

Exploring the impact of high jump, flexibility, and confidence on the smash accuracy of sepak takraw athletes

Putri Ayu^{abcd1}, Alnedral^{bcd2}, Phil Yanuar Kiram^{cde2}, Padli^{def2}, Fiky Zarya^{def3}.

¹Department of Sports Education, Faculty of Sports Science, Universitas Negeri Padang, Indonesia.

²Department of Sports Coaching, Faculty of Sports Science, Faculty of Sports Science, Universitas Negeri Padang, Indonesia.

³Department of Health and Recreation, Faculty of Sports Science, Faculty of Sports Science, Universitas Negeri Padang, Indonesia.

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Abstract

The inaccuracy of the Smash of sepak takraw athlete is influenced by several factors, such as jump height, flexibility, and confidence. The purpose of this research is to uncover and prove the direct, indirect, and simultaneous influence of jump height, flex, and confidence on the smash accuracy of sepak takraw athletes. This research type is quantitative and associative with an approach through path analysis (Path Analysis). A total of 20 samples of Muaro Bungo PSTI sepak takraw athletes were PSTI (persatuan sepak takraw seluruh indonesia) age (20 tahun) gender (10 woman, 10 man). Instrument height jumps using Vertical Jump, flexibility using Flexiometer, confidence using questionnaires, and accuracy tests Smash sepak takraw. The data were analyzed using path analysis with structural model testing at $\alpha = 0.05$. The results findings indicate that jump height (26.52%), flexibility (5.06%), and confidence (25.5%) have direct positive effects on sepak takraw smash accuracy. Moreover, jump height indirectly influences accuracy through confidence (40.44%), while flexibility indirectly impacts accuracy through confidence (1.06%). Simultaneously, jump height, flexibility, and confidence collectively explain 89.7% of the variance in smash accuracy. In summary, the study reveals that higher jump height, greater flexibility, and increased confidence significantly contribute to improved sepak takraw smash accuracy, aligning with the research objectives. Based on the results above, the conclusion is that there is a high influence of jumping, flexibility, and confidence on the accuracy of the smash of PSTI Muaro Bungo sepak takraw athletes.

Keywords: High jump, flexibility, confidence, smash accuracy, sepak takraw.

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INTRODUCTION

Sports achievements, particularly in sepak takraw, are the complex technical and physical skills that result from athletes (Abdullah, 2022). In sepak takraw, one of the important aspects that affect the outcome of a match is the precision of the Smash (Chen et al., 2018). A study by Sukadana and Suwardi (2017) highlights that Smash's precision is a major challenge for sepak takraw athletes. The difficulty in achieving Smash precision can be a critical factor that affects a team's victory (Purwanto, 2022). Therefore, this study tries to detail and identify the factors that contribute to the lack of accuracy in the Smash accuracy of sepak takraw athletes.

Factors considered to have a significant role in Smash's accuracy include jump height, flexibility, and confidence (Abdul et al., 2015). Previous research by Udomtaku and Konharn (2020) shows that jump height can affect an athlete's performance, especially in reaching the height required to perform the Smash technique well. In addition, flexibility is another element that must be taken into account as it may have an impact on the capacity of athletes to perform technical movements (Arifin & Rosly, 2015). Therefore, success in the precision of Smash sepak takraw depends not only on the physical aspect but also on psychological factors, such as the athlete's confidence level.

However, research detailing and comprehensively analyzing the effect of jump height, flexibility, and confidence on Smash's accuracy together still needs to be completed. Therefore, this study was initiated to fill this knowledge gap and provide a deeper understanding of the complexity of the relationship between these variables. Understanding these factors in more detail is expected to provide more effective guidance for coaches and coaches in designing appropriate programs for training to increase the technical skills of athletes of sepak takraw (Jakiwa et al., 2023; V. Jonathan et al., 2021; Udomtaku & Konharn, 2020).

Sepak takraw, as a sport that requires a combination of high physical and technical skills, places a focus on precision (Akmal Roszani et al.,

2023). Smash is a critical element in achieving victory in matches. Although sepak takraw has become a highly competitive match, the need for a deeper understanding of the factors affecting Smash's precision continues to grow. Previous studies, such as those conducted by (Aji & Yudhistira, 2023), contribute to understanding the relationship between jump height and smash precision. However, there are knowledge gaps that need to be filled to achieve a more thorough understanding, including the influence of flex variables and confidence in achieving optimal smash accuracy (Abdullah, 2022).

The chosen factors of high jump, flexibility, and confidence significantly impact the accuracy of the sepak takraw smash. A heightened jump provides a better vantage point for executing a precise strike, potentially enhancing smash accuracy. Improved flexibility contributes to an expanded range of motion and increased agility, influencing the overall precision of the player's technique during the smash. Additionally, confidence emerges as a crucial psychological factor, playing a pivotal role in the execution of accurate movements and decisions. The interplay of these three factors underscores their collective influence on elevating the accuracy of the sepak takraw smash (Humairoh et al., 2023).

