et al. (2024). Example statements included "my technical performance (serving, passing, spiking, blocking) has improved compared to the previous season" and "my contribution has a meaningful impact on the team competitive results."

Construct validity was assessed through Confirmatory Factor Analysis (CFA). The results demonstrated Composite Reliability (CR) values exceeding 0.70 and Average Variance Extracted (AVE) values above 0.50 across all constructs, indicating satisfactory internal consistency and convergent validity.

Procedures

The survey was administered electronically through the Google Forms platform. Before accessing the questionnaire items, respondents received a detailed explanation describing the purpose of the investigation, guarantees regarding data privacy and confidentiality, as well as clarification that participation was entirely optional. Participants were required to provide electronic consent to indicate their agreement before proceeding to complete the survey.

The study adopted a non-experimental design, involving no manipulation of variables or assignment to treatment groups. Physical fitness (X1) and training facilities (X2) were specified as independent variables, mental readiness (Z) as the mediating variable, and athletic performance (Y) as the dependent variable. The researcher did not directly engage in the athlete training activities and functioned solely as a data collector and analyst.

DOI: https://doi.org/10.17509/jpjo.v11i1.91543
p- 2085-6180 e- ISSN 2580-071X

Design or Data Analysis

Data analysis was conducted using SPSS version 23 and AMOS software. The initial stage involved descriptive statistical analysis to summarize respondent characteristics and examine the distribution of the collected data. Internal consistency reliability of the measurement items was assessed using Cronbach's alpha coefficients.

The measurement model was subsequently evaluated using Confirmatory Factor Analysis (CFA) to assess the validity and reliability of the latent constructs. Convergent validity was examined through standardized factor loadings, Composite Reliability (CR), and Average Variance Extracted (AVE). Factor loadings above 0.50, CR values greater than 0.70, and AVE values exceeding 0.50 were considered indicative of acceptable construct validity and reliability.

After the adequacy of the measurement model was confirmed, the structural model was analyzed using Structural Equation Modeling (SEM) to test the hypothesized relationships among physical fitness, training facilities, mental readiness, and athletic performance. Model fit was evaluated using multiple goodness-of-fit indices, including the chi-square to degrees of freedom ratio (χ^2/df), Goodness-of-Fit Index (GFI), Comparative Fit Index (CFI), Normed Fit Index (NFI), Incremental Fit Index (IFI), and Root Mean Square Error of Approximation (RMSEA), following the guidelines proposed by Byrne (2016) and Hair et al. (2018).

To examine the mediating role of mental readiness, a bootstrapping procedure with 5,000 resamples was conducted to estimate the significance of indirect effects. Mediation was considered significant when the bootstrapped confidence interval did not include zero, in accordance with the mediation testing approach recommended by Hayes (2013).

RESULTS

Prior to conducting primary data collection, a pilot study was carried out for the purpose of assessing the clarity of the questionnaire statements as well as confirming content validity. Input obtained during the pilot phase served as the basis for refining wording and enhancing item comprehensibility. A total of 175 volleyball athletes were invited to participate in the main study, of whom 120 provided complete and analyzable responses.

Table 1. Respondent Demographics

Demographic Items	Frequency	Percentage (%)
Gender		
Male	48	40.0
Female	72	60.0
Age		
Under 20 years old	55	45.8
21-25 years old	58	48.3
26-30 years old	7	5.8
Level of Competition		
Provincial Level	100	83.3
National Level	20	16.7

Based on Table 1, the majority of respondents were female (60%), while male athletes accounted for 40% of the sample. In terms of age distribution, most participants were between 21 and 25 years old (48.3%), followed closely by those under 20 years of age (45.8%). Only a small proportion of respondents fell within the 26–30-year age range (5.8%). Regarding competitive levels, the majority of athletes competed at the provincial level (83.3%), whereas 16.7% had experience competing at the national level.

