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PERFORMANCE ANALYSIS IN K-1 KICKBOXING DISCIPLINE - CASE STUDY

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Original research

ABSTRACT

The present study aims to analyze the performance discrepancies between a specified case study fighter and his opponents across 18 competitive kickboxing matches. The research involved a sample comprising of a singular subject pitted against 18 distinct opponents (n=19) in a series of competitive kickboxing bouts, all male participants possessing a minimum of five years of experience in kickboxing. A total of 40 variables were identified, of which 37 were designated to evaluate technical prowess, while the remaining 3 focused on tactics. The assessment of performance, based on video recordings, was carried out by a panel of three evaluators.

To ascertain the disparities in the efficacy of technical and tactical components between the case study fighter and his opponents, the Chi-square test of total frequencies variance was employed at a statistical significance level of 0.05, utilizing the IBM SPSS 26.0 software. Standardized residuals exceeding +2.0 and falling below -2.0 were instrumental in identifying the key variables contributing to the overall divergence between the case study fighter and his opponents.

The outcomes of the study revealed a significant statistical contrast between the case study fighter and his adversary across 23 variables, encompassing hand-based strikes in 6 instances, leg-based strikes in 9 instances, arm and leg defense in 4 instances, advanced defense techniques in 3 instances, method of victory in 1 instance, and tactics in 1 instance. The research findings shed light on the distinct disparities between the case study fighter under examination and his opponents, highlighting the opponents' heightened usage of hand and foot strikes as opposed to the case study fighter's superior proficiency in hand and foot defenses, alongside adept employment of advanced defensive maneuvers.

Keywords: kickboxing: K-1 discipline, performance, Chi-square test, technique, tactics.

INTRODUCTION

In the realm of elite sports, the assessment of situational effectiveness plays a pivotal role in gathering data geared towards enhancing competitors' performance. Kickboxing, a contemporary martial art form, encompasses diverse sports disciplines, with K-1 emerging as one of the most captivating disciplines necessitating consistent performance analysis to enhance competitive capabilities (Kapo, 2010). Engaging in competitive bouts within the K-1 kickboxing discipline instills considerable stress, underscoring the imperative need for a systematic approach towards athlete preparation (Rydzik, 2021). Attaining top-tier results in sports hinges upon multifaceted factors, with competitive activity analysis standing out as a critical determinant. In high-level kickboxing, significant muscle strength development in both upper and lower extremities is essential, complemented by psychological attributes such as self-confidence, motivation, dispositional hope, optimism, mental resilience, and adaptive perfectionism which have been demonstrated to distinguish successful from less successful kickboxers (Slimani et al., 2017). The collection of data aims to provide benchmarks for enhancing training regimens, acknowledging disparities in technical-tactical proficiency across varying competitive tiers, from world championships to local tournaments (Rydzik, 2022). As the level of competition

