

The Effect of COVID-19 Pandemic on Judo Match Performance: Descriptive Research

COVID-19 Pandemisinin Judo Müsabaka Performansına Etkisi: Tanımlayıcı Araştırma

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ABSTRACT Objective: The purpose of this study is to examine the match-related performance (scores and penalties) of the athletes in the Junior European Judo Championship (EJC) and U23 EJC categories before and immediately after the coronavirus disease-2019 (COVID-19) quarantine, according to gender and weight category groups. **Material and Methods:** Our sample was based on the junior and U23, male and females, 2019-2020 Junior EJCs and 2019-2020 U23 EJCs. A total of 1,431 matches in these tournaments were analyzed: male (n=812) and female (n=619). **Results:** The main findings of this study showed that most matches in both the male and female categories resulted in Ippon (2019-2020 average: 64.35% for Junior male, 70.55% for U23 male and 69.3% for Junior female, 64.4% for U23 female). No significant differences ($p>0.05$) were observed between gender and age groups concerning the match scores. **Conclusion:** In order to minimize performance losses in athletes in similar processes such as COVID-19, training programs should be carefully planned in terms of the number, intensity and scope of training, taking into account individual differences. It is worth noting that the frequency of buying Ippon for male and female has increased in post quarantine competitions; the reason for this situation may be not to prolong the match, to finish the match by taking Ippon early, or to preserve the energy as if he will compete at any moment. Therefore, judo athletes must be tactically prepared to face these situations.

Keywords: Score analysis; judo competitive performance; performance analysis; COVID-19

ÖZET Amaç: Bu çalışmanın amacı, gençler Avrupa Judo Şampiyonası [European Judo Championship (EJC)] ve U23 EJC kategorilerindeki sporcuların koronavirüs hastalığı-2019 [coronavirus disease-2019 (COVID-19)] karantinası öncesi ve hemen sonrasındaki maçla ilgili performanslarını (skorlar ve cezalar) cinsiyet ve ağırlık kategorisi gruplarına göre incelemektir. **Gereç ve Yöntemler:** Örneklemimiz, gençler ve U23, erkekler ve kadınlar, 2019-2020 Gençler EJC ve 2019-2020 U23 EJC'ye dayanmaktadır. Bu turnuvalardaki toplam 1.431 maç analiz edilmiştir: erkek (n=812) ve kadın (n=619). **Bulgular:** Bu çalışmanın ana bulguları, hem erkek hem de kadın kategorilerindeki maçların çoğunun Ippon ile sonuçlandığını göstermiştir (2019-2020 X: genç erkekler için %64,35, U23 erkekler için %70,55, genç kadınlar için %69,3, U23 kadınlar için %64,4). Cinsiyet ve yaş grupları arasında maç puanları açısından anlamlı bir fark ($p>0,05$) gözlenmemiştir. **Sonuç:** COVID-19 gibi benzer süreçlerde sporcularda performans kayıplarını en aza indirmek için antrenman programları bireysel farklılıklar göz önünde bulundurularak antrenman sayısı, yoğunluğu ve kapsamı açısından dikkatli bir şekilde planlanmalıdır. Karantina sonrası müsabakalarda erkek ve kadınlarda Ippon alma sıklığının arttığını belirtmekte fayda var; bu durumun sebebi maçı uzatmamak, erken Ippon alarak maçı bitirmek ya da her an müsabakaya çıkacakmış gibi enerjiyi korumak olabilir. Bu nedenle judo sporcuları bu durumlarla karşılaşmaya taktiksel olarak hazırlıklı olmalıdır.

Anahtar Kelimeler: Puan analizi; judo müsabaka performansı; performans analizi; COVID-19

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Judo is a high intensity, intermittent combat sport in which many physical characteristics are required to achieve optimal technical tactical development and competitive success.^{1,2} In official judo competitions, athletes are classified according to gender (male and female), age (U13, U15, U18, U21 and senior) and weight categories. During competitive combats, athletes seek to establish an advantage based on different valid scores (e.g. Ippon or Wazari) or to induce penalties in opponents (e.g. shido), for this judo athletes use different approaches related to technical tactical strategies in official competition, involving technical variability, groundwork transition strategies and attack side and direction as an example.³⁻⁷

The proportion and variety of techniques used in a judo competition may vary depending on gender, weight categories and competition outcome.⁸

Examining more than one competition in judo according to weight, scores or gender category variables is mostly due to the rule change made by the International Judo Federation (IJF).⁹⁻¹⁶ In addition, in the event of an epidemic crisis, the deficiencies of the study in which judo competitions were examined according to various variables attracted attention.