DOI: https://doi.org/10.17509/jpjo.v11i1.91543
p- 2085-6180 e- ISSN 2580-071X

Table 2. Descriptive Statistics Correlation Matrix among Variables

Constructs	Mean	SD	PF	TF	MR	AP
PF	3.94	0.60	-			
TF	3.96	0.65	0.610	-		
MR	4.11	0.61	0.700	0.620	-	
AP	3.91	0.64	0.656	0.621	0.754	-

Note: PF = Physical Fitness; TL = Training Facilities; MR = Mental Readiness; AP = Athletic Performance; SD = Standard Deviation.

Descriptive statistics and the correlation matrix among the study variables are presented in Table 2. The results show that all variables have relatively high mean scores, ranging from 3.91 to 4.11, indicating generally positive responses from the athletes. The correlation analysis demonstrates positive relationships among all variables examined in this study. Physical fitness is strongly associated with mental readiness (r = 0.700) and athletic performance (r = 0.656). Training facilities are also positively correlated with mental readiness (r = 0.606) and athletic performance (r = 0.621). Among all variables, mental readiness exhibits the strongest relationship with athletic performance (r = 0.754), suggesting that psychological preparedness plays a crucial role in shaping an athlete competitive performance.

Table 3. Measurement Model Results

Construct	Indicator	Factor Loading	Composite Reliability	AVE
Physical Fitness	PF1	0.573	0,958	0.822
	PF2	0.699		
	PF3	0.595		
	PF4	0.669		
	PF5	0.700		
Training Facilities	TF1	0.558	0.916	0.685
	TF2	0.772		
	TF3	0.677		
	TF4	0.833		
	TF5	0.787		
Mental Readiness	MR1	0.739	0.931	0.819
	MR2	0.720		
	MR3	0.735		
	MR4	0.790		
	MR5	0.654		
Athletic Performance	AP1	0.713	0.959	0.825
	AP2	0.676		
	AP3	0.798		
	AP4	0.670		
	AP5	0.713		

Table 3 presents the standardized factor loadings, composite reliability (CR), and average variance extracted (AVE) for each construct. All standardized factor loadings exceeded the recommended minimum threshold of 0.50, indicating satisfactory indicator reliability. Composite reliability values ranged from 0.916 to 0.959, surpassing the commonly accepted cutoff of 0.70 and demonstrating strong internal consistency across constructs. The AVE values ranged from 0.685 to 0.825, all exceeding the minimum criterion of 0.50, thereby supporting convergent validity. Overall, these findings indicate that the measurement model exhibits robust reliability and validity, justifying its suitability for subsequent structural model testing.

DOI: https://doi.org/10.17509/jpjo.v11i1.91543
p- 2085-6180 e- ISSN 2580-071X

Table 4. Proposed Model Results

Relationship	Path Coefficient (β)	p-value	Test Results
Physical Fitness → Athletic Performance	0.184	0.000	Supported
Training Facilities → Athletic Performance	0.170	0.000	Supported
Mental Readiness → Athletic Performance	0.639	0.298	Unsupported
Physical Fitness → Mental Readiness	0.751	0.002	Supported
Training Facilities → Mental Readiness	0.303	0.045	Supported

Note: $p < 0.05$

The structural model results reveal important relationships among the variables examined in this study. First, physical fitness was found to have a significant positive effect on athletic performance (β = 0.184, p = 0.000). Similarly, training facilities also showed a significant positive influence on athletic performance (β = 0.170, p = 0.000). However, mental readiness did not demonstrate a significant direct effect on athletic performance (β = 0.639, p = 0.298). Furthermore, physical fitness was found to significantly influence mental readiness (β = 0.751, p = 0.002). Training facilities also significantly affected mental readiness (β = 0.303, p = 0.045).

DISCUSSION

The empirical findings of the present study demonstrate that physical fitness, training facilities, and mental readiness collectively contribute to volleyball athlete performance. These results reinforce the conceptual framework that sport achievement emerges from the multidimensional interaction among physiological capacity, psychological preparedness, and the quality of the training environment. Within volleyball development in South Sulawesi, the present findings provide empirical evidence supporting concerns regarding inconsistent competitive performance in national competitions, suggesting that multiple performance determinants must be addressed simultaneously.