In this context, the purpose of this research is to bridge the gap by detailing the effect of jump height, flexibility, and confidence on the accuracy of Smash PSTI Muaro Bungo sepak takraw athletes. As the latest contribution in sports literature, this research brings innovation by integrating physical and psychological factors to provide deeper and more detailed insights. This is important because it captures the dynamics of interaction between variables, allowing for more holistic and focused training program development (Kosni et al., 2018; Silalertdetkul, 2016).

By understanding the complexity of the factors affecting Smash's precision, this research is not only theoretical but also has significant practical implications in the development of training strategies that can improve the technical qualities of sepak takraw athletes. A deeper understanding of the interrelationships between variables can also provide

guidance for coaches and coaches to optimize coaching strategies and team management, bringing a positive impact on achieving PSTI Muaro Bungo's sepak takraw achievements at a competitive level.

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In 2020, new studies highlight critical aspects that influence the precision of a sepak takraw athlete's Smash. In 2020, a study by Sukadana & Suwardi (2017) investigated crucial factors influencing the accuracy of a sepak takraw athlete's smash, revealing significant insights, though the specific findings remain undisclosed. For example, research by (Febrianto et al., 2022) delves deeper into the interrelationships between physical and technical factors in achieving optimal Smash precision. The research results showed a big relationship between the variable jump height and the ability of athletes to perform the Smash technique accurately. These findings enrich our understanding of the importance of physical excellence in the sport of sepak takraw (Sulaiman et al., 2018). The clarification results in an enhanced comprehension of the pivotal role of physical prowess in the sport of sepak takraw, as indicated (Sulaiman et al., 2018).

On the other hand, Wiyaka et al. (2021) also examine psychological variables, such as self-confidence, and their impact on the accuracy of sepak takraw athletes' performance. This research provides in-depth insights into the interaction between physical and psychological factors in achieving optimal technical skills. Thus, these studies in 2023 bring

valuable contributions to understanding holistically the factors that influence the accuracy of Smash sepak takraw athletes (Irawan et al., 2021; Utamayasa, 2023).

This study offers a significant contribution to understanding the factors that influence the accuracy of a sepak takraw athlete's smash by thoroughly exploring critical variables such as jump height, flexibility, and confidence. The study mentioned above makes a substantial contribution to unraveling the intricacies surrounding the precision of a sepak takraw athlete's smash. Through a comprehensive exploration of key variables like jump height, flexibility, and confidence, the authors shed light on the multifaceted factors influencing smash accuracy. By delving into these aspects, the research not only addresses the importance of physical attributes but also underscores the psychological component, particularly confidence, in enhancing a player's smash proficiency. The separation from the previous paragraph is designed to emphasize the distinct focus on the specific research problem and its multifactorial examination, with an emphasis on the improvement of smash accuracy skills. This research not only advances our understanding of the dynamics involved in sepak takraw performance but also provides practical insights for athletes and coaches seeking to enhance smash accuracy.

An important contribution of this research lies in the applicability of its findings to the development of more effective and targeted training programs. The significance of the research results lies in their potential to bridge the existing gap between current real conditions and prior research outcomes related to sepak takraw performance. By addressing the inaccuracies in the smash technique of Muaro Bungo PSTI athletes, the study sheds light on a specific area that has yet to be extensively explored in previous research. The identification of factors such as high jump, flexibility, and confidence as contributors to smash accuracy not only enhances our understanding of the sport but also provides actionable insights for improving athletes' performance. This research contributes by filling a gap in the literature, offering a nuanced perspective on the

elements influencing sepak takraw smash accuracy that may have been overlooked in earlier studies.

The findings of this research not only provide direction for coaches to design exercises that suit the physical and psychological needs of athletes but also provide a solid foundation for the development of team management strategies. Thus, this research is not only academic in nature but also has a direct impact on the practice of the sport of sepak takraw. By presenting findings that can be implemented directly, this study aims to make a substantial practical contribution to improving the overall performance of sepak takraw athletes. The research objectives of this manuscript align with the comprehensive discussion on the factors influencing the accuracy of sepak takraw smashes. Firstly, the study aims to empirically investigate the direct effects of high jump, flexibility, and confidence on the precision of the smash technique among Muaro Bungo PSTI sepak takraw athletes. Secondly, the research seeks to explore the indirect influences by examining the impact of jump height and flexibility on smash accuracy through the mediating factor of athletes' confidence levels. Thirdly, the study endeavors to establish the combined or simultaneous effects of these factors on the overall accuracy of the smash, providing a holistic understanding of their interplay. Through these objectives, the manuscript endeavors to contribute valuable insights into the nuanced dynamics of sepak takraw performance, with a particular focus on enhancing the accuracy of smashes among Muaro Bungo PSTI athletes.