The coronavirus disease-2019 (COVID-19) quarantine seen in all countries around the world has created critical changes in the field of sports as in many other fields. Among these, the cancellation of important competitions in the 2020 match calendar, which carry points for the Olympics, can be considered as a separate crisis situation. Especially for performance athletes, the COVID-19 process caused restrictions, postponements and disruptions in training and competition programs.^{17,18} This process will definitely have effects on the results of competition performance in performance athletes.¹⁹ According to the literature, it is stated that the loss of performance of athletes alone occurs within 2-4 weeks.¹⁹ Therefore, the recovery of performance athletes requires more challenging and comprehensive training processes.

Ensuring development in athletes through training requires training stimuli at optimal intensity. The interruption of these training stimuli leads to loss of performance, that is, the decrease in the state

achieved in training is called “detraining”.²⁰ For this reason, the COVID-19 process has caused many performance athletes, regardless of branch, to face “detraining” syndrome.

The biggest consequences of this syndrome are seen in max VO₂, general endurance, specific fitness and coordination levels.²¹ At the same time, it is stated in the literature that this syndrome causes changes and disturbances in the psychological factors of athletes.²²

Studies have examined the effects on skills such as endurance, conditioning and coordination in athletes.^{21,22} When we adapt this situation to the judo branch, it is thought that there will be changes in the scores in matches and technical-tactical components in the competition with the return of athletes who have experienced a decrease in training due to quarantine.

It is thought that with the return of athletes to the matches, there will be changes in the competition scores and technical tactical components of the competition.

Therefore, the main hypotheses of this study are that the match scores of the athletes who experience a decrease in training due to the quarantine will change and will also change in gender and weight categories.

Research aim: To examine match related performances (e.g. scores and penalties) of athletes in the Junior European Judo Championships (EJC) and U23 EJC categories by gender and weight category groups before and immediately after COVID-19 quarantine.

MATERIAL AND METHODS

DESIGN

This research is a descriptive study and the relational survey model, which is one of the general survey models, was used in the research.²³ The method of the research is observation based notational data collection.

SAMPLES AND VARIABLES

Within the scope of this study: After the postponement of the competitions due to the COVID-19 epi-

demic in March 2020, the junior and U23 category matches held in November, as well as the Junior EJC and U23 EJs held in 2019, male and female in total, constitute the universe of our 1944 official competition research been taken under. However, in 513 of these matches, the athletes did not compete by passing bye. For this reason, the universe of our research consists of 1,431 competitions in 14 weight categories (7 female, 7 male). In order to increase the validity and reliability of our research, sampling was not done, and the entire universe (n=1,431) was reached.

PROCEDURES

A total of 1431 matches in these tournaments were analyzed: 812 for male and 619 for female. The analyses were documented by a judo expert coach of the IJF. Information related to the match variables performance, such as the number, type of scores (Wazari and Ippon) and penalties during matches are taken from the Official Results Books of the IJF for further analysis.²⁴ Considering that the analyzed data were obtained from an open access website in secondary form and were not produced experimentally, there is no ethical problem in examining or interpreting them.^{6,8} This research waives ethics committee approval as it does not directly involve human participants.

STATISTICAL ANALYSIS

By using the SPSS 25 (Armonk, NY: IBM Corp) program in the comparison of the variables of the research data; frequency, percentage, mean, standard deviation results from descriptive statistics were used. Average results: It was interpreted by calculating “category number row spacing ÷ category number”. Independent chi-square tests were used to test the association between different match scores and gender groups, weight categories and probability coefficient to confirm the degree of relationship for all variables. The correlation strength of the tests with a significant difference was calculated with the “contingency coefficient”. The effect size used was Cramér’s V effect size’s (ES≤0.2 weak, 0.2<ES≤0.6 moderate, ES>0.6 strong effect).²⁵

RESULTS

The ratios of the pre-post COVID-19 match scores of the athletes in the junior and U23 category according to the gender variable are given in Table 1. There is an increase of 12.5% in the average score of junior males Ippon after COVID-19. There is a 7.7% decrease in Wazari scores.

