

Differences in Activity Profiles During Action Time: A Comparison Between Winners and Losers in Young Male Silat Tempur Athletes

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Received Januari 24, 2023; Revised March 11, 2023; Accepted April 12, 2023

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Abstract

Background and aim. Match analysis has been widely used to examine performance characteristics and activity demands in combat sports. However, empirical evidence focusing on Silat Tempur, particularly among youth athletes, remains limited. This study aimed to analyse and compare the activity profile during action time between winners and losers in national Silat Tempur competitions involving young male athletes.

Methods. Seven publicly available video recordings of official national Silat Tempur matches from different weight categories were analysed using a validated notational analysis system. Each match was observed twice with a 48-hour interval. Intra-observer reliability demonstrated excellent agreement for total actions and outcome variables ($ICC \geq 0.95$). A matched-samples t-test was used to compare activity profiles between winners and losers.

Results. The results showed that *hit target* (HT) outcomes accounted for the highest proportion of actions (50.6%), followed by *hit elsewhere* (HE) (32.5%) and *miss opponent* (MO) (16.9%). Winners performed a greater number of total actions (79 actions, 51%) compared to losers (57 actions, 41%). In addition, winners recorded a substantially higher proportion of *hit target* outcomes (48 actions, 69%) than losers (21 actions, 31%). These findings indicate that *hit target* outcomes were the primary determinant of match success, as they directly contributed to scoring in Silat Tempur. Overall, winners demonstrated a higher frequency of effective actions, accounting for 79 of the 136 total actions recorded during the matches.

Conclusions. Performance differences in youth Silat Tempur competitions are primarily determined by the effectiveness of actions rather than the total volume of actions performed. These findings provide empirical evidence on the activity profile of youth Silat Tempur and offer practical insights for training design that emphasises scoring effectiveness and balanced offensive–defensive strategies.

Keywords: *Action Time; Activity Profile; Match Analysis; Silat Tempur.*

1. Introduction

Martial arts are classified as combat sports that require high levels of physical capacity, technical skill, tactical competence, and psychological readiness during competition (Franchini et al., 2011; Slimani et al., 2017). Within a competitive context, martial arts are characterized by high-intensity intermittent activities, in which athletes must effectively manage movement patterns, offensive strategies, and energy utilization throughout the match

(Chaabène et al., 2015; Slimani et al., 2017). Therefore, match-based performance analysis constitutes a crucial aspect of sport science research, particularly for understanding the activity demands encountered by athletes in real competitive situations (Bunker & Susnjak, 2022; Chaabène et al., 2015; García Alonso et al., 2023).

Silat is one of the traditional martial arts originating from Southeast Asia and has developed into a competitive sport with standardized systems of rules, scoring, and weight classifications (B. Mulyana & Lutan, 2020; M. Mulyana et al., 2024).

Unlike other combat sports such as judo or taekwondo, silat exhibits distinctive movement characteristics, combining strikes, kicks, grips, and takedown techniques that are influenced by cultural values and the context of modern sport (Doewes & Nugroho, 2025; Shapie, 2022). In competitive practice, silat is contested in two main formats, namely sport silat and silat tempur, each of which has different match structures and activity demands.

Combat silat tempur is designed as a platform for the development and nurturing of young athletes by emphasizing technical simplicity, direct engagement between athletes, and more controlled movement patterns (Shapie, Kusrin, et al., 2019; Shapie, Tumijan, et al., 2019). competition arena for silat tempur takes the form of a straight and narrower lane compared to sport silat, thereby limiting excessive movement and encouraging athletes to perform offensive and defensive actions in a more direct manner (N. A. A. Aziz et al., 2023). This format is considered more suitable for young athletes, as it facilitates the development of technical skills, tactical understanding, and competitive courage within a more structured and safer environment.

However, despite the significant potential of silat tempur in the context of youth athlete development, scientific studies that specifically examine the characteristics of match activities in silat tempur remain very limited (N. A. A. Aziz et al., 2023; Saphie et al., 2019). Most previous research in silat has focused on sport silat and has highlighted its high-intensity and intermittent nature (A. R. Aziz et al., 2002; Mohamed Shapie et al., 2013). Consequently, information regarding activity patterns occurring during active match time in the context of silat tempur is still rarely reported in the scientific literature.