escalates, the demand for meticulous data analysis and application intensifies correspondingly. During training sessions, athletes are advised to concentrate on formulating effective combinations of punches and kicks (Ambrozy et al., 2020). Originating from a fusion of boxing, karate, taekwon-do, kung fu, and other oriental martial arts, kickboxing embodies the fundamental goal of outperforming adversaries through superior technique, speed, and strength, all while upholding values of safety, tolerance, integrity, and honor. Western in origin, kickboxing stands as a distinct response to numerous Eastern martial traditions. Within the K-1 discipline, kickboxers aim to vanquish opponents utilizing forceful techniques, ensuring precision, speed, and resoluteness in delivering strikes on sanctioned body areas. Strikes to the head and torso are permissible from frontal and sideward angles, while kicks and knees are authorized to target the legs, including all joint areas. Moreover, grapplings involving the opponent's neck and shoulders for knee strikes are within the purview of permissible maneuvers. (http://wako.sport/en/). The technical-tactical advantages inherent in martial sports and skills are meticulously defined and refined within the distinctive framework of K-1 rules, carefully crafted to optimize anthropological, morphological, psychological, structural, technical, and tactical performance potential. Within the highly dynamic and ever-evolving realm of combat, a fighter must adeptly leverage technical-tactical stereotypes, swiftly adapt these strategies, and continuously develop defensive, offensive, and counter-attack action plans. The intricate array of technical elements and their complexities render it impractical for fighters to achieve mastery across all K-1 techniques of equal quality. Therefore, elite fighters at advanced technical levels typically focus on mastering techniques that align with their specific needs and morphological attributes. Engaged in direct confrontation with an adversary, a fighter must surmount the opponent's resistance, actualize personal intentions, anticipate and thwart the opponent's intentions, and ultimately secure victory. Key morphological characteristics such as longitudinal skeletal dominance, motor proficiency, quick reflexes, agility, and comprehensive technical and tactical acumen play pivotal roles in this context (Kapo, 2010). The energy dynamics of K-1 sports are underpinned by stress intensity and fight duration, showcasing a harmonious representation of all three fundamental energy pathways (alactate, lactate, and aerobic) within K-1 competition (Buse 2009, Zabukovec, 1995). In alignment with the objectives of the sport, strategic utilization of energy-efficient techniques in optimal locations and timings is paramount to achieving maximum impact with minimal energy expenditure, with a knockout being the most efficient route to victory (Ambrozy, 2020). Sports technique embodies a rational, biomechanically efficient execution of movement structures specific to a given sport, aimed at solving defined tasks and enabling athletes to express their abilities to the fullest extent—decisively influencing outcomes in various sports disciplines. To gauge the technical prowess of K-1 fighters, a comprehensive evaluation encompassing all relevant parameters defining their preparedness is essential. The tactical dimension of K-1 delineates a strategic framework that integrates various fighting components, instilling order, purpose, and plan execution. In a particular manner, it governs the allocation of physical energy, execution of technical movements, and contributes significantly to the fortitude of the combatant. Tactics in K-1 not only organize physical and technical aspects but also play a role in bolstering the fighter's mental fortitude. Owing to its pivotal role, tactics shape the core activities of a fighter within the ring, with a fighter's technical proficiency serving as the bedrock that underpins their tactical acumen. In combat scenarios, tactical engagement unfolds through three interconnected phases: perceptual analysis of the combat situation, mental resolution, and motoric implementation of tactical objectives.

The aim of the research is to analyze the differences and success in the performance of technical elements and the application of tactical forms through a case study of one fighter in relation to 18 opponents in 18 matches.

METHODS

Sample of Participants

The sample of participants consisted of 19 K-1 kickboxing fighters, with the analysis focused on evaluating the technical-tactical performances of these fighters during their competitive bouts. The central figure of the study is a fighter standing at 174 cm and weighing between 70-76 kg, who engaged in matches against 18 distinct opponents with an average height of 178 cm and an average weight of 74 kg.

Variables

A total of 40 variables were considered for the research, comprising 37 variables for assessing technique and 3 variables for evaluating tactics, covering all movements conforming with the regulations of K-1 kickboxing discipline.

LDIRTH: Left direct to the head, LDIRTS: Left direct to the stomach, RDIRTH: Right direct to the head, RDIRTS: Right direct to the stomach, LHTH: Left hook to the head, LHTS: Left hook to the stomach, RHTH: Right hook to the head, RHTS: Right hook to the stomach, PTH: Left uppercut to the head, LUPTS: Left

uppercut to the stomach, RUPTH: Right uppercut to the head, RUPTS: Right uppercut to the stomach, LFROK: Left front kick, RFROK: Right front kick, LLOK: Left low kick, RLOK: Right low kick, RMIK: Right middle kick, LMIK: Left middle kick, LHIK: Left high kick, RHIK: Right high kick, LKNK: Left knee kick, RKNK: Right knee strike, LHBFP: Left hand block from punches, RHBFP: Right hand block from punches, LHBFK: Left hand block from kicks, RHBFK: Right hand block from kicks, LLBFK: Left leg block from kicks, RLBFK: Right leg block from kicks, DMIA: A defensive manoeuvre involving assuming a crouched position to evade hand strikes. DTHB: A dodging the whole body in order to miss hand and foot strikes. AOSH: The action of shifting the body to either side to evade incoming hand strikes. KNULH: Knockdown using the left hand. KNURH: Knockdown using the right hand. KNWLL: Knockdown with the left leg. KNWRL: Knockdown with the right leg. VIKBKN: A victory by knockout VIKBDE: A victory by decision of the judges. OFFEN: Offensive tactics, DEFEN: Defensive tactics and COMB: Combined tactics

