



## Descriptive of the Indonesian National Women's Volleyball Team at the FIVB World Women's Volleyball U21 Championship in Indonesia 2025

Silvia Kristianingtyas<sup>1A-E\*</sup>, Soni Sulistyarto<sup>2B-D</sup>, Himawan Wismanadi<sup>3B-D</sup>, Hijrin Fithroni<sup>4D</sup>

<sup>1,2,3,4</sup> Universitas Negeri Surabaya, Jawa Timur, Indonesia

[silvia.22119@mhs.unesa.ac.id](mailto:silvia.22119@mhs.unesa.ac.id)<sup>1</sup>, [sonisulistyarto@unesa.ac.id](mailto:sonisulistyarto@unesa.ac.id)<sup>2</sup>, [himawanwismanadi@unesa.ac.id](mailto:himawanwismanadi@unesa.ac.id)<sup>3</sup>,  
[hijrinfithroni@unesa.ac.id](mailto:hijrinfithroni@unesa.ac.id)<sup>4</sup>

### ABSTRACT

Volleyball plays a crucial role in maintaining physical and mental health while contributing to the overall quality of life. Internationally, volleyball is governed by the Fédération Internationale de Volleyball (FIVB), and nationally by the Indonesian Volleyball Federation (PBVSI). The FIVB Women's U-21 Volleyball World Championship 2025, held in Surabaya from August 7 to 17, involved 24 countries and served as a platform for young athletes to demonstrate their abilities, strengthen athlete development pathways, and determine global rankings. This study aims to analyze the overall performance of the Indonesian Women's U-21 National Volleyball Team throughout the tournament, from the preliminary round to the play-off phase, by identifying playing patterns, factors contributing to wins and losses, and Indonesia's global position when competing against strong teams such as Italy and China. The research employed a descriptive quantitative analytical approach using document analysis. Data were collected from match results, point statistics, and final rankings. The findings indicate that Indonesia, competing in Pool A, finished 16th in the world ranking, 5th in Asia, and 2nd in Southeast Asia, achieving two wins and seven losses. Italy emerged as the world champion, while Japan secured the runner-up position. The discussion highlights that mental resilience, technical mastery, and tactical execution are key determinants of competitive performance at the international level. Therefore, sustained high-quality training programs and multidimensional support, along with strong collaboration among stakeholders, are essential to enhance the future performance of the Indonesian national team, in line with FIVB's vision of "Volleyball for All."

### ARTICLE HISTORY

Received: 2025/12/25  
Accepted: 2026/01/23  
Published: 2026/02/05

### KEYWORDS

Women's U-21 volleyball;  
Performance analysis;  
Indonesian national team;  
FIVB World Championship;  
Descriptive study.

### AUTHORS' CONTRIBUTION

A. Conception and design of the study;  
B. Acquisition of data;  
C. Analysis and interpretation of data;  
D. Manuscript preparation;  
E. Obtaining funding

**Cites this Article** : Kristianingtyas, S.; Sulistyarto, S.; Wismanadi, H.; Fithroni, H. (2026). Descriptive of the Indonesian National Women's Volleyball Team at the FIVB World Women's Volleyball U21 Championship in Indonesia 2025. **Competitor: Jurnal Pendidikan Kepeleatihan Olahraga**. 18 ( 1 ), p.0228-0239

## INTRODUCTION

Sport plays a fundamental role in human life because it directly contributes to maintaining physical and mental health, developing character, and improving overall quality of life. Sports activities have been proven to improve physical fitness, psychological balance, social skills, and mental resilience, particularly in adolescents and young adults (Khairuddin, 2017; Eime et al., 2015). In the context of competitive sports,



the function of sport extends beyond health aspects to serve as a tool for developing superior human resources who are competitive at the national and international levels.

Volleyball is one of the fastest-growing sports globally. Volleyball is a team sport that requires mastery of basic technical skills, specific physical abilities, tactical intelligence, and high mental preparedness. The game is played by two teams of six players each, with a rotation system, requiring each player to possess relatively equal technical and tactical competency across all positions (Cirana et al., 2021; Marcelino et al., 2014). The complexity of modern volleyball makes it a high-performance sport that requires long-term, structured development.