On the other hand, research in other combat sports has widely adopted the activity profile approach to examine differences in match performance. Studies in professional Muay Thai have reported variations in technical frequency as well as action to rest ratios between winning and losing athletes, which contribute to overall performance effectiveness (Bhumipol et al., 2023). Similar match analysis approaches have also been applied in other combat sports, such as judo (Franchini et al., 2013), taekwondo (Tornello et al., 2013), dan boxing (Phewkham et al., 2024), with findings indicating that activity profile

characteristics, attacking patterns, and the balance between offensive and defensive actions serve as key differentiating factors between winning and losing athletes. In the context of silat, existing studies to date are still predominantly focused on sport silat, demonstrating that winning athletes tend to execute a higher number of techniques (Shapie et al., 2018). However, among the limited body of available research, no study has specifically examined the activity profile during action time of winning and losing athletes in male youth silat tempur competitions.

Based on this research gap, the present study aims to analyze and compare the activity profiles during action time between winning and losing male youth athletes in silat tempur matches. The findings of this study are expected to contribute to the scientific literature on performance analysis in combat sports and to provide practical insights for coaches and practitioners in the development of youth silat tempur athlete training programs.

2. Materials and Method

Design

This study employed a descriptive comparative observational design using a video-based match analysis approach to identify and compare activity profiles during action time between winning and losing male youth athletes in silat tempur matches. This analytical approach was applied to objectively and systematically evaluate performance characteristics and activity demands in sport contexts (Debanne, 2018; O'Donoghue, 2014). The research data were obtained from publicly available video recordings of male silat tempur matches from official national competitions in Malaysia organized by the Pertubuhan Seni Gayung Fatani Malaysia. A total of seven matches were analyzed, with each match representing a different weight category.

Participants

All participants in this study were male youth silat tempur athletes who competed in officially sanctioned national-level competitions in Malaysia. The athletes represented various weight categories and competed in accordance with the prevailing silat tempur regulations. All matches were conducted under high competitive intensity, thereby reflecting the athletes' actual performance in authentic match situations. The athletes involved were active competitors with experience at the national level, consistent with their respective age categories and weight classes. The research data

were derived from publicly accessible match recordings; therefore, the study did not involve direct intervention with athletes or the collection of individual physiological or anthropometric data.

Match Analysis Procedure

Match analysis was conducted using video recordings that were reviewed repeatedly to ensure observational accuracy. The playback speed was reduced to 50 percent of the normal speed to allow more precise identification and measurement of each offensive and defensive movement category. In addition, the videos could be paused and replayed frame by frame to facilitate clear determination of the onset and completion of each technical action performed by the athletes during the match. The analytical procedure followed a notation system developed by Shapie and colleagues, which has been previously applied and validated in silat-related research.

Technical Categories

Silat tempur comprises five primary techniques that are commonly executed during competition. Accordingly, the analysis in this study was limited to these five technical categories, namely punches, kicks, blocks, catches, and topples (Saphie et al., 2019). The activity profile analysis focused on the action time phase, defined as the period in which athletes were actively engaged in offensive or defensive actions during the match. Each technical action was recorded from its initiation to completion and subsequently classified according to its outcome into three categories: hit target, hit elsewhere, and miss opponent.

Indicators and Observational Reliability

The analyzed indicators included the frequency of each technical action, the mean number of actions performed, and the percentage contribution of each technique to the total number of actions during the match. All indicators were compared between winning and losing athletes to identify differences in activity characteristics associated with match outcomes. To ensure the reliability of the observational data, intra-observer reliability was assessed using the intraclass correlation coefficient (ICC). All matches were analyzed by the same observer across two separate observation sessions with a 48-hour interval. ICC values were calculated for total actions as well as for each outcome category to evaluate the consistency of coding across observations. The observer was an experienced silat practitioner with a strong understanding of technical characteristics and competition rules of silat tempur, which was

essential given the speed and complexity of athletes' movements during matches.

Data Analysis

Match notation data were recorded and processed using Microsoft Excel and subsequently analyzed using SPSS version 24.0. Descriptive statistical analysis was employed to describe the activity profiles of winning and losing athletes during matches. Furthermore, paired samples t-tests were conducted to examine differences in performance indicators between winning and losing athletes, with the level of statistical significance set at $p < 0.05$.

3. Results and Discussion

Results

This section presents the results of the analysis of young male Silat Tempur matches obtained through video-based match analysis. The results are reported descriptively to illustrate the characteristics of activity patterns during action time based on empirically coded match data. All findings are presented in tabular form to provide a clear and objective quantitative description of match activities without theoretical interpretation. The results of the intra-operator reliability analysis are presented in Table 1.

