



COMPARATIVE ANALYSIS OF DURATIONS OF JUDO FIGHT TIME: IN THE CASE OF NATIONAL AND INTERNATIONAL CHAMPIONSHIPS

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Abstract: The aim of the research was to determine the differences in the duration of judo fights between judo championships of different competitive levels. The samples were 606 judo fights, recorded at the National Championship of Uzbekistan and the European Championship. All analyzed fights were divided into three variables: Time I –introductory phase of the competition (I, II, III, and IV rounds); Time II - final phase of the competition (quarterfinals, repechage, third place fights, semifinals and finals); and, Time III – all rounds together. Statistical data processing included the calculation of basic descriptive parameters: Arithmetic Mean (M), Standard Deviation (SD), Minimum (Min) and Maximum (Max) results. The distributions of the results were analyzed by the results of skewness (Sk), as a measure of the symmetry of the distribution and kurtosis (Ku), as a measure of the homogeneity of the distribution. The differences between the subsamples were determined by applying the T-test for independent samples. Inference was realized at the level of statistical significance $p < 0.05$. The results of the study showed that time durations in each type of competition differs from each other in I and II subphases of the competition. The result showed that in international championships aerobic power of the athletes might be useful to win the contest. The results of the present study might be useful for coaches and judo athletes to plan their training design. Moreover, results would be clear indicator to better understanding of differences of energy demands of the judokas during the international and national championships.

Keywords: judo, competition level, time durations, rounds.

1. Introduction

In judo competitions time characteristics of the fights play a significant role to determine total match structure. The duration of matches is also dependent on the age of the competitors. Match length is typically three minutes for children, four minutes for teenagers and young adults, and three minutes for 'masters' (adults thirty years of age or older) [www.ijf.org]. This factor always influence to sporting results and preparedness of the athletes.

During the last decade the IJF has been tried to improve judo rules as well as judo become an attractive sport. After these rule changes some authors reported that an increase in penalties and a decrease scores (wazaari and yuko) for both sexes. Also, disqualification (hansoku make) was increased for all weight and gender during the European Judo Championship [2]. In fact, there were found statistically differences between the mean fight time London-2012 and Rio-2016 Olympic Games. During males' competitions, the actual time was 91% in London (273s/300s) and 75.3% in Rio de Janeiro (226s/300s). For females, for whom the contest time was reduced, these values were 92.7% (278s/300s) and 85.0% (204s/240s), respectively [3]. These findings indicate that in judo rule changes have influenced to fighting style and future preparing process of the athletes. Other studies have determine that different combat phases were various for home and visiting athletes. Home athletes were attacked more than the visiting one. Additionally, time structure was differed from each other from two groups of athletes during the international competitions [4].

To successfully participating at the international competitions judokas need to complete regular ranking scores. It is not enough to win the national championship to participate in an Olympic Games and other worldwide matches. For this reason judo coaches and athletes are tried to win different tournaments. Also, athletes are currently trying to perform effective attacks and preferential grips to control space and to defend the attempt of his/her opponent in international competitions [5]. The competitive activities of athletes have been studied in recent decades. While, there were few research paper that can compare time durations of the fights of International and National Championships. Furthermore, there were no studies that investigated the full competition into two subgroups such as I subgroup (1, 2, 3 and 4th rounds) and II subgroup (quarterfinal, semifinal, repechage, bronze medal fights and final meets). In this investigation there were calculated time durations of fights as I and II subgroups. Also, the full competition rounds were observed.

There were studied refereeing rule changes and the most frequently used techniques in judo. Studies show that in judo [12]. According to the results throwing techniques Uchi mata and Seoi nage, Ko-uchi gari, Kosoto gari, Kata guruma, Te guruma, Kuchiki taoshi, Morote seoi nage, Ippon seoinage, Ouchigari, Harai goshi, Tani otoshi and others were mostly used in competitions. On the other hand biomechanical bases of the throws are directly connected with the throws which are classified by the Sacripanti [13] as Lever based and Couple of force throws. While, studied literatures show that there are no studies that focus to investigate time characteristics of the fights on the stage of two different International and National competitions.

National judo team of Uzbekistan is fruitfully participating in World Championships, Olympic Games and other international judo tournaments. In fact, in Olympic Games 2 silver and 4 bronze medals, in World Championships 2 golden, 2 silver and 6 bronze medals were won by the Uzbek judokas [1]. While, there is chance to improve results of the national judo team of the Uzbekistan. Comparing of these two types of competitions (Uzbekistan Championships and European Championships) might be useful for coaches and judokas that how to plan their training design and training program to successfully participate in International Championships. Because of the International competitions such as European Championships are considered one of the biggest tournaments in the world. In international competitions not only Japanese judokas, but also European athletes are worthy competitor for Uzbekistan judokas. It is known that Uzbekistan judo team not participated in European Championship. However, they meet in a World Championships, Olympic Games, Gran Prix and etc. 57.14% of male athletes (-66, -81, -90 and +100) and 42.85% of female athletes (-48, -63 and -70) are managing the top world ranking [1]. For this reason, the aim of the research is to determine the differences in the duration of judo fights between judo championships of different competitive levels.