The first major finding indicates that physical fitness has a significant positive influence on athletic performance. This result aligns with the well-established understanding that volleyball requires a high level of explosive power, muscular endurance, agility, and coordinated movement (Esposito et al., 2024; Mohammadreza & Ghazalian, 2023). Empirical research has consistently shown that structured physical training programs enhance agility and reaction speed, which directly contribute to improved execution of essential volleyball techniques such as spiking, blocking, and serving (Amiri et al., 2025; Martin et al., 2024; Raiola et al., 2025). Furthermore, explosive strength and muscular endurance have been found to correlate positively with match performance indicators and competitive outcomes (Budiyanto & Komari, 2025). The present findings therefore strengthen the argument that physical fitness should not merely be considered a supporting component but rather a central determinant of competitive achievement. In regional settings where national competition results have not yet met expectations, strengthening scientifically periodized conditioning programs represents a crucial strategic step for improving long-term athlete performance.

In addition to physical conditioning, training facilities were also found to significantly influence athletic performance. This finding supports the perspective that sport infrastructure plays a fundamental role in shaping the quality and effectiveness of the training process (Karemu et al., 2024). Adequate facilities enable athletes to perform technical and physical training in an optimal environment, thereby improving both skill development and performance outcomes. Previous research emphasizes that appropriate sport facilities can enhance training motivation, increase training efficiency, and support structured training programs (Fitri et al., 2022). Moreover, effective facility management has been associated with measurable improvements in athlete physical performance and training outcomes (Ishak

DOI: https://doi.org/10.17509/jpjo.v11i1.91543
p- 2085-6180 e- ISSN 2580-071X

et al., 2025). In South Sulawesi, variations in facility quality and limitations in infrastructure management may represent structural challenges that constrain consistent athlete development. Consequently, the present findings highlight the importance of infrastructure investment and facility management as strategic components of regional sport development policies.

Interestingly, the present study found that mental readiness did not exhibit a statistically significant direct relationship with athletic performance. Although the path coefficient indicated a positive direction, the absence of statistical significance suggests that psychological preparedness alone may not independently predict measurable performance outcomes within the present sample. This finding contrasts with several previous studies emphasizing the role of psychological skills such as emotional regulation, mental toughness, and structured self-talk in enhancing competitive performance (Aulia et al., 2025; Demir et al., 2025; Nikijuluw et al., 2024). One possible explanation is that in performance-oriented sports such as volleyball, psychological attributes often function as enabling conditions rather than primary determinants of observable performance indicators. While mental readiness may improve an athlete ability to maintain concentration, manage competitive anxiety, and sustain motivation during matches. The translation of these psychological advantages into measurable performance outcomes may depend heavily on the athlete underlying physical capacity and technical competence.

From a theoretical perspective, this finding may also be explained through the hierarchical structure of sport performance determinants. Physiological readiness often constitutes the foundational layer that supports technical execution and tactical decision-making during competition (Dambroz & Teoldo, 2023; Qiao et al., 2025). Psychological factors, including mental readiness, may therefore operate as complementary mechanisms that enhance performance consistency rather than directly determining performance (Alecu & Onea, 2025; Kelemen et al., 2024). In situations where athletes already possess relatively similar psychological preparedness levels, such as among athletes who participate in regular structured training and competitive seasons, the statistical influence of mental readiness may become less pronounced. Limited variability in psychological readiness among participants can reduce its explanatory power within structural models.