In the context of youth athlete development, age-group world championships play a strategic role as a platform for evaluating national development outcomes. The Women's U-21 Volleyball World Championship, organized by the Fédération Internationale de Volleyball (FIVB), is an official event designed to measure the readiness of young athletes to advance to the senior level. For Indonesia, participation in the U-21 World Championship is not merely competitive participation but also an important indicator for assessing the effectiveness of the national athlete development system managed by the Indonesian Volleyball Association (PBVSI).

The main problem that arises is the limited scientific studies that comprehensively analyze the performance of the Indonesian national team in age-group world championships, particularly from a technical and tactical perspective, and from a global competitive context. National team performance evaluations are often general descriptive or based on practitioner opinion, without the support of systematic scientific analysis. This situation results in the suboptimal use of international competition data as a basis for strategic decision-making in long-term athlete development.

International volleyball research over the past decade has shown a significant increase in performance analysis-based studies. Recent studies emphasize the importance of analyzing match statistics, attack patterns, serving effectiveness, blocking, and defence-offence transitions as key indicators of team success (Marcelino et al., 2018; Palao et al., 2015). At the elite level, victory is no longer determined solely by physical ability, but by measurable technical efficiency and tactical intelligence.

Several Scopus studies report that top world teams such as Italy, Poland, China, and the United States have consistently high performance in the youth age groups, demonstrating the success of a sustainable development system (Costa et al., 2016; Laporta et al., 2020). Other research confirms that the U-21 World Championship serves as a "talent pipeline" that significantly determines the quality of future senior national teams (García-de-Alcaraz et al., 2017).

In Indonesia, volleyball research focuses more on developing training models, improving basic technical skills, and the physical condition of school-age and club athletes (Septiani & Sari, 2021; Prasetyo et al., 2020). Several SINTA journals report the effectiveness of drills, paired practice, and interactive media-based approaches on improving passing and serving skills. However, studies utilizing official international competition data are still very limited.

Furthermore, research integrating the global competitive context, tournament analysis, and comparisons of Indonesia's performance with elite global nations is still rare, both in national and international journals. This approach is crucial for understanding Indonesia's relative position in the global volleyball competitive landscape and as a basis for reformulating national athlete development policies.

Based on a review of the current literature, several significant research gaps can be identified. First, although volleyball performance analysis has developed rapidly internationally, research specifically examining the performance of the Indonesian national team at age-group world championships is almost nonexistent. Most national studies are still oriented towards local training contexts and have not yet addressed the global competitive level.

Second, there is limited research documenting and analyzing the national team's competition pathway, from the preliminary phase to the playoffs, as a unified performance process. The analysis is often fragmented and does not provide a complete picture of the determinants of victory and defeat in the context of international tournaments.

Third, there is a lack of research linking international competition results with strategic implications for the national athlete development system. Data from the U-21 World Championships holds significant strategic value as a basis for evaluating policies, coaching curricula, and the direction of national volleyball development. This gap underscores the urgency of research based on the evaluation of the Indonesian national team's performance at the U-21 World Championships.

Based on these research problems and gaps, the main objective of this study is to comprehensively analyze the performance of the Indonesian U-21 Women's National Volleyball Team at the 2025 FIVB World Championship in Surabaya. This study aims to: describe Indonesia's competitive journey from the preliminary round to the playoffs, identify the team's playing patterns, technical-tactical strengths and weaknesses, and position Indonesia in the context of global competition with elite nations such as Poland, Italy, China, and the United States.

The novelty of this research lies in its performance analysis approach based on official international competitions, which integrates tournament context, match history, and global comparisons as the basis for evaluating national athlete development. This study is one of the first in Indonesia to utilize the U-21 World Championship as a strategic evaluation instrument for youth women's volleyball development.

Furthermore, this research provides practical contributions to the Indonesian Volleyball Association (PBVSI) and national sports policymakers in formulating long-term, evidence-based development strategies. Thus, the results of this study are expected not only enrich the scientific treasury of volleyball but also become a strategic foothold to increase Indonesia's competitiveness in the international volleyball arena.