Instruments and Procedure

Utilizing match recordings, data collection and fight analysis were performed by three trained evaluators who met specific criteria. Criteria included holding at least a master's or postgraduate degree in Sports and Physical Education, possessing substantial experience in kickboxing, securing medals in national or international kickboxing competitions, and demonstrating coaching experience. A successful technique was defined as one that successfully targeted the opponent's head or body, and effectively countered opponent techniques through either contact (blocking with hand or foot) or non-contact means (evasion, deflection, or dodging). All procedures adhered to the recommendations of the Helsinki Committee and the ethical standards of the ethical commission at the University of Sarajevo.

Statistical Analysis

Data were analyzed using frequencies, and the Chi-square test with a statistical significance level of 0.05 in the IBM SPSS 26.0 program. Standardized residuals greater than +2.0 or less than -2.0 were used to identify variables contributing significantly to differences in match outcomes between the case study fighter and opponents. Indicators of standardized residuals were utilized to assess the specific individual variables that contribute to the overall variance in frequencies between case study combatants and adversaries.

RESULTS

Table 1. Chi-square test results, indicating a significant difference between the case study fighter and the opponent in the 18 analyzed matches ($\chi 2 = 857.33$, $p < 0.001$).

Table 1. Results of the Chi-square test of differences in performance variables between the case study fighter and the opponent

Chi-Square Tests			
	Value	df	p
Pearson Chi-Square	857.333[a]	39	.000
Likelihood Ratio	903.836	39	.000
Linear-by-Linear Association	413.811	1	.000
N of Valid Cases	6232		

Table 2. Results of the symmetry measures derived from the Chi-square test conducted between the Case study fighter and their opponent.

	Value	p
Phi	.371	.000
Cramer's V	.371	.000
N of Valid Cases	6232	

Table 3. Cross-tabulation of performance variables -punch

			CASE	OPPONENTS	Total
PERFORMANCE-HAND STRIKES	LDIRTH	Count	374	574	948
		Expected Count	529.1	418.9	948.0
		Adjusted Residual	-11.0	11.0	
	LDIRTS	Count	9	6	15
		Expected Count	8.4	6.6	15.0
		Adjusted Residual	.3	-.3	
	RDIRTH	Count	118	214	332
		Expected Count	185.3	146.7	332.0
		Adjusted Residual	-7.6	7.6	
	RDIRTS	Count	5	10	15
		Expected Count	8.4	6.6	15.0
		Adjusted Residual	-1.8	1.8	
	LHTH	Count	281	338	619
		Expected Count	345.5	273.5	619.0
		Adjusted Residual	-5.5	5.5	
	LHTS	Count	26	42	68
		Expected Count	37.9	30.1	68.0
		Adjusted Residual	-2.9	2.9	
	RHTH	Count	198	314	512
		Expected Count	285.7	226.3	512.0
		Adjusted Residual	-8.2	8.2	
	RHTS	Count	39	34	73
		Expected Count	40.7	32.3	73.0
		Adjusted Residual	-.4	.4	
	LUPTH	Count	34	19	53
		Expected Count	29.6	23.4	53.0
		Adjusted Residual	1.2	-1.2	
	LUPTS	Count	27	15	42
		Expected Count	23.4	18.6	42.0
		Adjusted Residual	1.1	-1.1	
	RUPTH	Count	15	54	69
		Expected Count	38.5	30.5	69.0
		Adjusted Residual	-5.7	5.7	
	RUPTS	Count	5	7	12
		Expected Count	6.7	5.3	12.0
		Adjusted Residual	-1.0	1.0	

Table 2. Displays the symmetry measures of the applied Chi-square test for criterion performance variables and predictor variables, showing Phi as 0.371 and Cramer's V as 0.371.

