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By Universitas Muhammadiyah Sidoarjo

Table Of Contents

Journal Cover	1
Author[s] Statement.....	3
Editorial Team	4
Article information	5
Check this article update (crossmark)	5
Check this article impact	5
Cite this article.....	5
Title page.....	6
Article Title	6
Author information	6
Abstract	6
Article content	8

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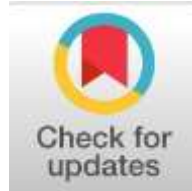
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Tactical Analysis Of Nage Waza Performance In Elite Women Judo Competitions: Analisis Taktis Performa Nage Waza Pada Kompetisi Judo Wanita Elit

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Abstract

General Background Judo relies heavily on strength, coordination, and efficient energy utilization. **Specific Background** Video-based match evaluation is crucial for observing throwing maneuvers and combat strategies in national tournaments. **Knowledge Gap** Although previous research addresses physical fatigue and coordination, empirical studies detailing tactical adaptability during national-level Indonesian championships remain limited. **Aims** This study investigates the throwing maneuvers of gold medalist Mia Maulidini in the 78 kg category at the 2024 Aceh-Sumatra National Sports Week to identify successful combat strategies. **Results** Quantitative video observations from the quarter-finals to the final demonstrated an 82.3 percent overall technical success rate. The athlete consistently scored ippon points utilizing Uchi-Mata, Seoi Nage, Tai Otoshi, and Kata Guruma, displaying significant tactical variations across different tournament rounds. **Novelty** This research presents observable evidence that dynamic technique adaptation and precise attack timing, aligning with the Seiryoku Zenyo principle, are primary determinants of victory over brute physical strength. **Implications** The identified combat patterns provide objective performance indicators, equipping coaches with actionable data to formulate targeted, strategy-based training programs for high-performance athletes.

Highlights

- The observed athlete achieved an 82.3 percent success rate utilizing varied throwing maneuvers.
- Strategic attack timing and balance control proved crucial for scoring ippon points.
- Match progression required continuous adaptation of offensive methods to counter opponent movements.

Keywords

Video Observation; Throwing Techniques; Combat Strategy; Match Evaluation; Seiryoku Zenyo

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INTRODUCTION

Judo is a contemporary martial art originating in Japan and created by Jigoro Kano. Judo was developed from a traditional Japanese martial art known as jiu jitsu, which was then modified to make it safer, more educational, and imbued with high moral values. Kano founded the Kodokan Judo as the first judo teaching institution in Tokyo, Japan, with the aim of shaping individuals who are physically, mentally, and morally strong through disciplined training and the right philosophy of life [1].

In sports that require strength, speed, coordination, and strategy such as judo, regular training is essential to ensure that technical and physical abilities can continue to develop. Perseverance in training helps the body and mind to adapt to the physical and mental challenges that arise during competition [2].

This analysis of judo plays a very important role in the development of sports science, improving the quality of athletes, and assessing the effectiveness of techniques and strategies in competition. In judo, which relies on strength, technique, strategy, and energy efficiency, analysis is essential for understanding performance patterns, technique effectiveness, and factors influencing victory [3]. The results also help coaches develop more targeted training programs focusing on throwing techniques, ground fighting, and physical abilities according to competition demands. In addition, match analysis helps detect technical errors, opponents' attack habits, and adjustments that athletes need to make to achieve maximum performance [4].

Etymologically, the term judo comes from two Japanese words, namely 'ju', which means gentle or flexible, and 'do', which means path or method. Therefore, judo can be understood as the 'path of gentleness,' which emphasises the efficient use of energy and the use of an opponent's strength to defeat them without using excessive force [5].

Over time, judo has evolved from a traditional martial art into a modern competitive sport. Judo began to gain recognition at the national level. The development of judo in Indonesia began in 1955 when several dojos were established in Jakarta and Surabaya. Furthermore, the formation of the All Indonesia Judo Association (PJSI) on 3 December 1959 was an important step because since then judo has been recognised as an official national sport under KONI. Judo was officially contested at the 1969 PON VII in Surabaya and has continued to develop. At the 2024 PON XXI Aceh-North Sumatra, Mia Maulidini of West Java won the women's -78 kg gold medal through effective techniques, strategic control, and energy efficiency. This category requires strength, mastery of nage-waza and ne-waza, and the ability to read opponents' attacks [3].

The Uchi-mata technique has become Mia's primary weapon, which she has applied well in various rounds, including the final. Uchi-mata works well because it utilises the removal of the opponent's balance, hip rotation, and attack energy [6]. Mia's success was also achieved thanks to regular training, which is an important element in developing endurance, technical accuracy, and stability in the performance of judo athletes [7].