## METHODS

This study adopts a descriptive quantitative analytical research design, which aims to systematically describe, analyze, and interpret numerical data in order to explain observable phenomena within a specific context. This approach is particularly

appropriate for research that seeks to provide an objective overview of performance patterns and competitive outcomes without manipulating variables. The primary data collection technique used in this study is document analysis, which involves the examination of official tournament records and published reports to ensure data accuracy and reliability (Sugiyono, 2019).

The data sources include official match results, score sheets, statistical summaries, point accumulations, and final team rankings released by the Fédération Internationale de Volleyball (FIVB). Both primary sources (official championship data) and secondary sources (supporting reports and publications) were utilized to strengthen data triangulation and enhance the credibility of the findings. The collected data were then organized, classified, and tabulated according to competition phases, including the preliminary round, classification matches, and play-off stages.

Data analysis was conducted by calculating frequencies, win-loss records, point distributions, and ranking positions for each team, with particular emphasis on the performance of the Indonesian Women's U-21 National Team. The analysis also involved comparative descriptions between Indonesia and other participating teams to identify performance trends, strengths, and weaknesses throughout the tournament. The results of this analysis are presented descriptively through tables and narrative explanations to facilitate a clear understanding of competitive dynamics.

By applying this descriptive quantitative analytical method, the study provides a comprehensive and evidence-based depiction of the FIVB Volleyball Women's U-21 World Championship 2025, enabling meaningful interpretation of team performance, tournament structure, and Indonesia's position within the global competitive landscape.

## RESULTS AND DISCUSSION

### Result

The FIVB Volleyball Women's U-21 World Championship 2025 was held in Surabaya, Indonesia, from August 7 to 17, 2025. The championship was conducted across three venues, namely Jawa Pos Arena, GOR Pancasila, and Samator Volleyball Hall, all located in Surabaya, Indonesia. The tournament was participated in by 24 countries. These participating nations were divided into four pools, with each pool consisting of six teams, based on the official rankings or seedings issued by the FIVB. The distribution of teams into the four pools is presented in Table 1.

**Table 1.**  
Grouping of Participating Teams into Four Pools

No.	Pool A	Pool B	Pool C	Pool D
1.	Argentina	Amerika Serikat	Aljazair	Brasil
2.	Indonesia	China	Republik Ceko	Bulgaria
3.	Kanada	Korea Selatan	Italia	Chile
4.	Puerto Riko	Kroasia	Mesir	Jepang
5.	Serbia	Meksiko	Polandia	Thailand
6.	Vietnam	Republik Dominika	Turki	Tunisia

Based on Table 1, the Indonesian Women's U-21 National Volleyball Team was placed in Pool A together with the Women's U-21 National Teams of Argentina, Canada, Puerto Rico, Serbia, and Vietnam. In the FIVB Volleyball Women's U-21 World Championship 2025 held in Surabaya, Indonesia, the competition format consisted of two stages, namely the preliminary round and the final round. The preliminary round applied a single round-robin pool system, while the final round employed a single-elimination (knockout) system. The final round was contested only by the top 16 teams, ranked 1st to 4th from each pool. Teams that failed to qualify for the final round continued to compete in the play-off stage to determine rankings from 17th to 24th.

During the preliminary round using the single round-robin pool system, the Indonesian Women's U-21 National Team faced the Vietnam Women's U-21 National Team in the opening match and suffered a 0-3 defeat (15-25; 16-25; 18-25). In subsequent preliminary matches, Indonesia defeated Canada with a 3-1 victory (28-26; 25-18; 18-25; 25-21), lost to Puerto Rico by 2-3 (25-17; 26-28; 25-15; 23-25; 15-17), and lost to Serbia by 2-3 (21-25; 27-25; 23-25; 25-22; 13-15). In the final preliminary match, Indonesia suffered a straight-set loss (0-3) against Argentina, the pool winner (23-25; 18-25; 22-25).

It should be noted that the scoring system applied in the preliminary round was as follows: (a) a 3-0 or 3-1 win was awarded 3 points; (b) a 3-2 win was awarded 2 points; (c) a 2-3 loss earned 1 point; and (d) a 1-3 or 0-3 loss earned 0 points.