In Table 3. The findings of the standardized residuals concerning the performance variables associated with the utilization of hand strikes are demonstrated. These variables significantly contribute to the overall disparity observed between the Case Study Fighter and the opponent. The specific hand strikes considered are as follows: left direct to the head (Case Study: -11, Opponent: 11), right direct to the head (Case Study: -7.6, Opponent: 7.6), left hook to the head (Case Study: -5.5, Opponent: 5.5), left hook to the stomach (Case Study: -2.9, Opponent: 2.9), right hook to the head (Case Study: -8.2, Opponent: 8.2), and right uppercut to the head (Case Study: -5.7, Opponent: 5.7). It is evident that the opponents exhibited higher frequencies compared to the fighters in the case study.

Table 4. Cross tabulation of performance variables – kicks

			CASE	OPPONENTS	Total
PERFORMANCE-LEGS STRIKES	LFROK	Count	40	72	112
		Expected Count	62.5	49.5	112.0
		Adjusted Residual	-4.3	4.3	
	RFROK	Count	46	19	65
		Expected Count	36.3	28.7	65.0
		Adjusted Residual	2.4	-2.4	
	LLOK	Count	220	106	326
		Expected Count	181.9	144.1	326.0
		Adjusted Residual	4.4	-4.4	
	RLOK	Count	610	221	831
		Expected Count	463.8	367.2	831.0
		Adjusted Residual	11.0	-11.0	
	RMIK	Count	24	23	47
		Expected Count	26.2	20.8	47.0
		Adjusted Residual	-.7	.7	
	LMIK	Count	18	29	47
		Expected Count	26.2	20.8	47.0
		Adjusted Residual	-2.4	2.4	
	LHIK	Count	20	53	73
		Expected Count	40.7	32.3	73.0
		Adjusted Residual	-4.9	4.9	
	RHIK	Count	59	25	84
		Expected Count	46.9	37.1	84.0
		Adjusted Residual	2.7	-2.7	
	LKNK	Count	6	45	51
		Expected Count	28.5	22.5	51.0
		Adjusted Residual	-6.4	6.4	
	RKNK	Count	6	53	59
		Expected Count	32.9	26.1	59.0
		Adjusted Residual	-7.1	7.1	

Table 4. Illustrates the findings of the standardized residuals concerning performance variables associated with the utilization of kicks, which significantly contribute to the overall discrepancy between the focal fighter in the study and their adversary. These variables include: left front kick (case study -4.3, opponent 4.3), right front kick (case study 2.4, opponent -2.4), left low kick (case study 4.4, opponent -4.4), right low kick (case study 11, opponent -11), left middle kick (case study -2.4, opponent 2.4), left high kick (case study -4.9, opponent 4.9), right high kick (case study 2.7, opponent -2.7), left knee kick (case study -6.4, opponent 6.4), right knee kick (case study -7.1, opponent 7.1). The focal fighter in the study demonstrated a higher frequency of executing kicks.

Table 5. Presents the findings of the standardized residuals pertaining to performance variables associated with the utilization of defensive maneuvers involving hands, feet, and advanced techniques. These variables notably contribute to the greatest extent towards the overall variance between the fighter in the case study and their adversary. Specifically, the following defensive actions were examined: left hand block from punches (case study residual 5.3, opponent residual -5.3), right hand block from punches (case study residual 6.6, opponent residual -6.6), right hand block from kicks (case study residual 7.2, opponent residual -7.2), left leg block from kicks (case study residual -2.9, opponent residual 2.9), defensive maneuver involving assuming a crouched position to evade hand strikes (case study residual 4.9, opponent residual -4.9), dodging the whole body in order to miss hand and foot strikes (case study residual 7.4, opponent residual -7.4), and action of shifting the body to either side to evade incoming hand strikes (case study residual 8, opponent residual -8). The analysis

Table 5. Cross-tabulation of performance variables pertaining to defense using arms, legs, and advanced defense techniques.