2. Methods

2.1. The sample

The research sample represents 606 judofights, recorded at the National Senior Championship of Uzbekistan in 2018 and the European Championship for seniors in 2018. The sample of 606 judo fights, according to the above mentioned championships, was divided into two subsamples;

First subsample; 351 matches (national judo championships of Uzbekistan for seniors, 2018)

Second subsample; 235 matches (European senior championship, 2018)

2.2. Sample variables

The analysis of the duration of judo fights between the two championships was realized through monitoring and comparing the three variables: Time I – duration of judo fights in the introductory phase of the competition (I, II, III, and IV rounds); Time II - duration of judo fights in the final phase of the competition (quarterfinals, rematch, fights for third place, semifinals and finals); and, Time III - duration of judo fights in the complete championship.

2.3. Research description

The collection of data related to the National Championship of Uzbekistan was conducted by one of the authors of the work, as a licensed judge of the Judo Federation of Uzbekistan, through the records of the official video recorder of the competition. Data related to the European Championship for seniors in 2018 in Israel (Tel Aviv) were taken over by other authors from the official documents of the European Judo Union website (<https://www.eju.net/>). Data collection and processing were carried out in June, 2020. The duration of the judo fight included the time in the regular part and the compensation of time (Golden Score) of the fight. In order to process the data more accurately, the time analysis of judo fights were analyzed in seconds. Fights that ended without duration, due to the injury of the competitors, were not included in the analysis.

2.4. Statistical processing

Statistical data processing included the calculation of basic descriptive parameters; Arithmetic Mean (M), Standard Deviation (SD), Minimum (Min) and Maximum (Max) results. The distribution of the results was analyzed by the results of skewness (Sk), as a measure of the symmetry of the distribution and kurtosis (Ku), as a measure of the homogeneity of the distribution. The difference between the subsamples was determined by applying the T-test for independent samples. Inference was realized at the level of statistical significance $p < 0.05$. The statistical computer software package was used for data analyzing.

3. Results

Table 1 presents the numerical values of the basic descriptive indicators of the subsamples. The values of skewness (Sk) and kurtosis (Ku) in all variables indicate a fairly normal distribution of results, i.e. grouping of results around the arithmetic mean (M). Based on the values of the arithmetic mean (M), approximately identical values are stated, i.e. the uniform duration of judo fights in all variables related to the 2018 European Championship subsample. In the subsample related to the National Championship of Uzbekistan 2018, the arithmetic mean for the first variable related to the duration of judo fights in the first phase of the competition is $M = 168.62$, while in the next phase, judo fights at the Uzbekistan Championship 2018, lasted an average of 3.42 minutes, which is a difference of 53.75 seconds when compared to the first phase.

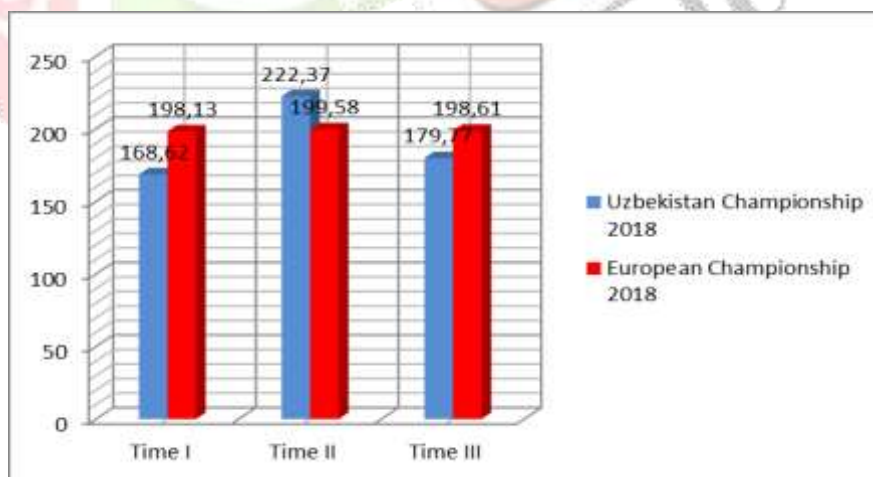
Table 1. Descriptive statistics of National and International judo tournaments

V	Uzbekistan championship 2018 –Tashkent (Uzbekistan)					European Championship 2018 – Tel Aviv (Izrael)				
	N	M	SD	Sk	Ku	N	M	SD	Sk	Ku
Time I	294	168.62	99.74	.44	-.06	158	198.13	106.88	.68	.55
Time II	77	222.37	136.44	.34	-.74	77	199.58	84.85	.16	.32
Time III	371	179.77	110.28	.56	.02	235	198.61	100.01	.58	.62

Legends; V-variables, N-sample, M-arithmetic mean, SD-standard deviation, Sk-skewness, Ku-kurtosis.