The final results of the preliminary round matches are presented as follows:

**Table 2.**  
Preliminary Round Match Outcomes

No.	Pool	Tim	Pld	W	L	S	P
1.	A	Argentina	5	5	0	15 : 2	15
2.		Serbia	5	4	1	13 : 6	11
3.		Indonesia	5	2	3	10 : 10	8
4.		Puerto Riko	5	2	3	7 : 12	5
5.		Kanada	5	1	4	6 : 12	3
6.		Vietnam (DSQ)*	5	1	4	3 : 13	3
1.	B	China	5	5	0	15 : 1	15
2.		Amerika Serikat	5	4	1	12 : 4	12
3.		Korea Selatan	5	3	2	10 : 8	8
4.		Kroasia	5	2	3	9 : 9	7
5.		Republik Dominika	5	1	4	3 : 13	3
6.		Meksiko	5	0	5	01 : 15	0
1.	C	Polandia	5	4	1	14 : 3	13
2.		Italia	5	4	1	14 : 5	12
3.		Turki	5	3	2	11 : 8	9
4.		Republik Ceko	5	3	2	9 : 8	8
5.		Mesir	5	1	4	03 : 12	3
6.		Aljazair	5	0	5	0 : 15	0
1.	D	Jepang	5	5	0	14 : 3	15
2.		Brasil	5	4	1	14 : 5	12
3.		Bulgaria	5	2	3	11 : 8	7
4.		Thailand	5	2	3	9 : 8	6
5.		Chile	5	2	3	3 : 12	5
6.		Tunisia	5	0	5	0 : 15	0

During the preliminary round in Pool A, an incident occurred in which one team fielded an ineligible player, specifically a male player, which violated competition regulations. The national team involved in this violation was the Vietnam Women's U-21 National Volleyball Team. As a consequence, all matches involving Vietnam were officially recorded as 0-3 losses in favor of their opponents. In other words, the Vietnam Women's U-21 National Team was subjected to a disqualification (DSQ) sanction.

Accordingly, based on the results presented in Table 2, the teams that qualified for the final round (Round of 16) from Pool A were the national teams of Argentina, Serbia, Indonesia, and Puerto Rico. From Pool B, the teams advancing to the final round were China, the United States, South Korea, and Croatia. From Pool C, the qualified teams were Poland, Italy, Turkey, and the Czech Republic. Meanwhile, from Pool D, the teams that progressed to the final round were Japan, Brazil, Bulgaria, and Thailand.

Following the completion of the matches using a single-elimination (knockout) system, the results of the Round of 16 are presented in Table 3 below.

**Table 3.**

Results of the Round of 16 Matches

No.	The team that competes		Score	Winner
1	China	Thailand	3-0 (25-15, 25-18, 25-19)	China
2	Brasil	Korea Selatan	3-0 (25-23, 25-17, 25-17)	Brasil
3	Argentina	Republik Ceko	3-0 (25-15, 25-13, 25-19)	Argentina
4	Serbia	Turki	0-3 (14-25, 23-25, 10-25)	Turki
5	Amerika Serikat	Bulgaria	0-3 (23-25, 16-25, 15-25)	Bulgaria
6	Italia	Indonesia	3-1 (25-12, 25-19, 21-25, 25-13)	Italia
7	Jepang	Kroasia	3-1 (25-16, 22-25, 25-17, 25-17)	Jepang
8	Polandia	Puerto Riko	3-0 (25-15, 25-16, 25-13)	Polandia

Based on Table 3, which presents the results of the Round of 16, eight teams advanced to the quarterfinal round, namely the national teams of China, Brazil, Argentina, Turkey, Bulgaria, Italy, Japan, and Poland. In the Round of 16, the Indonesian Women's U-21 National Volleyball Team faced the Italian Women's U-21 National Volleyball Team, the eventual tournament champion. The result showed that Indonesia was defeated by Italy with a score of 1-3.

The subsequent match results, from the quarterfinals to the final, are presented in Table 4 and Table 5 below.