			CASE	OPPONENTS	Total
PERFORMANCE-DEFENSE WITH HANDS, LEGS AND ADVANCED DEFENSE	LHBFP	Count	192	76	268
		Expected Count	149.6	118.4	268.0
		Adjusted Residual	5.3	-5.3	
	RHBFP	Count	254	95	349
		Expected Count	194.8	154.2	349.0
		Adjusted Residual	6.6	-6.6	
	LHBFK	Count	62	32	94
		Expected Count	52.5	41.5	94.0
		Adjusted Residual	2.0	-2.0	
	RHBFK	Count	97	11	108
		Expected Count	60.3	47.7	108.0
		Adjusted Residual	7.2	-7.2	
	LLBFK	Count	16	30	46
		Expected Count	25.7	20.3	46.0
		Adjusted Residual	-2.9	2.9	
	RLBFK	Count	1	2	3
		Expected Count	1.7	1.3	3.0
		Adjusted Residual	-.8	.8	
	DMIA	Count	62	12	74
		Expected Count	41.3	32.7	74.0
		Adjusted Residual	4.9	-4.9	
	DTHB	Count	400	168	568
		Expected Count	317.0	251.0	568.0
		Adjusted Residual	7.4	-7.4	
	AOSH	Count	170	35	205
		Expected Count	114.4	90.6	205.0
		Adjusted Residual	8.0	-8.0	

indicates that the fighter in the case study employed a greater number of defensive strategies compared to their opponents.

The findings in Table 6. exhibit the standardized residuals of the performance variables concerning knockdowns and the method of victory. These variables significantly account for the overall discrepancy between the fighter under study and their adversary. Specifically, the analysis highlights victory by knockout with the case study fighter having a value of 2.5 and opponents with a value of -2.5. Remarkably, the case study fighter managed to evade being knocked down throughout 18 fights, whereas their opponents suffered knockdowns on 11 occasions.

Table 7. Presents the outcomes of the standardized residuals regarding the performance variables associated with the deployment of tactics, which significantly impact the overall disparity between the focal fighter in the case study and their adversary. Notably, the key factors examined include offensive tactics, with the case study fighter registering a value of -2.5, whereas the opponent's value stands at 2.5. It is worth mentioning that the case study fighter, who surpassed their opponent in performance, notably favored employing combined tactics.

Table 6. Cross-tabulation of Performance Variables - Knockdowns and Mode of Victory.

			CASE	OPPONENTS	Total
PERFORMANCE-NOCKDOWNS AND MODE	KNULH	Count	3	0	3
		Expected Count	1.7	1.3	3.0
		Adjusted Residual	1.5	-1.5	
	KNURH	Count	2	0	2
		Expected Count	1.1	.9	2.0
		Adjusted Residual	1.3	-1.3	
	KNWLL	Count	2	0	2
		Expected Count	1.1	.9	2.0
		Adjusted Residual	1.3	-1.3	
	KNWRL	Count	4	0	4
		Expected Count	2.2	1.8	4.0
		Adjusted Residual	1.8	-1.8	
	VIKBKN	Count	8	0	8
		Expected Count	4.5	3.5	8.0
		Adjusted Residual	2.5	-2.5	
	VIKBDE	Count	7	2	9
		Expected Count	5.0	4.0	9.0
		Adjusted Residual	1.3	-1.3	

Tabel 7. Cross-tabulation of performance variables- Tactics

			GRUPE		Total
			CASE	OPPONENTS	
TACTICS	OFFEN	Count	2	9	11
		Expected Count	6.1	4.9	11.0
		Adjusted Residual	-2.5	2.5	
	DEFEN	Count	1	1	2
		Expected Count	1.1	.9	2.0
		Adjusted Residual	-.2	.2	
	COMB	Count	15	8	23
		Expected Count	12.8	10.2	23.0
		Adjusted Residual	.9	-.9	