Despite the non-significant direct effect on performance, mental readiness was significantly influenced by both physical fitness and training facilities. Athletes who perceive themselves as physically prepared may experience greater self-confidence and emotional stability during competition (Ayranci & Aydin, 2025; Feng et al., 2025; Predoiu et al., 2025). Similarly, structured and well-managed training environments can foster psychological comfort, reduce performance-related anxiety, and strengthen attentional focus (Azadi et al., 2024; Yu et al., 2024). These findings indicate that physical and environmental factors contribute to psychological preparedness. However, the absence of a significant pathway from mental readiness to athletic performance means that its mediating role is not empirically supported in the present structural model.

From a conceptual standpoint, the present research extends existing scholarship through integrating physical fitness, training facilities, and mental readiness within an integrated structural model. Although earlier investigations have commonly explored these variables independently (Alagoz et al., 2025; Deliceoğlu et al., 2024; Villaseca-Vicuña et al., 2021), the present findings clarify that physical and infrastructural determinants play a more dominant direct role in shaping measurable volleyball performance outcomes. The model therefore supports a systems-based coaching approach that prioritizes conditioning quality and

DOI: https://doi.org/10.17509/jpjo.v11i1.91543
p- 2085-6180 e- ISSN 2580-071X

infrastructure optimization while maintaining psychological development as a complementary component rather than a primary performance driver.

The practical implications of these findings are relevant for several stakeholders involved in athlete development. For coaches, the results highlight the importance of prioritizing scientifically designed physical conditioning programs that focus on developing explosive strength, agility, and endurance capacities required for volleyball performance. Integrating structured strength and conditioning routines alongside technical training sessions can ensure that athletes possess the physical capacity necessary to execute complex skills during competition. Although psychological training remains relevant, the findings suggest that mental skill development may be most effective when integrated with physical and tactical training rather than implemented as a standalone intervention.

For sport development organizations, the findings emphasize the strategic importance of improving training infrastructure and facility management systems. Adequate sport facilities, including well-maintained courts, appropriate training equipment, and recovery facilities, enable athletes to conduct high-quality training sessions that support long-term performance development. Organizations responsible for regional athlete development should therefore prioritize investments in facility maintenance, modernization of training equipment, and the establishment of structured training environments that promote consistent athlete development.

For regional sport policy makers, the present findings highlight the need for integrated sport development policies that combine infrastructure investment with evidence-based training systems. Policies aimed at strengthening regional sport competitiveness should prioritize expanding access to quality training facilities, supporting sport science-based coaching education, and developing systematic athlete development programs. Through coordinated efforts involving infrastructure development, coaching capacity building, and athlete conditioning programs, regional sport authorities may establish a more sustainable ecosystem for producing higher levels of competitive performance.

Nevertheless, several limitations should be acknowledged. The present study employed a cross-sectional research design, which restricts the ability to establish causal relationships over time. Future research utilizing longitudinal or experimental designs may provide deeper insights into the dynamic relationships among physical, psychological, and environmental determinants of athletic performance. Additionally, future studies could examine potential moderating variables such as competitive experience, match pressure intensity, or coaching quality in order to better understand the conditional role of psychological factors in shaping athlete performance.

CONCLUSION

This study concludes that physical fitness and training facilities significantly influence volleyball athlete performance within the proposed structural model. Physical fitness emerged as the strongest direct predictor of performance, while training facilities also demonstrated a meaningful contribution, highlighting the importance of both physiological preparation and infrastructural support. Although mental readiness was positively influenced by physical fitness and training facilities, it did not show a statistically significant direct effect on athletic performance. Consequently, its mediating role was not supported in this study. Overall, the findings emphasize that performance enhancement strategies should prioritize scientifically based physical conditioning and the optimization of training infrastructure, while

DOI: https://doi.org/10.17509/jpjo.v11i1.91543
p- 2085-6180 e- ISSN 2580-071X

psychological development remains a complementary component of athlete preparation rather than a primary determinant of competitive outcomes.

AUTHORS' NOTE

The authors declare no conflict of interest.

REFERENCES

Alagoz, I., Demirkan, E., Ozkadi, T., & Yildirim, T. (2025). The effect of sports on mental performance according to skill types in youth athletes. *BMC Sports Science, Medicine and Rehabilitation*, *17*(1), 1–10.