**Table 4.**

Results of the Quarterfinal and Semifinal Matches

No.	The team that competes		Score	Winner
1	Brasil	Argentina	3-0 (25-19, 25-18, 25-14)	Brasil
2	Bulgaria	Polandia	3-1 (25-23, 22-25, 25-23, 25-18)	Bulgaria
3	Italia	China	3-0 (25-23, 25-19, 25-15)	Italia
4	Turki	Jepang	0-3 (23-25, 21-25, 20-25)	Jepang
No.	Tim Yang Bertanding		Score	Pemenang
1	Brasil	Italia	0-3 (16-25, 21-25, 19-25)	Italia
2	Bulgaria	Jepang	0-3 (17-25, 18-25, 13-25)	Jepang



Based on Table 4, which presents the results of the quarterfinal and semifinal rounds, the final match was contested between the Italian and Japanese national teams. Meanwhile, the third-place match was played between the Brazilian and Bulgarian national teams. Following the completion of these matches, the results of the final round are presented in Table 5 below.

**Table 5.**  
Results of the Final Matches

No.	That team that competes		Score	Winner
1	Brasil	Bulgaria	3-1 (25-19, 25-20, 14-25, 25-21)	Brasil
2	Italia	Jepang	3-2 (25-22, 22-25, 15-25, 25-19, 15-11)	Italia

Based on Table 5, which presents the results of the final round, the Italian Women's U-21 National Volleyball Team emerged as the champion of the tournament. The runner-up position was secured by the Japanese Women's U-21 National Volleyball Team. Subsequently, third place was achieved by the Brazilian Women's U-21 National Volleyball Team, while fourth place was claimed by the Bulgarian Women's U-21 National Volleyball Team.

Following a 1-3 defeat against the Italian Women's U-21 National Volleyball Team, the Indonesian Women's U-21 National Volleyball Team proceeded to compete in the play-off matches to determine positions from 9th to 16th place. The results of Indonesia's matches in this play-off stage are presented in Table 6 below.

**Table 6.**  
Results of the Play-off Matches for 9th-16th Place

No.	The team that competes		Score	Note
1	Indonesia	Thailand	0-3 (24-26, 19-25, 22-25)	Rank 9-16
2		Korea Selatan	2-3 (25-22, 15-25, 25-17, 18-25, 5-15)	Rank 13-16
3		Puerto Riko	2-3 (24-26, 25-19, 25-22, 22-25, 12-15)	Rank 15-16

Based on the match results described above, from the preliminary round in each pool through the final round and the play-off matches for ranking positions, the overall final standings of the tournament are presented in Table 7 below.

**Table 7.**  
Final Results and Overall Rankings

No.	Team	No.	Team	No.	Team
1.	Italia	9.	Amerika Serikat	17.	Kanada
2.	Jepang	10.	Republik Ceko	18.	Chile
3.	Brasil	11.	Kroasia	19.	Vietnam
4.	Bulgaria	12.	Thailand	20.	Rep. Dominika
5.	China	13.	Korea Selatan	21.	Mesir
6.	Polandia	14.	Serbia	22.	Tunisia
7.	Argentina	15.	Puerto Riko	23.	Meksiko
8.	Turki	16.	Indonesia	24.	Aljazair

Based on Table 7, the Italian Women's U-21 National Volleyball Team emerged as the tournament champion, while the Algerian Women's U-21 National Volleyball Team finished in last place. Meanwhile, the Indonesian Women's U-21 National Volleyball Team concluded the tournament in 16th position in the final overall rankings

## Discussion

The 2025 U-21 Women's Volleyball World Championship final, between the Italian U-21 Women's National Team and the Japanese U-21 Women's National Team, represented a clash of two modern volleyball coaching approaches from different continents. Italy, representing Europe, displayed a playing style based on physical strength, height, and offensive dominance, while Japan, representing Asia, emphasized speed, consistent defense, and tactical discipline. This finding aligns with literature suggesting that regional characteristics significantly influence elite volleyball playing styles (Marcelino et al., 2014; Palao et al., 2015).

The 3-2 victory for Italy reflects the highly competitive nature of the competition, where victory is no longer a single factor. Studies by Costa et al. (2016) and Laporta et al. (2020) confirm that in elite youth competition, victory is determined by the integration of four key components: physical fitness, technical skill, tactical intelligence, and mental toughness. The final match clearly demonstrated these dynamics, particularly in the decisive fourth and fifth sets.

Japan's victories in the second and third sets, including a dominant 25-15 scoreline in the third set, demonstrated the effectiveness of the fast-paced defense-transition strategy that is characteristic of Asian volleyball. Research by García-de-Alcaraz et al. (2017) found that Asian teams tend to excel in long rallies, second-ball possession, and stable serve-receiver play. However, these advantages often face limitations when faced with teams with explosive attacking capabilities and solid blocks like Italy.