There is an increase of 5.2% average score of U23 females Wazari score after COVID-19 alone. There is no significant change in other score types.

TABLE 1: Match related variables statistics of junior and U23 athletes by gender.

Category	Score	n	Weight				
			Female			Male	
			%	$\bar{X}\pm SD$	n	%	$\bar{X}\pm SD$
EJCJ-2019	Ippon	117	69.2	1.41 (±0.67)	128	58.2	1.53 (±0.68)
	Wazari	34	20.1		68	30.9	
	Shido	18	10.7		24	10.9	
EJCJ-2020	Ippon	120	69.4	1.43 (±0.70)	158	70.5	1.36 (±0.59)
	Wazari	31	17.9		52	23.2	
	Shido	22	12.7		14	6.3	
EJCU23-2019	Ippon	79	65.3	1.50 (±0.74)	109	69.9	1.37 (±0.61)
	Wazari	24	19.8		36	23.1	
	Shido	18	14.9		11	7.1	
EJCU23-2020	Ippon	99	63.5	1.48 (±0.69)	151	71.2	1.34 (±0.58)
	Wazari	39	25		49	23.1	
	Shido	18	11.5		12	5.7	

2019: Pre-pandemic; 2020: Post-pandemic; EJCJ: European Judo Championship Junior; EJCU23: European Judo Championship U23; SD: Standard deviation.

According to Table 1, when the score rates for the years 2019-2020 are compared, Junior female's match winning rates with Ippon, Wazari and Shido scores are similar, while Junior male's match winning rate with Ippon has increased by 6.9%.

There was a 11.92% decrease in the U23 female's match winning rate with Ippon, while there was no significant change in the Wazari and Shido scores.

In the U23 men's category, there was a 10.42% decrease in the match winning rate with Wazari.

The comparisons of the match score of the Junior and U23 athletes before and after COVID-19, considering the gender variable, are shown in Table 2.

A low but statistically significant positive correlation was found between covid time (before and after) and competition scores in youth and U23 judo athletes in both groups, only in the male category.

The comparisons of the match related scores of the junior and U23 judo athletes category, considering the weight variable, are shown in Table 3.

When calculating the averages of match points, a statistical scoring range was determined. To determine which category the average belongs to, the category range was divided by the number of categories ($2/3=0.66$). The averages were categorized as Ippon: 1-1.66; Wazari: 1.67-2.33; Shido: 2.34-3.

Considering the weight variable of the athletes in the junior and U23 category, as a result of the com-

parisons of the match score; in U23 category in all three categories of the score variable, there is a significant difference between before and after COVID-19 according to the weight variable Ippon; [$\chi^2(18)=67.930$, $p<0.05$], Wazari; [$\chi^2(18)=42.603$, $p<0.05$], Shido; [$\chi^2(18)=25.303$, $p<0.05$]. The calculated relationship strengths were low for Ippon (0.372) and moderate for Wazari (0.459) and Shido (0.538).

DISCUSSION

It was seen in the literature review that similar situation occurred in all branches during the pandemic period. However, since Judo is an individual sport, it is thought that the results will be felt more dominantly on the competition performance and this study was conducted in order to see the results of this. The main findings of this study indicated partially confirmed our initial hypothesis. Specifically, it was observed that the Ippon score ratio increased in almost all pre-post quarantine data. In addition, it was observed that the Ippon score was significantly higher than the other score types (2019-2020 average: 64.35% in Junior male, 70.55% in U23 male and 69.3% in Junior female, 64.4% in U23 female). However, the hypothesis that the quarantine period will differ in the match scores of judo athletes by gender and weight category has not been confirmed, as no difference has been found.

A situation similar to our study is the studies in which the frequency of winning matches with Ippon

TABLE 2: Change of match related by gender in junior judo athletes before and after COVID-19.