Alecu, S., & Onea, G. A. (2025). Readiness for competition across sports and genders: a study on psychological skills intervention. *Frontiers in Psychology*, *16*, 1–15. h

Amiri, S., Mohammadi, H., Watt, P., Shakiba, E., & Shahrjerdi, S. (2025). The Impact of a Structured Volleyball-Specific Fitness Training on the Performance of Female Volleyball Players. *Women in Sport and Physical Activity Journal*, *33*(1), 1–9.

Aulia, P., Puspasari, D., Maharani, P., Safitri, S. N., Yulitri, S., Rahmah, J. H., Hazizah, I. Z., & Dani, F. R. (2025). The effectiveness of self-talk to increase self-confidence, emotional regulation and motivation in athletes. *Retos*, *65*, 285–292.

Ayranci, M., & Aydin, M. K. (2025). The complex interplay between psychological factors and sports performance: A systematic review and meta-analysis. *Plos One*, *20*(8), 1–24.

Azadi, H., Meshkati, Z., & Rice, S. (2024). The effects of training conditions on athletes' mental health throughout the COVID-19 pandemic: Psychometric validation of the Persian athlete psychological strain questionnaire. *Apunts Sports Medicine*, *59*(1).

Budiyanto, A., & Komari, A. (2025). Correlation between the Leg Length , Leg Muscle Explosive Power , Speed , and Body Mass Index (BMI) towards the Outcomes of Kids Athletics. *Kinestetik : Jurnal Ilmiah Pendidikan Jasmani*, *9*(1), 84–97.

Byrne, B. M. (2016). *Structural Equation Modeling with AMOS: Basic Concepts, Applications, and Programming* (3rd ed.). Routledge.

Cereda, F. (2025). Physical Fitness Profile of Elite Female Volleyball Players: An Observational Study Correlating Bioimpedance Vector Analysis (BIVA) with Field-Based Testing. *Journal of Science in Sport and Exercise*, 1-11.

Costa, C. L. A., Valentini, N. C., Nascimento, E. M. Do, & Ugrinowitsch, H. (2024). Validity and reliability of the volleyball serve accuracy-test. *Journal of Human Sport and Exercise*, *19*(2), 570–578.

Dambroz, F., & Teoldo, I. (2023). Better decision-making skills support tactical behaviour and reduce physical wear under physical fatigue in soccer. *Frontiers in Physiology*, *14*, 1–9.

Deliceoğlu, G., Kabak, B., Çakır, V. O., Ceylan, H. İ., Raul-Ioan, M., Alexe, D. I., & Stefanica, V. (2024). Respiratory Muscle Strength as a Predictor of VO2max and Aerobic Endurance in Competitive Athletes. *Applied Sciences (Switzerland)*, *14*(19),1-17.

Demir, G. T., Namlı, S., Çakır, E., Batu, B., Ateş, F., Yılmaz, E., Güvendi, B., Adaş, S. K., & Çağın, M. (2025). The role of mental toughness, sport imagery and anxiety in athletic performance: structural equation modelling analysis. *BMC Psychology*, *13*(1).

Esposito, G., Altavilla, G., Giardullo, G., Ceruso, R., & D'isanto, T. (2024). The Effects of the Use of Plyometric Exercises with and without the Ball in the Development of Explosive Strength in Volleyball. *Journal of Functional Morphology and Kinesiology*, *9*(3).

Feng, Y., Sun, Y., & Hang, C. (2025). Multimodal fusion for athlete state prediction leveraging XLNet and deep generative models. *Alexandria Engineering Journal*, *129*, 925–936.

Fitri, M., Abidin, N. E. Z., Novan, N. A., Kumalasari, I., Haris, F., Mulyana, B., Khoo, S., & Yaacob,

N. (2022). Accessibility of Inclusive Sports Facilities for Training and Competition in Indonesia and Malaysia. *Sustainability (Switzerland)*, *14*(21), 1–12.