Table 1. Reliability of silat data (95% CI)

Variable	Intraclass correlation coefficient	
	Single measures	Average measures
Total Actions	0.957 (0.878 – 0.987)	0.979 (0.935 – 0.993)
Total Hit Elsewhere (HE)	0.995 (0.983-0.998)	0.997 (0.992-0.999)
Total Hit Target (HT)	1.000 (0.999-1.000)	1.000 (0.999-1.000)
Total Miss Opponent (MO)	0.999 (0.998-1.000)	1.000 (0.999-1.000)

Table 1 shows that the intraclass correlation coefficient (ICC) values for all variables indicate strong to very strong agreement, demonstrating high consistency in the coding of actions and outcomes across repeated observations. The frequency of actions and their outcomes during silat tempur matches is presented in Table 2.

Table 2. Frequency action and outcome recorded during silat tempur matches.

Exponent	Outcome			Total
	Hit Elsewhere	Hit Target	Miss Opponent	
Block	1	16	2	19
Punch	17	33	6	56
Kick	25	20	14	59
Catch	1	0	1	2
Topple	0	0	0	0
Total	44	69	23	136

Note: All data shows mean action from 7 matches.

Table 2 shows that hit target outcomes accounted for the highest proportion of actions (50.6%), followed by hit elsewhere (32.5%) and miss opponent (16.9%). Kicks and punches were the most frequently performed techniques. The comparison of action frequencies between winners and losers is presented in Table 3.

Table 3. Frequency of actions between winners and losers.

Exponent	Actions					Total
	Block	Punch	Kick	Catch	Topple	
Winners	13	30	36	0	0	79
Losers	6	26	23	2	0	57
Total	19	56	59	2	0	136

Note: All data shows mean action from 7 matches.

Table 3 shows that winners recorded a higher total number of actions (79 actions, 59%) compared with losers (57 actions, 41%). In both groups, kicking and punching were the most frequently used techniques. Winners demonstrated higher frequencies of kicking and blocking actions, while catch actions were only observed among losers. The distribution of action outcomes between winners and losers is presented in Table 4.

Table 4. Frequency of outcome between winners and losers.

Exponent	Outcome			Total
	Hit Elsewhere	Hit Target	Miss Opponent	
Winners	22	48	9	79
Losers	22	21	14	57
Total	44	69	23	136

Note: All data shows mean action from 7 matches.

Table 4 shows that winners recorded a higher frequency of hit target outcomes compared with losers. In contrast, the frequency of hit elsewhere outcomes was similar between the two groups, while miss opponent outcomes occurred more frequently among losers. These findings indicate that differences in match outcomes are more strongly influenced by the accuracy of attacks

rather than by the total number of actions performed. A summary of the paired samples t-test results comparing winners and losers is presented in Table 5.

Table 5. Paired Samples t-test Summary Between Winners and Losers

Outcome Variable	Mean Difference	t	df	P-value
Hit Target Outcomes	3.86	2.690	6	0.012

Table 5 shows a significant difference between winners and losers in hit target outcomes. The paired samples t-test confirmed that this difference was statistically significant ($p < 0.05$). These findings indicate that the ability to direct attacks accurately toward the target makes an important contribution to match success.

Overall, the results indicate that hit target was the most frequent outcome during action time in young male Silat Tempur matches. Winners demonstrated a higher total number of actions and a greater proportion of hit target outcomes compared with losers. Kicking and punching were the most frequently performed techniques by both groups, while catch actions occurred infrequently and no topple actions were recorded. A significant difference between winners and losers was observed only for hit target outcomes, whereas no differences were identified for hit elsewhere or miss opponent outcomes.

Discussion

The main findings of this study indicate that winning athletes produced a significantly higher number of hit targets than losing athletes. This result suggests that success in silat tempur competition is not determined solely by the total number of actions performed, but rather by the effectiveness of those actions in generating scores. This finding is conceptually consistent with research in other combat sports, such as amateur boxing and Muay Thai, which has reported that winning athletes tend to demonstrate higher attack success rates than losing athletes, despite having relatively similar total action volumes (Bhumipol et al., 2023; Ouergui et al., 2014). Accordingly, action effectiveness can be regarded as a key performance indicator in match-based combat sports.

The dominance of kicking and punching techniques observed in both groups reflects the technical characteristics of silat tempur competition. However, winning athletes exhibited a higher proportion of kicking actions compared to losing athletes. This finding indicates that kicking techniques play an important role in supporting competitive success. Previous studies in sport silat

and other striking-based combat sports have similarly reported that punches and kicks are the most frequently executed techniques during competition (Shapie et al., 2018). Furthermore, research by Shapie et al. has shown that techniques with longer reach, such as kicks, may provide advantages in controlling distance and creating more effective scoring opportunities (Shapie, Kusrin, et al., 2019). Although this study did not include anthropometric data, the higher frequency of kicks among winning athletes highlights the substantial contribution of this technique within the competitive context of youth silat tempur.