In the fourth and fifth sets, Italy was able to restore momentum through increased attack intensity, serve effectiveness, and mental stability. This supports the psychological momentum theory in competitive sports, which states that the ability to manage psychological pressure during crucial phases of a match is crucial to the final outcome (Taylor & Wilson, 2019; Gucciardi et al., 2015). Italy's mental toughness was evident in the consistency of its decision-making and minimal unforced errors in the deciding set.

Interestingly, although Italy emerged as world champions, the team suffered a loss in the qualifying round against Turkey. This phenomenon reinforces the view that age-group tournaments are dynamic and not always linear, and demand a high degree of adaptability throughout the competition (Fraser-Thomas et al., 2018). In other words, world champions are not teams that never lose, but rather those that are able to learn and adapt quickly from setbacks.

In the Asian context, Japan's performance, with only one loss throughout the tournament, underscores the success of a long-term development system based on technical consistency, high training volume, and mental strengthening from an early age. This finding aligns with research by Baker et al. (2020), which emphasized that the success of developing elite young athletes is largely determined by program continuity and the quality of the training environment.

When compared to Italy and Japan, the performance of the Indonesian U-21 Women's National Volleyball Team shows a significant gap. Although Indonesia managed to qualify for the final phase of the tournament, its 16th place out of 24 countries places it below major Asian nations such as Japan, China, Thailand, and South Korea. This



indicates that youth women's volleyball development in Indonesia is still in its infancy and not yet fully competitive at the global level.

Further analysis shows that Indonesia only managed two wins out of nine matches, with one of those wins coming via disqualification. This situation indicates limited performance consistency, particularly in high-pressure match phases. Research by Piggott (2015) and Henriksen et al. (2019) confirms that one indicator of a mature coaching system is the athlete's ability to maintain optimal performance in crucial situations.

Indonesia's losses in two five-set matches against Puerto Rico are a strong indicator of problems with mental toughness and competitive resilience. Studies by Gucciardi et al. (2015) and Clough et al. (2002) stated that mental toughness plays a significant role in determining the outcome of tight matches, particularly in the deciding set. Indonesia's inability to convert winning opportunities in the fifth set demonstrates that psychological aspects have not been optimally integrated into the athlete development process.

In addition to mental factors, limitations in specific physical conditions and technical efficiency are also limiting factors. Research by Sheppard et al. (2016) and Gabbett (2016) confirms that modern volleyball demands high levels of explosive strength, anaerobic endurance, and neuromuscular stability. When compared to elite world teams, Indonesian athletes still lag behind in these aspects, which directly impacts their offensive effectiveness and endurance in long rallies.

Furthermore, these results also indicate the need to strengthen indirect supporting factors, such as the quality of domestic competition, science-based training periodization, sports science support, and structured mental development. The Long-Term Athlete Development (LTAD) model emphasizes that international success is the cumulative result of a consistent, multidisciplinary, and long-term development system (Balyi et al., 2013; Lloyd et al., 2016).

Thus, Indonesia's position, which is only one spot above Vietnam and its victory, achieved by disqualification strongly signals that improved performance cannot be achieved in parts. Synergy is needed between quality technical-tactical training, scientifically based physical conditioning improvements, and the integration of mental development and competition management. Without comprehensive improvements, the performance gap with elite Asian and global nations will widen.

Overall, this discussion confirms that Italy's success and Japan's consistency reflect the superiority of a mature coaching system, while Indonesia's performance demonstrates the urgency of reforming its youth women's volleyball development strategy. The 2025 U-21 World Championship will not only be a competitive event, but also an objective mirror to evaluate Indonesia's position in the global volleyball competition and formulate a more science-based and long-term coaching direction.