Fitriani, I. N., Anggara, N., & Perdinanto. (2025). Mental Readiness Of Banjarbaru Male Volleyball Athletes In Facing The 2025 Provincial Championship. *Kinestetik : Jurnal Ilmiah Pendidikan Jasmani*, *9*(2), 419–426.

Fitriyani, A., Rahayu, S., & Hartono, M. (2024). Analysis of the Implementation of the Sports Achievement Development System in Koni , Kendal Regency. *Journal of Physical Education and Sports*, *13*(1), 28–37.

Gajardo-Burgos, R., Valdebenito-Tejos, C., Gálvez-García, G., & Bascour-Sandoval, C. (2023). Pain and Psychological Readiness to Return to Sport in Elite Volleyball Players: A Cross-Sectional Study. *International Journal of Environmental Research and Public Health*, *20*(3), 1–10.

Gregori-Faus, C., Crespo, J., Calabuig, F., & Parra-Camacho, D. (2025). State-of-the-art of sustainability in sports facilities : a systematic review. *Environment, Development and Sustainability*.

Haetami, M., Gandasari, M. F., Pranata, D., Atiq, A., Perdana, R. P., & Sastaman, P. (2023). Pelatihan Perwasitan Olahraga Permainan Bola Voli Tingkat Provinsi Kalimantan Barat. *Jurnal Bina Pengabdian Kepada Masyarakat*, *4*(1), 114-121.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2018). *Multivariate Data Analysis* (8th ed.). Cengage Learning.

Hayes, A. F. (2013). Mediation, moderation, and conditional process analysis. *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*, *1*(6), 12-20.

Ilham, M., Oktafiranda, N. D., & Antoni, R. (2022). Correlation between mental skills and anxiety during the covid-19 pandemic in university volleyball athletes. *Gladi : Jurnal Ilmu Keolahragaan*, *13*(1), 61–75.

Ishak, M., Awaluddin, & Hasanuddin, M. I. (2025). A Comprehensive Approach to Facility Management in Enhancing Physical Fitness and Sports Performance. *Indonesian Journal of Sport Management*, *5*(2), 307–322.

Jafar, M., Rinaldy, A., & Yunus, M. (2023). Improving student motor skills through a structured physical training program. *Journal of Advances in Sports and Physical Education*, *6*(05), 82-95.

Karemu, L. K., Maithya, P., & Kisirkoi, F. (2024). Assessing the Association between Provision of Sports Facilities and Student Sporting Talent Development in Public Secondary Schools in Meru County, Kenya. *International Journal of Research and Innovation in Social Science (IJRISS)*, *7*(3), 5376–5381.

Kelemen, B., Tóth, R., Benczenleitner, O., & Tóth, L. (2024). Mental preparation in runners: gender differences, competition levels, and psychological training effects on performance. *Frontiers in Sports and Active Living*, *6*.1–11.

Keoliya, A. A., Ramteke, S. U., Boob, M. A., & Somaiya, K. J. (2024). Enhancing Volleyball Athlete Performance: A Comprehensive Review of Training Interventions and Their Impact on Agility, Explosive Power, and Strength. *Cureus*, *16*(1), 1–7.

Khoirunisa, N. T., Nugraha, R., & Salman, S. (2024). The Relationship Between Mental Toughness and Sports Anxiety in Volleyball Athletes. *JUMORA: Jurnal Moderasi Olahraga*, *4*(2), 173–183.

Machado, T. do A., Paes, M. J., Lirani, L. da S., Mara, J., & Stefanello, F. (2023). Validation of the Self-Efficacy in Volleyball Scale for Youth Athletes (VSES-B). *Psicologia - Teoria e Prática*, *25*(2), 1–21.

Martin, Ștefan A., Gavra, M. G., & Martin-Hadmaș, R. M. (2024). Analyzing Targeted Muscle Strength: Impact on Speed, Endurance, and Performance in Female Volleyball. *Applied Sciences (Switzerland)*, *14*(23), 1–16.