In addition to offensive actions, winning athletes also demonstrated a higher frequency of defensive actions in the form of blocking compared to losing athletes. This indicates that winning athletes not only excel in scoring but are also more capable of managing defensive aspects throughout the match. In silat tempur, maintaining a balance between attack and defense plays a crucial role in limiting opponents' scoring opportunities while sustaining control over the contest. These findings are consistent with tactical match analysis studies in pencak silat, which have reported significant differences in offensive and defensive action patterns based on match outcomes, with winning athletes tending to apply defensive strategies more effectively than their losing counterparts (Mujahid & Subekti, 2021; Subekti et al., 2021).

Another noteworthy finding is the low frequency of catch techniques and the absence of topple techniques during the analyzed matches. Although topple techniques yield higher scoring values, their execution requires more complex coordination, precise timing, and greater physical control. Such demands may influence technical selection during competition. Youth athletes tend to favor techniques that are simpler, safer, and easier to control, particularly under competitive conditions. This pattern aligns with long-term athlete development frameworks, which suggest that complex coordination abilities, neuromuscular control, and tactical maturity are not yet fully developed during youth stages, leading to less frequent use of highly complex techniques in competition (Lloyd & Oliver, 2012). Similar findings have also been reported in other combat sports, indicating that complex techniques are relatively underutilized due to limitations in coordination, strength, and tactical maturity among athletes (Casolino et al., 2012; Tornello et al., 2013).

From a practical perspective, the findings of this study offer important implications for the development of youth silat tempur athletes. Training programs should not focus solely on increasing the volume of actions, but should place greater emphasis on improving the accuracy and effectiveness of scoring actions. In addition, the

development of defensive skills and the gradual introduction of more complex techniques, such as catch and topple, should be implemented progressively and aligned with athletes' physical, technical, and psychological development.

This study has several limitations that should be acknowledged. The number of matches analyzed was relatively limited and involved only male athletes, which restricts the generalizability of the findings. Furthermore, the reliance on publicly available video recordings constrained the collection of anthropometric and physiological data. Future research is therefore encouraged to include larger samples, incorporate female athletes, and integrate more comprehensive performance indicators to enhance understanding of the determinants of success in silat tempur.

Overall, this study provides initial empirical evidence on activity profiles during action time in male youth silat tempur matches. The findings emphasize that the effectiveness of scoring actions, supported by the dominance of punching and kicking techniques and a balanced integration of offensive and defensive actions, plays a critical role in determining match success. Consequently, this research contributes to the performance analysis literature in combat sports and may serve as an evidence-based reference for the development of silat tempur athlete training programs.

4. Conclusion

This study demonstrates that performance differences between winning and losing male youth athletes in silat tempur matches are primarily determined by the effectiveness of actions in producing hit targets rather than by the sheer volume of actions performed. Winning athletes tend to exhibit more effective activity profiles, characterized by the dominance of punching and kicking techniques, a higher frequency of blocking actions, and a greater ability to balance offensive and defensive strategies throughout the match. In contrast, more complex techniques such as catch and topple are rarely employed, reflecting technical constraints and the physical development stage of youth athletes.

5. Acknowledgment

We would like to thank Akademi Silat Malaysia and Pertubuhan Seni Gayung Fatani Malaysia for volunteering for the study especially to Grandmaster Aminuddin Anuar his support in this study. Special thanks to Institute of Research Management and Innovation, Universiti Teknologi MARA for the financial support for this research (600-RMC/GIP 5/3 [161/2021]).

6. Author Contributions

MNMS, MFCA, dan HS berkontribusi dalam konseptualisasi penelitian, perancangan studi, dan pengembangan kerangka metodologi. MNMS, HS, dan DAS terlibat dalam pengumpulan data serta pengawasan pelaksanaan penelitian di lapangan. MRA, NMA, dan VP bertanggung jawab atas analisis data, interpretasi hasil, serta validasi temuan penelitian. NSN, JK, dan NAB berkontribusi dalam penyusunan draf awal manuskrip dan pengembangan bagian hasil serta pembahasan. MAMN memberikan masukan substantif melalui proses peninjauan kritis dan penyempurnaan naskah. Seluruh penulis membaca, meninjau, dan menyetujui versi akhir manuskrip untuk dipublikasikan.

7. Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this article. The funding body had no role in the study design, data collection, data analysis, interpretation of results, or decision to publish the manuscript.

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