DISCUSSION

The aim of the present study was to analyze the performance disparities between the focal case study fighter and their adversaries across 18 matches. Analyzing the data gathered from the Chi-square test results reveals a statistically significant variance in performance between the case study fighter and their opponents. While indicating a general difference in performance, these outcomes fail to pinpoint the specific segments contributing the most to this difference, which could be crucial for refining the training regimen. A more detailed insight into these differences was provided through cross-tabulation data, encompassing observed and expected frequencies alongside standardized residuals that highlight the variables exerting the greatest influence on the overall variation between the case study fighter and the opponent. The comparison of observed frequency differences related to hand strike applications is delineated in Table 1. Based on the values of the standardized residuals, six variables stand out in the analysis. Concerning the variables associated with hand strikes, the standardized residuals indicate that the opponents exhibited a higher number of observed frequencies when compared to the expected frequencies of the case study fighter across all six variables. The predominant hand strike utilized is the left direct to the head, with standardized residuals of -11 for the case study fighter and 11 for the opponents. This preference for left direct punches can be attributed to their technical simplicity and their effectiveness in creating distance during combat engagements. Additionally, the analysis reveals that a right direct to the head, with standardized residuals of -7.6 for the case study fighter and 7.6 for the opponents, is statistically significant but occurs less frequently than the left direct punch. This discrepancy is likely due to the strategic advantage of the left hand being closer to the opponent, facilitating distance management and setting up subsequent strikes or kicks. Moreover, the consistent use of kicks is a prevalent feature in kickboxing matches. This finding is in line with prior research, such as studies by Kapo (2008), Davis et al. (2015), and El-Ashker (2011), which similarly highlighted the prevalence of direct punches over other forms of hand strikes.The rationale behind this outcome can be elucidated by the relatively simplistic nature of these techniques in attaining optimal results with minimal energy expenditure as noted by El-Ashker (2011), Hickey (2006), and Blower (2007). In assessing the impact of left hook variables, the statistical significance of the standardized residuals pertaining to left hook to the head and right hook to the head interactions among fighters and opponents in the case study can likely be attributed to the inherent naturalness and frequent utilization of the hook punch,

as suggested by Kapo et al. (2006). The study delved into the application of hand techniques in K-1, focusing on participants aged between 21 and 39. Trend analysis pointed towards a proclivity for using left and right hooks alongside left uppercuts, revealing notable discrepancies between the case study fighter and the opponent. Other researchers have found that the left uppercut to the body is the most common strike in K-1 (Kapo et al., 2008), likely because fighters aim for the right side of the opponent's abdomen, where the liver is located, making it the most sensitive target on the body. Davis et al. (2015) conducted a study on the finals and semi-finals of the Olympic tournament, finding that the winners had a lower number of strikes but still dominated, probably due to greater accuracy and the impression made on the judges. The right uppercut to the head (case study -5,7, opponents 5,7) is one of the least common strikes in K-1, likely because it is the most technically demanding to execute, leading fighters to use it less frequently.If we partially examine hand strikes in relation to other variables, it is evident that the opponents more frequently used most hand strikes compared to the case study fighter. This could call into question the outcomes of the matches that the case study fighter mostly won. However, in response to this assumption, it should be noted that the case study fighter utilized significantly more hand defenses and advanced defenses against hand strikes than the opponents, thereby neutralizing a large number of the opponents strike attempts. Slimani et al. (2017) conducted a study on the activity profiles of elite kickboxers, involving 72 participants. The analysis revealed that competitors used their hands 63.4% of the time and their legs 36.6% of the time, with a higher frequency of targeting the head (59.6%) compared to the body (43.1%). Based on these findings, it can be concluded that training must be adapted to specific demands to develop technical-tactical skills that increase the chances of victory. Davis et al. (2015) conducted a study analyzing the performance of elite female amateur boxers and comparing it with their male counterparts. The boxers analyzed were at the highest level of their sport.Footage from 18 bouts was analyzed. Body strikes emerged as the specific techniques differentiating winners from losers. These findings will be valuable for those designing training programs and may also inform fitness testing protocols. An analysis of individual performance variables related to kick application (Table 2) was conducted to determine their contribution to the overall frequency difference. The case study fighter employed certain kick techniques more frequently than their opponents, specifically: right front kick, left low kick, right low kick, and right high kick. Conversely, the opponents demonstrated higher frequency in the use of left front kick, left middle kick, left knee kick, and right knee kick. The right low kick emerged as the most frequently utilized kick technique. The case study fighter executed this particular kick technique nearly three times more frequently than their opponents (case study: 610, opponents: 221). This disparity can likely be attributed to several factors: the technique's lower technical and energy demands compared to other kick types, a reduced risk of receiving counter-strikes, and its utility in setting up more advanced techniques such as high roundhouse kicks, which the case study fighter employed more frequently than their opponents. The right low kick may serve as a preparatory move, enabling the fighter to transition to more complex maneuvers. Examining the method of victory, the standardized residual values indicate statistical significance in the variable of knockout wins. Revisiting the knockdown frequencies, it is evident that the case study fighter achieved 4 knockdowns with the right leg and 2 with the left leg, likely resulting from low kicks used to set up high roundhouse kicks. In kickboxing, the high kick is recognized as the most prevalent technique for achieving knockout victories (Ambrozy et al., 2020). Regarding tactical approaches, the standardized residual values revealed statistical significance for the offensive tactics variable, which was more frequently employed by the opponents. Overall effectiveness favored the case study fighter, who responded to the offensive tactics which proved suboptimal against this particular fighter through a combination of hand defenses, advanced defensive maneuvers, and kick combinations. This resulted in a mixed tactical approach alternating between defense and offense, characterized by a high volume of precise strikes. This strategy ultimately led to the case study fighter securing victories via stoppage or knockout against their opponents. Other research in other combat sports (taekwondo) indicates that competitors more frequently employed an offensive strategy (Casolino et al., 2012; Matsushigue et al., 2009). Ouergui and colleagues (2013) conducted a study on the technical-tactical analysis of high-level kickboxing matches and found that the winners utilized a more offensive strategy. This issue has been addressed by many researchers, such as Pityn et al. (2017), who conducted a study on the dynamics of the technical and tactical action index of qualified individual fighting styles in kickboxing. When examining the technical style and technical-tactical approach of athletes from various combat disciplines in competitive activities, four common fighting styles have been identified: points fighters, continuous fighters, knock out fighters, and versatiles. Kapo and colleagues (2011) conducted a study on the differences in the use of technical and tactical elements between winners and losers among K-1 super heavyweight fighters in Japan in 2010. The results indicate that winners more frequently utilized both hand and leg techniques compared to the