Frassinelli et al. (2019) conducted a study aimed at analysing the relationship between motor coordination and muscle strength and technical success in the sport of judo. [8]. On the other hand, Quamila, Kadir and Kardjono (2012) conducted a study on the importance of mastering nage-waza techniques in improving the performance of judo athletes. Furthermore, Désormeaux (2012) conducted research into the application of tactics in martial arts, emphasising the importance of mastery of kumi-kata, the timing of attacks, and the ability to adapt to an opponent's fighting style [10]. The next study by Del Vecchio et al. (2018) conducted a study on the relationship between fatigue levels, technical performance and match efficiency in competitive judo athletes. [11]. Finally Ozaki and Ozawa (2024) conducted a study aimed at analysing the performance of a judo athlete through video recordings of matches using the SPLYZA TEAMS software. A total of 13 matches were analysed to identify patterns 15 in the matches, the techniques employed, and the factors influencing the athlete's victories and defeats. [12]. However, to date, there has been no study linking this mental aspect to the effectiveness of judo techniques at the national level. This study was conducted to identify the techniques, strategies, and factors that contributed to Mia Maulidini's victory at the 21st PON in Aceh and North Sumatra in 2024. Mia Maulidini from West Java was selected as the subject of this study because she won a gold medal in the women's -78 kg weight class. An analysis was also conducted on the opponents Mia faced to determine the techniques and strategies they employed during the matches and how they responded to her attacks. Thus, this study is expected to provide insight into the techniques, strategies, and factors that contributed to Mia's success in winning the matches.

METHOD

This study was conducted to identify the techniques, strategies, and factors that contributed to Mia Maulidini's victory at the 21st PON in Aceh and North Sumatra in 2024. Mia Maulidini from West Java was selected as the subject of this study because she won a gold medal in the women's -78 kg weight class. An analysis was also conducted on the opponents Mia faced to determine the techniques and strategies they employed during the matches and how they responded to her attacks. Thus, this study is expected to provide insight into the techniques, strategies, and factors that contributed to Mia's success in winning the matches.

The research data was obtained from video recordings of matches available on YouTube. The researcher observed Mia Maulidini's matches from the preliminary rounds through the finals, then recorded the techniques used, the timing of those techniques, the number of attacks, the success rate of the techniques, and the number of points scored. The researcher also observed her opponents' play to identify the techniques and strategies they used during the matches. The data collected was then recorded using a match analysis sheet and analyzed based on the observations to identify the techniques, strategies, and factors that contributed to Mia Maulidini's victory at the 21st PON in Aceh and North Sumatra in 2024.

Equation and Formula

This study employs a quantitative approach using observation methods through the analysis of judo match videos. The analysis was conducted to obtain objective data on match activity, including the number of attacks, the types of techniques used, the scores achieved, and the fouls committed during the match. The data from the observations were then calculated and analysed using equations and formulas arranged in numerical order within brackets.

The number of attacks in one round is calculated using the formula: Number of Attacks = Attack by Athlete A + Attack by Athlete B (1)

The percentage of use of a particular technique is calculated using the formula:

1. Total Attacks=Attacks by Athlete A+Attacks by Athlete B)
2. Percentage of Technique (%)=Total AttacksNumber of a Particular Technique×100%
- 3.Percentage of Attacks per Athlete (%)=Total Attacks in the RoundAttacks by Athlete×100%

RESULTS AND DISCUSSION

A. Result

1. Quarter-Final Analysis -78g PON XXI Aceh North Sumatra 2024. Mia.M (West Java) VS Seni.R (East Kalimantan)

Table 1. Quarter-Final Analysis -78g PON XXI Aceh North Sumatra 2024.

Menit	Mia.M (Jabar)	Seni.R (KTM)	Point	Teknik
3.32	✓		-	Uchimata
3.38	✓		-	Uchimata
3.45	✓		Ippon	Uchimata

Figure 1. Quarter-Final Analysis -78g PON XXI Aceh North Sumatra 2024.



https://www.youtube.com/live/2wKjoSvv2LI?si=UiyRG5ore-DL_in-

At 3:45, Mia.M opened the attack with an uchimata technique, and at 3:38, Mia.M performed another uchimata, scoring 1 point. In the final minute, at 3:32, Mia.M repeated the uchimata technique.