## CONCLUSION

Based on the results and discussion presented above, several conclusions can be drawn from this study. In the FIVB Volleyball Women's U-21 World Championship 2025

held in Surabaya, Indonesia, the Italian Women's U-21 National Volleyball Team emerged as the tournament champion, while the Japanese Women's U-21 National Volleyball Team secured the runner-up position. The Indonesian Women's U-21 National Volleyball Team finished the tournament in 16th place out of 24 participating countries, ranking fifth among six Asian teams and second among three Southeast Asian teams. These outcomes indicate that, although Indonesia was able to compete at the global level, its overall performance still lags behind several regional competitors. Therefore, improving the performance of the Indonesian Women's U-21 National Volleyball Team requires sustained hard work and strong collaboration among all relevant stakeholders across multiple aspects, including direct factors such as high-quality training programs and indirect supporting factors that contribute to long-term athlete development.

## Acknowledgement

The authors would like to express their sincere gratitude to the Fédération Internationale de Volleyball (FIVB) and the Indonesian Volleyball Federation (PBVSI) for organizing the 2025 FIVB Women's U-21 Volleyball World Championship and for providing access to official competition data used in this study. Special appreciation is extended to the coaches, athletes, and technical officials of the participating teams for their professionalism and contributions, which made this research possible. The authors also thank colleagues and reviewers who provided constructive feedback that helped improve the quality of this manuscript.

## REFERENCES

- Asian Volleyball Confederation. (2025). Team ranking and competition updates. Diakses dari <https://asianvolleyball.net>
- Aat. (2016). Daftar Juara Proliga. Yogyakarta: PBVSI.
- Arikunto, S. (2006). Prosedur Penelitian. Jakarta: PT. Rineka Cipta.
- Baker, J., Wattie, N., & Schorer, J. (2020). A proposed conceptualization of talent in sport. *Quest*, 72(1), 1-17. <https://doi.org/10.1080/00336297.2019.1690544>
- Balyi, I., Way, R., & Higgs, C. (2013). Long-term athlete development. *Human Kinetics*. <https://us.humankinetics.com/products/long-term-athlete-development>
- Bola.net. (2025). Jadwal lengkap pertandingan Kejuaraan Dunia Voli Putri U21 2025. Diakses dari <https://www.bola.n>
- Cirana, W., Hakim, A. R., & Nugroho, U. (2021). Pengaruh Latihan Drill Smash Dan Umpan Smash Terhadap Keterampilan Smash Bola Voli Pada Atlet Putra Usia 13-15 Tahun Club Bola Voli Vita Solo Tahun 2020.7(1).
- Clough, P., Earle, K., & Sewell, D. (2002). Mental toughness: The concept and its measurement. *Journal of Sport Sciences*, 20(1), 32-33. <https://doi.org/10.1080/026404102317200846>