Mohammadreza, T. H., & Ghazalian, F. (2023). The Effect of Six Weeks of Specific Volleyball

DOI: https://doi.org/10.17509/jpjo.v11i1.91543
p- 2085-6180 e- ISSN 2580-071X

Training and Plyometric Exercises on the Physical Performance of Female Volleyball Players. *International Journal of Sports Science and Physical Education*, *8*(3), 22–31. https://doi.org/10.11648/j.ijsspe.20230803.11

Nikijuluw, A. L., Sunadi, D., Syafriani, R., Sri Ramania, N., & Hidayat, Y. (2024). The Effectiveness of Self-Talk in Enhancing Athletic Performance and Mental Resilience: A Systematic Review. *Journal of Teaching Physical Education in Elementary School*, *8*(10), 47–54.

Predoiu, R., Bertollo, M., Piotrowski, A., Stănescu, R., Hamdi, F., Szabo, G., & Cosma, G. (2025). Psychological resilience in Olympic combat sports. *Frontiers in Psychology*, *16*(June), 1–9.

Qiao, W., Hua, K., Zhang, J., Song, D., Li, J., Chen, X., & Liang, D. (2025). Higher Heart Rate Intensity Can Negatively Impact Tactical Decision-Making and Technical Accuracy in Small-Sided Games: A Study on The Effects of Field Size and Scoring Method Manipulation. *Journal of Sports Science and Medicine*, *24*(3), 522–531. https://doi.org/10.52082/jssm.2025.522

Raiola, G., Esposito, G., Aliberti, S., & D'Elia, F. (2025). Effects on Performance, Perception, and Awareness of Plyometric Training in Youth Volleyball: A Novel Methodological Approach to Training. *Applied Sciences (Switzerland)*, *15*(3), 1–12.

Rebelo, A., Valente-Dos-Santos, J., Pires, I. G., Arrais, I., Pereira, J. R., & Turner, A. N. (2022). Strength and Conditioning for Volleyball: A Review. *Strength and Conditioning Journal*, *47*(5), 499–517.

Rogowska, A. M., & Tataruch, R. (2024). The relationship between mindfulness and athletes' mental skills may be explained by emotion regulation and self-regulation. *BMC Sports Science, Medicine and Rehabilitation*, *16*(1), 1–13.

Roji, F., Galuh, U., Sihabudin, A. A., Galuh, U., Sujai, I., Pemerintahan, I., & Galuh, U. (2025). Evaluasi Program Pembinaan Tim Bola Voli Oleh Komite Olahraga Nasional Indonesia Kabupaten. *Jurnal Sains Student Research*, *3*(4), 833–842. https://doi.org/10.61722/jssr.v3i4.5910

Sobko, I., Fylypchenko, O., & Sobko, Y. (2024). Aspects of psychological training of volleyball players of different ages. *Health Technologies*, *2*(2), 6-17.

Villaseca-Vicuña, R., Otero-Saborido, F. M., Perez-Contreras, J., & Gonzalez-Jurado, J. A. (2021). Relationship between physical fitness and match performance parameters of Chile women's national football team. *International Journal of Environmental Research and Public Health*, *18*(16),1-12.

Xiao, W., Bu, T., Zhang, J., Cai, H., Zhu, W., Bai, X., Zhang, L., & Geok, S. K. (2025). Effects of functional training on physical and technical performance among the athletic population: a systematic review and narrative synthesis. *BMC Sports Science, Medicine and Rehabilitation*, *17*(1).

Yu, X., Yang, Y., & He, B. (2024). The effect of athletes' training satisfaction on competitive state anxiety—a chain-mediated effect based on psychological resilience and coping strategies. *Frontiers in Psychology*, *15*.1-11.

DOI: https://doi.org/10.17509/jpjo.v11i1.91543
p- 2085-6180 e- ISSN 2580-071X