defeated fighters, predominantly employing offensive tactics. On the other hand, defeated fighters more commonly employed defensive techniques and defensive tactics. Ouergui and colleagues (2013) conducted a study on the analysis of techniques and tactics in elite kickboxing matches. A total of 45 matches (135 rounds) involving male competitors from the 2009 and 2011 World Championships were analyzed. The analysis was based on a notation system for determining technical and tactical aspects. The results of the analysis indicate that offensive actions were utilized, with the most common strikes being direct strikes. The results suggest the conclusion that more practice should be dedicated to an offensive fighting style. Ouergui et al. (2015) conducted a study focusing on hormonal, physiological, and physical performance during a simulated kickboxing bout to examine disparities between victorious and defeated participants. An observable contrast emerged in the performance metrics related to a higher frequency of direct and cross kicks, roundhouse kicks, total kicks, and attacking strategies in favor of the triumphant combatants. El Ashker (2011) investigated the technical and tactical elements distinguishing successful from unsuccessful outcomes in boxing contests. Analysis of the technical-tactical domain disparity between victorious and vanquished pugilists revealed that the former exhibit a higher propensity for executing offensive maneuvers targeting the head and body, utilizing hand strikes, combinations, and engaging in defensive maneuvers to a significantly greater extent, thereby demonstrating heightened competitive efficacy. In a study by Ljubisavljević et al. (2021), an examination was conducted on the prevalence of distinct punching and kicking techniques throughout kickboxing competitions, utilizing data from the 5th Balkan Best Fighters Tournament. The analytical sample comprised fifteen championship matches, corresponding to a total of thirty combatants. Results unveiled that the most commonly employed offensive maneuvers encompassed the crouch (28.49%) and low kick (28.60%).

CONCLUSION

The results of this research indicate the importance of advanced techniques both in attack and defense. Opponents were more frequent in the use of punches and kicks, while the case study fighter was more successful in the use of hand and legs defenses, and advanced defenses that, along with the precision and efficiency of legs techniques, especially the right low kick, as well as high kicks (left and right) were crucial when it comes to the ultimate goal, which is victory. The practical implication of these findings lies in their potential to enrich the educational and training regimen of aspiring kickboxers. By elucidating the strategies adopted by victorious athletes, these insights hold potential value for the Kickboxing Federation of Bosnia and Herzegovina in enhancing the competitive readiness of its athletes.

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Conflict of Interest

The authors do not have any conflicts of interest to disclose. All co-authors have reviewed and concurred with the manuscript's content, and no financial interests need to be reported.