In the quarter-finals, Mia.M dominated with the Uchi-Mata technique, executing it three times effectively, with one attempt scoring a point. Meanwhile, Seni.R made no technical attempts and focused solely on defense, demonstrating Mia.M's dominance and strategic focus. Out of these attempts, Mia.M executed the technique three times with a 100% success rate, while Seni.R did not attempt any techniques at all. This can be seen from the point tally, where Mia.M successfully ended the match at 3:32 minutes by scoring an ippon through the Uchimata technique.

2. Semi-Final Analysis -78g PON XXI ACEH SUMUT 2024. Mia.M (West Java) VS Fania.F (Bali)

Table 2. Semi-Final Analysis -78g PON XXI Aceh North Sumatra 2024.

Minutes	Mia.M (West Java)	Fania.F (Bali)	Points	Technique
3.45	✓		-	Ippon Seoi Nage
2.41	✓		-	Makikomi
1.47	✓		-	Seoi Nage
1.03		✓	-	Tai Othosi
0.30	✓		-	Kata Guruma
Golden Score				
0.08	✓		-	Makikomi
0.27		✓	-	Tai Othosi
0.40	✓		-	Makikomi

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Figure 2. Semi-Final Analysis -78g PON XXI Aceh North Sumatra 2024.



https://www.youtube.com/live/2wKjoSvv2LI?si=UiyRG5ore-DL_In-

At 3:45, Mia.M opened the attack with an ippon seoi nage technique, then at 2:41, Mia. M continued the technique with a makikome technique, then at 1:47 Mia.M performed another seoi nage technique, then at 1:03 Fania.F countered the attack with a tai Othosi technique but failed, then at 0:30 Mia.M added another attack with a kata guruma technique, then entered the golden score round. At 0:08, Mia.M attacked with the makikome technique, then at 0:27, Fania.F countered with the tai othosi technique, then at 0:40, Mia.M attacked again with the makikome technique, and in the last minute, at 1:03, Mia.M made a closing attack with the uki goshi technique.

The semi-final match was more intense. Both athletes exchanged techniques until the Golden Score round. However, Mia.M performed more consistently with a variety of throws (Ippon Seoi Nage, Makikomi, Uki Goshi), while Fania.F relied solely on Tai Otoshi.

Based on the semi-final data from the 2024 Aceh Sumut PON XXI -78kg Women's match between Mia. M (West Java) and Fania.F (Bali), there were 9 technique attempts by both athletes. Of these, Mia.M performed techniques 7 times, accounting for 77.7%, while Fania.F performed techniques 2 times, accounting for 44.4%. Mia.M successfully scored an ippon in the final match, which entered golden score time at 1:03 minutes with the uki ghosi technique, while Fania.F did not score any points in this semi-final match.

3. Analisis Final -78Kg Women PON XXI ACEH SUMUT 2024. Mia.M (Jawa Barat) VS Desi.Y (Jawa Tengah)

Table 3. Analysis Final -78g PON XXI Aceh North Sumatra 2024.

Minutes	Mia.M (West Java)	Desi.Y (Central Java)	Points	Technique
1.13	✓		-	Kata Guruma
2.10	✓		-	Uki Goshi
2.34		✓	-	Makikomi
2.59	✓		-	Seoi Nage
3.16	✓		Ippon	Tai Othosi

Figure 3. Analysis Final -78g PON XXI Aceh North Sumatra 2024.



https://www.youtube.com/live/2wKjoSvv2LI?si=UiyRG5ore-DL_In-

At 3:45, Mia.M opened the attack with an ippon seoi nage technique, then at 2:41, Mia. M continued the technique with a makikome technique, then at 1:47 Mia.M performed another seoi nage technique, then at 1:03 Fania.F countered the attack with a tai Othosi technique but failed, then at 0:30 Mia.M added another attack with a kata guruma technique, then entered the golden score round. At 0:08, Mia.M attacked with the makikome technique, then at 0:27, Fania.F countered with the tai othosi technique, then at 0:40, Mia.M attacked again with the makikome technique, and in the last minute, at 1:03, Mia.M made a closing attack with the uki goshi technique.

The semi-final match was more intense. Both athletes exchanged techniques until the Golden Score round. However, Mia.M performed more consistently with a variety of throws (Ippon Seoi Nage, Makikomi, Uki Goshi), while Fania.F relied solely on Tai Otoshi.