Variables	Scores				χ^2	p value	Effect size	
	COVID-19 before-after	n	Ippon	Wazari				Shido
EJJC 2019 female		169	117	34	18	0.530	0.76	-
EJJC 2020 female		173	120	31	22			
EJJC 2019 male		128	128	68	24	7.876	0.019	0.132
EJJC 2020 male		158	158	52	14			
EJCU23 2019 female		57	40	14	3	3.887	0.143	-
EJCU23 2020 female		144	97	26	21			
EJCU23 2019 male		220	128	68	24	7.876	0.019	0.312
EJCU23 2020 male		224	158	52	14			

2019: Pre-pandemic; 2020: Post-pandemic; EJJC: European Judo Championship Junior; EJCU23: European Judo Championship U23.

TABLE 3: Match related score statistics of junior and u23 athletes by weight.

Category	Score	Weight																										
		48	52	57	60	63	66	70	73	78	81	90	100	100+														
		n	X	n	X	n	X	n	X	n	X	n	X	n	X													
EJCJ-2019	Ippon	19	1.2	8	1.7	20	1.4	12	1.7	22	1.3	18	1.6	14	1.6	21	1.4	16	1.2	27	1.3	21	1.4	11	1.6	18	1.4	
	Wazari	4		10		5		15		5		10		5		11		3		9		7		6		10		
	Shido	1		2		4		3		2		6		6		3		1		3		4		3		2		2
EJCJ-2020	Ippon	16	1.6	16	1.5	22	1.5	20	1.4	19	1.3	35	1.1	21	1.2	29	1.4	14	1.3	31	1.2	18	1.5	10	1.5	15	1.1	
	Wazari	6		5		4		10		7		2		5		14		2		9		9		6		2		
	Shido	6		4		6		3		1		2		1		3		2		1		3		2		0		0
EJCU23-2019	Ippon	14	1.2	11	1.5	16	1.3	14	1.3	13	1.2	22	1.2	8	1.8	14	1.5	8	1.5	19	1.3	17	1.2	13	1.4	10	1.5	
	Wazari	2		4		5		3		2		5		4		8		6		8		5		6		1		
	Shido	1		3		1		2		1		1		6		3		1		1		0		1		3		
EJCU23-2020	Ippon	13	1.5	10	1.7	11	1.5	20	1.3	23	1.4	26	1.4	17	1.3	27	1.3	14	1.4	24	1.4	25	1.3	15	1.0	14	1.1	
	Wazari	4		8		8		10		8		7		5		10		5		11		9		1		1		
	Shido	3		4		2		1		3		4		1		2		2		3		1		0		1		

2019: Pre-pandemic; 2020: Post-pandemic; EJCJ: European Judo Championship Junior; EJCU23: European Judo Championship U23.

is high.²⁶⁻²⁸ Ceylan et al. compared to the others scores, such as penalties and match time variables of the athletes competing in the 2018 and 2019 World Championships and Grand Prix competitions.²⁶ Athletes' match-winning status with Ippon is higher than other types of points. When Kons et al. evaluated the Judo Olympic and Paralympic games Rio 2016 in terms of scores, Ippon was the score that determined the match win in both the Olympic and Paralympic games.²⁷ In addition, the frequency of using Ippon in Paralympic athletes was higher than in Olympic athletes. In the same direction, Segedi et al. evaluated the 2013 Rijeka Grand Prix competition in terms of scores and match times and examined that the matches ending with Ippon were more than the matches ending with Wazari and penalty.²⁸

In our study, while the rate of winning matches with Ippon for Junior male increased by 6.9%, no change was found for Junior female. However, a decrease of 11.92% in U23 female's match winning rate with Ippon was examined. According to Katicips et al. we can support it with the work of.¹⁶ When the effects of the judo rule change pro-posed by the IJF in the Grand Slam Paris competitions between 2011, 2016 and 2017 are examined, taking into account the scores and penalties, Ippon was the score that determines winning the match, especially for male judo athletes between 2011 and 2017. A contrasting result was seen by Doppelhammer and Stöckl when they analyzed the 2015 and 2018 World Judo Championships according to match duration, scores, penalties, and attempts.¹⁴ They found that the frequency of scoring according to gender was higher than that of female, and that the number of females receiving Ippon increased significantly, while no significant increase was observed in male.