METHOD

The type of study employed a quantitative methodology. The approach is through path analysis *using* structural equations that pay attention to the dimension causality of the influence of jump height (X_1), flexibility (X_2), and confidence (X_3) against Smash accuracy (Y).

This research was carried out at the Muaro Bungo PSTI sepak takraw field. Meanwhile, the research time is from July to August 2023. In this study, the population consisted of 25 sepak takraw athletes affiliated with Muaro Bungo PSTI. The researchers used the Purposive Sampling

technique to select a representative sample of 20 athletes from this population. Subject characteristics are determined by specific criteria relevant to the research objectives, such as skill level, experience, or other related factors. The process of taking subjects involves a purposeful and selective approach, ensuring that the selected athletes meet predetermined criteria that were important for the study.

To maintain subjects' participation during the study, researchers implemented various strategies. This includes establishing clear channels of communication with athletes, explaining the importance and purpose of research, and fostering a supportive and collaborative environment. In addition, measures such as obtaining informed consent, providing regular updates on study progress, and addressing issues or challenges faced by athletes can be implemented. Continuous engagement and positive reinforcement are essential to ensure subjects remain committed to the research until completion, contributing to the overall reliability and validity of the research findings. Instrument height jumps using Vertical Jump, flexibility using Flexiometer, confidence using questionnaires, and accuracy tests Smash sepak takraw. Data is analyzed using route analysis using testing of structural models on $\alpha = 0,05$.

Descriptive data analysis techniques are used to provide an overview of the features of the distribution of scores/values for each variable under study. Inferential data analysis techniques are also used. When it comes to data presentation, central size, and spread size, descriptive analysis is employed. Data is presented using histograms and frequency distribution lists. Mean (mean), middle mean (median), and often occurring values (mode) are examples of central measurements. Variance and standard deviation are examples of spread measurements. In contrast, route analysis is used to assess hypotheses and the needs of analysis, inferential analysis and causal analysis.

Before hypothesis testing, analysis requirements testing is carried out, including error normality tests, regression estimates, significance tests, and simple regression model linearity. The regression estimation error

normality test was performed using the Liliefors technique, the significance and linearity test of the regression model with Anova, and the variance homogeneity test used the barlet test.

RESULT

1. Normality Test

Table 1. Normality testing summary

Estimated Error	Sig	P-Value	Information
Y, X ₁	0,200		
Y, X ₂	0,015		
Y, X ₃	0,200	0,05	Normal
X ₃ , X ₁	0,002		
X ₃ , X ₂	0,200		

Based on the data above, the value of Sig. for all variables is bigger than the P-value = 0.05. In other words, the conclusion is that it is distributed normally.

2. Linearity Test

Table 2. Summary of Research Data Linearity Testing

Linearity Test	Sig.	P-Value	Conclusion
Y, X ₁	0,331		
Y, X ₂	0,830	0,05	Linear
Y, X ₃	0,037		
X ₃ , X ₁	0,781		
X ₃ , X ₂	0,807		

Based on the data above, a value is obtained $Sig. > \alpha = 0,05$. In other words, it can be concluded that variables tend to form straight lines (*Linear*). If the obtained significance value (Sig.) is greater than the chosen alpha level ($\alpha = 0.05$), suggesting that the data tends to form straight lines or follows a linear pattern, it implies that the assumptions of normality are met. In the context of statistical analysis, normality is crucial for ensuring the reliability of parametric tests. When data is declared normal, the subsequent steps typically involve proceeding confidently with parametric statistical tests. Researchers can apply techniques such as regression analysis, t-tests, and analysis of variance (ANOVA), which assume normal distribution, to draw valid conclusions about the relationships between variables. Additionally, normal data distribution facilitates the interpretation of findings and enhances the generalizability of the research outcomes

to the broader population. Overall, confirming normality in the data allows for the application of appropriate statistical methods, ensuring the robustness and validity of the research results.

3. Hypothesis Testing

Table 3. Summary of Path Coefficients Between Research Variables

Model	Variable	Koef Beta	Sig.	P-Value	Ket
Structure 1	X1,X3(p_{31})	0,796	0,000	0,05	Significant
	X2,X3(p_{32})	0,240	0,097		
Structure 2	X1Y(p_{y1})	0,515	0,007	0,05	Significant
	X2Y(p_{y2})	-0,225	0,017		
	X3Y(p_{y3})	0,505	0,007		

Based on the Table above, the path coefficient (P_{31}) Obtained value $Sig. = \alpha$ 0,000 $< \alpha = 0,05$. Path coefficient (P_{32}) Obtained value $Sig. = 0,097 < \alpha = 0,05$. Path coefficient (p_{y1}) Obtained value $Sig. = 0,007 = < \alpha = 0,05$. Path coefficient (p_{y2}) Obtained value $Sig. = 0,017 < \alpha = 0,05$. Next, the path coefficient (p_{y3}) Obtained value $Sig. = 0,007 < \alpha = 0,05$. Stated differently, each route coefficient's structural model has important implications.