Based on the semi-final data from the 2024 Aceh Sumut PON XXI -78kg Women's match between Mia. M (West Java) and

Fania.F (Bali), there were 9 technique attempts by both athletes. Of these, Mia.M performed techniques 7 times, accounting for 77.7%, while Fania.F performed techniques 2 times, accounting for 44.4%. Mia.M successfully scored an ippon in the final match, which entered golden score time at 1:03 minutes with the uki goshi technique, while Fania.F did not score any points in this semi-final match.

B. Discussion

The quarter-final to final matches in the women's -78 kg category at PON XXI 2024 demonstrated the technical superiority of Mia Maulidini (West Java), who won the gold medal. All matches ended in ippon victories using Uchi-Mata, Seoi Nage, Tai Otoshi, and Kata Guruma, highlighting the effectiveness of nage-waza as an important factor in elite judo performance [14].

In the quarter-finals, Mia successfully defeated her opponent, Seni Rahmawati (from East Kalimantan), in less than four minutes by repeatedly applying the Uchi-Mata technique with a very high success rate. Uchi-Mata is classified as an Ashi-Waza (leg technique), using the inner thigh and hip to lift and throw the opponent backwards. This technique is most effective when the opponent is leaning forward, allowing the attacker to use the opponent's momentum and balance to throw them (Kashiwazaki, 1992). The advantages of this technique lie in its energy efficiency and speed of execution, but if the technique fails, the attacker's open body position can be exploited by the opponent to launch a counterattack [3].

In the semi-finals, Mia faced Fania F. from Bali in a very close match that went into golden score. In this bout, Mia displayed a variety of techniques such as Ippon Seoi Nage, Makikomi, Kata Guruma, and Uki Goshi. The Seoi Nage technique is a type of shoulder throw that requires coordination between the grip (kumi-kata) and body rotation to lift and throw the opponent forward. This technique is widely used by judokas who are short and agile because it utilises the power of body rotation [15]. Based on research by Calmet, Miarka, & Franchini (2010), Seoi Nage is classified as one of the most effective techniques among professional judokas because it can score an ippon point in a short time if performed with perfect coordination of movements [16].

The final match against Desi Y. from Central Java showcased Mia's impressive technical and mental skills. She demonstrated four different techniques, namely Kata Guruma, Uki Goshi, Seoi Nage, and Tai Otoshi, with a success rate of 80%. The victory was secured thanks to the Tai Otoshi technique, which resulted in an ippon. Tai Otoshi is one of the throwing techniques that utilises foot placement to control the opponent's movement while pulling them down using the arms. According to Escobar-Molina & Courel-Ibáñez (2017), Tai Otoshi is the technique most often used by athletes at the international level because it offers high biomechanical efficiency and requires stability and strength in the lower body [3]. The victory achieved with this technique demonstrates Mia's ability to control the rhythm of the match and adapt her strategy based on her opponent's condition.

Overall, from the three rounds analysed, Mia demonstrated an average technique effectiveness of 82.3%, reflecting her skill maturity, efficiency in movement, and high tactical mastery. Mia's excellence demonstrates the application of the basic principles of judo, Seiryoku Zenyo (maximum use of energy) and Jita Kyoei (mutual assistance and collective progress), as taught by Jigoro Kano [1]. In addition, Mia's ability to maintain balance, regulate breathing, and control her opponent also reflects a mature mentality and optimal physical readiness.

According to research by Bompa and Buzzichelli published in 2019, maximum achievement in sports such as judo is largely determined by training schedules, the body's response to physical exertion, and consistency in technical and strategic training. This can be clearly seen in Mia's ability to maintain the effectiveness of her techniques from start to finish, without experiencing any significant decline in performance. These findings are consistent with the results of a study by Oliveira & Franchini (2020), which stated that physical endurance and fatigue management have a direct impact on the effectiveness of throwing techniques in competitive judo [17].

In addition to technical and strategic aspects, Mia Maulidini's optimal physical condition is also greatly influenced by physiological readiness that supports smooth movement during competition. Recent research shows that low-intensity, high-repetition strength training can reduce interleukin-6 (IL-6) levels and increase muscle strength, especially in those who were previously inactive. The decrease in IL-6 levels reflects a reduction in inflammatory response due to muscle adaptation, improved metabolic efficiency, and reduced oxidative stress, which indirectly supports physical endurance and technical reliability [17].

Based on the video observation, the consistency of Mia's technical effectiveness also demonstrates her ability to adjust her attacking patterns according to the match situation. In the quarter-final, the repeated use of Uchi-Mata indicates Mia's tendency to utilize the opponent's momentum and balance to create throwing opportunities. In the semi-final, the variation of Ippon Seoi Nage, Makikomi, Kata Guruma, and Uki Goshi demonstrates her ability to change her choice of techniques during a match that extended into the golden score. Meanwhile, in the final, the use of Kata Guruma, Uki Goshi, Seoi Nage, and Tai Otoshi demonstrates her flexibility in selecting techniques until she created an opportunity that resulted in an ippon.