In the literature, the frequency of winning matches with Ippon varies according to gender. Rule change or an epidemic crisis has significant impact on scores, especially for male or especially for female, and cannot be said to be ongoing. Only in this study, a statistically sig-

nificant relationship is observed between the time of COVID-19 (before and after) and all competition scores, only in the male category in the U23 and Junior groups. We can support this result with studies where competition scores other than Ippon are important. When the frequency of penalties of the athletes by randomly selecting the participants in the finals and semi-finals of the 12 tournaments valid for the IJF 2013 World Ranking List is examined, it is seen that on average, 6 out of 10 competitions result in penalty points.²⁹ When the athletes competing in the 2012 London and 2016 Rio Olympics are compared by years, it is seen that there is no change in the number of Ippon and Wazari, but an increase in the number of penalties.¹¹

Another result we reached in our study is that Junior and U23 female and male weight variables did not detect a statistical significance for the match score before and after COVID-19 ($p>0.05$). Contrary to this, in the literature, it is found that the rate of winning matches with Ippon is high in different weight categories, especially for male. In male's matches, the frequency of taking Ippon increases as the weight category increases; it is seen at the rates of 52.34% in light categories, 57.15% in medium categories, 59.98% in heavy categories, and the lowest frequency of Ippon use is in the light female category with a rate of 48.90%.³⁰ A conclusion supporting Segedi et al. can be seen in their study.²⁸ In the male's super heavyweight category (+100 kg), the match ended in only two ways; either with Ippon before time runs out or penalty. Similarly, 5 out of 6 matches in the female's super heavyweight category (+78 kg) finished in Ippon before the time limit expired. In contrast, Escobar-Molina et al. reveal that taking a shido increases the probability of defeat [odds ratio (OR)=3.18] and is associated with match outcome, especially in heavier weight categories (OR=1.22).²⁹

Due to the different results, we cannot say that the weight category is seen as a decisive factor for judo athletes to affect the score and win the match. Judo sport is based on different weight categories for male and female. These categories are important for the different technical and tactical developments required by the physical characteristics among the ath-

letes. However, we cannot say that matches are won with certain points, especially at certain weights. Because judo is a sport that constantly renews itself, changes and develops.

Finally, some limitations should be considered, such as the absence of time motion analysis and the lack of tracking of actions that do not result in scores. In the formation phase of the technique, considerations of high and low intensity actions, and analysis of the speed of athletes during matches in official competitions can help to better understand the dynamics of the variability of movements in judo matches. In addition, new studies can be carried out to be applied to athletes in different age categories who are on the way to become Olympic athletes.

CONCLUSION

In order to minimize performance losses in athletes in similar processes such as COVID-19, training programs should be carefully planned in terms of the number, intensity and scope of training, taking into account individual differences. Because this planning is an important factor affecting minimization of detraining syndrome in athletes. In addition, athletes can do exercises outside of the sport they specialize in to prevent detraining syndrome. Especially recreational sports activities can be used as a method. The current results provide coaches with concrete information on the formation and impact of scores in high-level judo competitions. In this sense, as a result of an unexpected change such as quarantine, the level of readiness of the athletes for the competition will also affect their match efficiency, special training may be required to be ready for these situations in advance.

It is worth noting that the frequency of buying Ippon for male and female has increased in post quarantine competitions; the reason for this situation may be not to prolong the match, to finish the match by taking Ippon early, or to preserve the energy as if he will compete at any moment. Therefore, judo athletes must be tactically prepared to face these situations.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that pro-

vides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: Şengül Demiral; **Design:** Şengül Demiral, Meltem Nazıroğlu; **Control/Supervision:** Nurper Özbar; **Data Collection and/or Processing:** Şengül Demiral, Meltem Nazıroğlu; **Analysis and/or Interpretation:** Cüneyt Taşkın; **Literature Review:** Meltem Nazıroğlu; **Writing the Article:** Şengül Demiral, Meltem Nazıroğlu; **Critical Review:** Nurper Özbar.

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