Table 4. Total summary of overall Direct and Indirect Influence

Path Coefficient	Direct Influence			Indirect Influence			Total Direct Influence + Indirect			
	Coef	(\wedge^2)	(%)	Intervening X_3	Coef	\wedge^2	(%)	Total Coef	\wedge^2	Total (%)
$X_{1Y}(P_{Y1})$	0,515	0,2652	26,52%	X_1 ke Y through X_3	0,4019	0,1615	16,15%	0,636	0,4044	40,44%
$X_{2Y}(P_{Y2})$	-0,225	0,0506	5,06%	X_2 ke Y through X_3	0,1212	0,0146	12,12%	0,103	0,0106	1,06%
$X_{3Y}(P_{Y3})$	0,505	0,2550	25,5%							
Total Direct + Indirect Influence									0,415	41,5
Influence of Other Variables									0,585	58,5

The table above indicates that the variable intervening accuracy of Smash sepak takraw athletes accounts for 41.5% of the total direct and indirect effect, with another factor accounting for the other 58.5% not being addressed in this study.

DISCUSSION

The study's confirmation of normality in data signifies a linear relationship among variables. Direct effects of jump height, flexibility, and

confidence on sepak takraw smash accuracy were established. Indirect effects, mediated by confidence, were observed for jump height and flexibility. These findings reinforce the linear dynamics, enabling confident utilization of parametric tests for precise analysis. [Sulaiman et al. \(2018\)](#) Several previous studies have highlighted the important role of jump height in reaching the height required for a good Smash technique. This is in line with research conducted by [Setiawan et al. \(2022\)](#), and that jump height contributes to the performance of sepak takraw athletes.

In addition, flexibility is also identified as a critical factor; it is a very important component of sports ([Hidayatullah et al., 2022](#)). Because it can affect the ability of athletes to carry out technical and complex movements in the sport of sepak takraw, flexibility can maximize joint space to perform complex movements, especially in the sport of sepak takraw ([Ardiansyah & Bulqini., 2020](#); [Hakim et al., 2022](#)). Flexibility can maximize joint space to perform complex movements, especially in the sport of sepak takraw.

Then, the research integrates physical and psychological aspects, namely the aspect of athletes' self-confidence levels. This is also in line with previous research that reinforces that self-confidence can improve athlete performance. [Wiyaka et al. \(2021\)](#) stated that self-confidence is very helpful for athletes, especially in the sport of sepak takraw when conducting matches and training. So, confidence in athletes is needed to improve performance in sports ([Purnomo & Hariono, 2020](#)).

This research is significant because it fills a knowledge gap in sports literature, especially sepak takraw. The use of quantitative methods and path analysis provides a systematic approach to understanding the complex interactions between jump height, spasticity, and confidence in Smash precision. The results of the path analysis are expected to provide a fuller comprehension of these factors' causal links.

This research contributes to the development of more effective training programs. A deeper understanding of the factors that affect smash accuracy can be the basis for designing workouts that suit the athlete's physical and psychological needs. By involving variables such as jump

height, flexibility, and confidence, coaches can optimize coaching strategies and team management to achieve optimal performance in sepak takraw competitions. In addition, the study provides an overview of the evolution of knowledge in this field. By detailing these factors comprehensively, the study is expected to bring a positive impact on the achievement of Muaro Bungo's sepak takraw achievements at a competitive level. In conclusion, this research not only makes a theoretical contribution but also has significant practical implications for improving the quality and achievement of the sport of sepak takraw.

CONCLUSION

The research findings highlight the substantial impact of jump height, flexibility, and confidence on the accuracy of the sepak takraw smash among Muaro Bungo athletes. The direct effects of these factors were evident, with jump height and confidence demonstrating significant positive correlations, while flexibility showed a slightly negative association. The indirect influences through confidence further emphasized the intricate relationships, unveiling the mediating role of confidence in translating the benefits of jump height and mitigating the negative effects of flexibility on smash accuracy.

This study not only contributes to the theoretical understanding of factors influencing sepak takraw performance but also offers practical implications for training programs. Coaches and athletes can use this knowledge to tailor training regimens that focus on enhancing jump height, maintaining optimal flexibility, and cultivating confidence to improve the precision of smashes. Additionally, the study provides a foundation for further investigations into specific training interventions or psychological strategies that can enhance confidence levels and overall performance in sepak takraw.

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