These variations indicate that the effectiveness of nage-waza is not only related to the ability to execute techniques, but also to the accuracy of selecting the appropriate timing and type of attack. Mia was observed to utilize the opponent's movements, maintain balance, and combine several techniques to create attacking opportunities. This pattern demonstrates tactical adaptability that can be directly observed through the match recordings.

When associated with the principle of Seiryoku Zenyo, Mia's technical execution demonstrates an effort to use energy efficiently through appropriate technique selection and timing of attacks. Meanwhile, her ability to maintain control over the opponent and adjust her technique selection in each round indicates an adaptive tactical strategy. These findings demonstrate that the success of throwing techniques in competition is determined not only by strength but also by the

ability to read the situation and make appropriate decisions.

The observations also revealed differences in the patterns of technique use across the rounds. The quarter-final was predominantly characterized by Uchi-Mata, the semi-final showed a wider variation of techniques as the match extended into the golden score, while the final was concluded with Tai Otoshi. These differences indicate that Mia's choice of techniques changed according to the opponent's responses and match conditions. This ability to adapt her techniques represents an important tactical aspect that contributed to her success in finishing each match with an ippon.

Therefore, the findings demonstrate that the average technical effectiveness of 82.3% not only reflects the successful execution of nage-waza, but also indicates consistency in technical application and tactical adaptability throughout the matches. The analysis based on timing, type of technique, and points scored provides evidence that Mia's success resulted from a combination of technical mastery, effective use of momentum, control of the opponent's balance, variation in attacks, and accuracy in selecting techniques according to the match situation.

Although previous studies have discussed the importance of physical condition and fatigue management in judo, these aspects were not directly measured as variables in this study. This study focused on data observable through match recordings, namely the type of technique, execution time, technical success, and points scored. Therefore, the interpretation of the findings was directed toward the technical and tactical aspects observed during the matches rather than physiological changes or the effects of training interventions.

The limitation of this study lies in the number of matches analyzed and the focus on only one athlete in the women's -78 kg class. Nevertheless, the analysis of the three rounds provides an overview of the pattern of technique use and the effectiveness of Mia Maulidini's techniques in a national-level competition. Future research could include more athletes, weight classes, and matches to enable a more comprehensive comparison of nage-waza effectiveness among judokas.

In other words, Mia Maulidini's success in winning the XXI Aceh-Sumatra PON 2024 was not based solely on physical strength, but also on effective technical mastery, the ability to analyze opponents' strategies, and composure when making decisions under pressure. The combination of technique, strategy, physical stamina, and mental resilience is an important element in determining the success of high-level judokas. In the context of this study, these findings were primarily demonstrated through the consistency of nage-waza effectiveness, variation in techniques, utilization of momentum, and the ability to adjust attacks in each round of the competition.

CONCLUSION

Based on the quantitative assessment of the women's -78 kg judo competition at the XXI Aceh-Sumatra National Sports Week (PON) 2024, Mia Maulidini of West Java demonstrated a high level of technical effectiveness, with an average effectiveness rate of 82.3%. Video observation showed that the nage-waza techniques used included Uchi-Mata, Seoi Nage, Tai Otoshi, Kata Guruma, Ippon Seoi Nage, Makikomi, and Uki Goshi. Techniques such as Uchi-Mata, Tai Otoshi, and Seoi Nage contributed to point scoring during the matches. Differences in technique selection across rounds also indicated variations in attack strategies according to the match situation and the opponent's movements.

The analysis showed that throwing technique effectiveness was reflected not only in successful execution but also in the ability to determine attack timing, exploit opportunities, read the opponent's movements, and vary techniques throughout the matches. In the quarter-final, Uchi-Mata was used predominantly, while greater technical variation was observed in the semifinal and final, resulting in effective attacks. These findings indicate that nage-waza effectiveness and variations in attack patterns are important aspects of Mia Maulidini's match performance.

Based on these findings, this study confirms that video-based analysis of technical effectiveness can provide an empirical overview of the successful application of nage-waza in judo competition. The results can serve as a technical evaluation reference for athletes and coaches, particularly in identifying effective techniques, attack patterns, and technique selection according to match situations. Future studies are recommended to analyze a larger number of matches and athlete

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