- Costa, G. C. T., Afonso, J., Barbosa, R. V., Coutinho, P., & Mesquita, I. (2016). Predictors of attack efficacy and attack type in high-level Brazilian women's volleyball. *Kinesiology*, 48(2), 242–248. <https://hrca.hr/170503>
- Dessianti Sherly (2015). *Posisi pemain dan tugasnya*. Jakarta: PBVSI
- Eime, R. M., Young, J. A., Harvey, J. T., Charity, M. J., & Payne, W. R. (2015). A systematic review of the psychological and social benefits of participation in sport. *International Journal of Behavioral Nutrition and Physical Activity*, 12(1), 1–21. <https://doi.org/10.1186/s12966-015-0235-5>
- FIVB. (2025). FIVB Volleyball Women's U21 World Championship 2025 – Results and standings. Diakses dari <https://www.fivb.com>
- Fraser-Thomas, J., Côté, J., & Deakin, J. (2018). Youth sport programs: An avenue to foster positive youth development. *Physical Education and Sport Pedagogy*, 23(1), 1–13. <https://doi.org/10.1080/17408989.2017.1324552>
- Gabbett, T. J. (2016). The training–injury prevention paradox. *British Journal of Sports Medicine*, 50(5), 273–280. <https://doi.org/10.1136/bjsports-2015-095788>
- García-de-Alcaraz, A., Ortega, E., & Palao, J. M. (2017). Performance indicators in volleyball: A systematic review. *International Journal of Performance Analysis in Sport*, 17(6), 901–916. <https://doi.org/10.1080/24748668.2017.1405274>
- Gucciardi, D. F., Hanton, S., Gordon, S., Mallett, C. J., & Temby, P. (2015). The concept of mental toughness: Tests of dimensionality, nomological network, and traitness. *Journal of Personality*, 83(1), 26–44. <https://doi.org/10.1111/jopy.12079>
- Henriksen, K., Stambulova, N., & Roessler, K. K. (2019). Successful talent development environments in sport. *Sport, Exercise, and Performance Psychology*, 8(3), 250–267. <https://doi.org/10.1037/spy0000160>
- Khairuddin. (2017). *Pendidikan jasmani dan kesehatan*. Jakarta: RajaGrafindo Persada. <https://rajagrafindo.co.id>
- Khairuddin, Khairuddin. 2017. "Olahraga Dalam Pandangan Islam." *Jurnal Olahraga Indragiri* 1(1):1–14.
- Koesnopoetro, Soendoro, 1993. *Permainan dan Metodik*. Jakarta: Departemen Pendidikan dan Kebudayaan.
- Laporta, L., Afonso, J., & Mesquita, I. (2020). Interaction network analysis of the six game complexes in high-level volleyball. *Journal of Sports Sciences*, 38(13), 1521–1529. <https://doi.org/10.1080/02640414.2020.1754119>
- Lloyd, R. S., Oliver, J. L., Faigenbaum, A. D., Myer, G. D., & De Ste Croix, M. B. A. (2016). Long-term athletic development—Part 1. *Journal of Strength and Conditioning Research*, 30(6), 1491–1509. <https://doi.org/10.1519/JSC.0000000000001387>
- Marcelino, R., Mesquita, I., & Sampaio, J. (2014). Effects of quality of opposition and match status on technical and tactical performances in elite volleyball. *Journal of Sports Sciences*, 32(10), 935–943. <https://doi.org/10.1080/02640414.2013.856833>
- Marcelino, R., Afonso, J., Moraes, J. C., & Mesquita, I. (2018). Determinants of attack efficacy in high-level men's volleyball. *Journal of Sports Sciences*, 36(5), 495–502. <https://doi.org/10.1080/02640414.2017.1320195>

- Palao, J. M., Santos, J. A., & Ureña, A. (2015). Effect of the setter's position on the block in volleyball. *International Journal of Performance Analysis in Sport*, 15(1), 1-14. <https://doi.org/10.1080/24748668.2015.11868788>
- Piggott, D. (2015). The open society and coach education. *Sports Coaching Review*, 4(1), 43-58. <https://doi.org/10.1080/21640629.2015.1056723>
- Prasetyo, Y., Sugiyanto, & Kristiyanto, A. (2020). Pengaruh latihan drill terhadap keterampilan passing bawah bola voli. *Jurnal Keolahragaan*, 8(2), 145-154. <https://doi.org/10.21831/jk.v8i2.32541>
- Septiani, R., & Sari, M. (2021). Analisis keterampilan teknik dasar bola voli pada atlet usia remaja. *Jurnal Pendidikan Jasmani Indonesia*, 17(1), 35-44. <https://journal.uny.ac.id/index.php/jpji>
- Septiani, S., & Sari, Y. P. (2021). Pengembangan Model Latihan Smash Bola Voli. *Jurnal Edukasimu*, 1(3), <http://edukasimu.org/index.php/edukasimu/article/view/41>
- Sheppard, J. M., Cronin, J., Gabbett, T. J., McGuigan, M. R., & Etchebarria, N. (2016). Relative importance of strength, power, and anthropometric measures to jump performance. *Journal of Strength and Conditioning Research*, 30(10), 2734-2741. <https://doi.org/10.1519/JSC.0000000000000379>
- Sugiyono. (2019). *Metode Penelitian Kuantitatif, Kualitatif dan R&D*. Bandung: Alfabeta
- Suherman, A. & Rahayu, N.I. (2014). *Modul statistika untuk ilmu keolahragaan*. Bandung: Universitas Pendidikan Indonesia.
- Taylor, J., & Wilson, G. (2019). Applying sport psychology in elite sport. *Journal of Applied Sport Psychology*, 31(3), 333-346. <https://doi.org/10.1080/10413200.2018.1539083>
- Wiratam, A. (2016). Pemain voli harus tau 4 teknik dasar permainan bola voli. [Online]. Tersedia: permainan-bola-voli. Diakses 1 November 2025