The analysis of graph 1 shows a deviation in the duration of judo fights, both in the first and second phase of the competition (I and II subphases), and in the variable related to the average duration of judo fights in the overall championships of Uzbekistan and Europe in 2018 (Time III). The difference between the first and second phase of the competition at the European Championship is only 1.45 seconds.

Graph 1. Graphical representation of arithmetic mean values



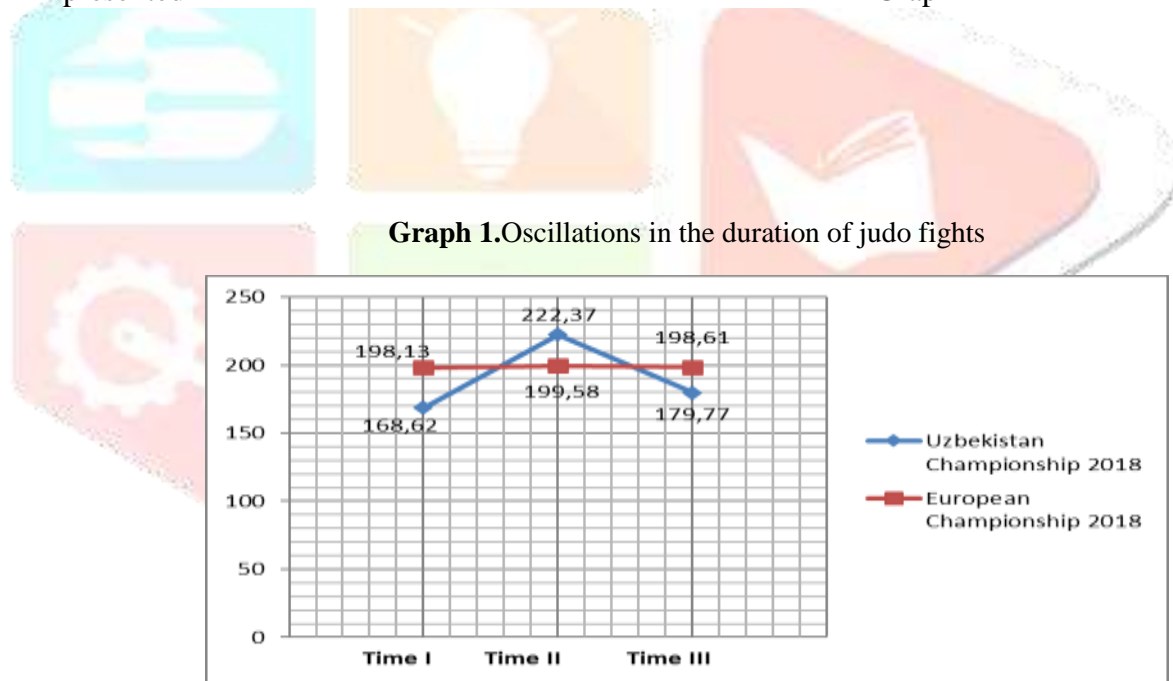
In line with the aim of the study, a T-test for independent samples was applied to determine whether there was a statistically significant difference in the analyzed variables between subsamples. Based on the levels of statistical significance (p), a statistically significant difference in two (Time I and Time III) of the three analyzed variables is observed. The results indicate that the fights related to the I, II, III and IV rounds of the competition lasted on average longer at the European Championship (Mean Diff. -29.51) compared to the Championship of Uzbekistan. In the second phase of the competition, which refers to the fights in the quarterfinals, rematch, fights for bronze, semifinals and finals (Time II), the duration of the fights at the championship of Uzbekistan (Mean Diff. 22.79) is evident, but the difference is not determined on statistically significant level.

Table 2. T test – Differences in duration of judo fights between subsamples

Variables	Groups	n	\bar{X}	Mean Diff.	SD	t	p-value
Time I	Uzbekistan championship	294	168.62	29.51	99.74	-2.86*	.00
	European Championship	158	198.13				
Time II	Uzbekistan championship	77	222.37	22.79	136.44	-1.12*	.021
	European Championship	77	199.58				
Time III	Uzbekistan championship	371	179.77	18.83	110.28	-2.12*	.003
	European Championship	235	198.61				

* A statistical significance at $P < 0.05$

The analysis of the variable Time III, which refers to the duration of judo fights at the complete analyzed championships, showed a difference of -18.83 seconds due to the longer duration of fights at the European Championships and that difference is at a statistically significant level ($p = 0.03$). Oscillations in the duration of judo fights between and within the competition are presented in Graph 2.



4. Discussion

The aim of the research is to determine the differences in the duration of judo fights between judo championships of different competitive levels. The analysis confirms that there are some different time limits between the two various championships. In the first time of the competition the combats lasted longer in European Championship than the National Championship of Uzbekistan, 198.13 and 168.62 seconds, respectively ($p < 0.05$). The differences between the samples were 29.51 seconds. These results can be explained by the preparedness of the athletes. Modern judokas start a fight in a fast rhythm and they must be able to maintain that pace until the end of the match to increase their chances to achieve results. Also, in judo match, attacking tactics is encouraged and more ippons are achieved [6]. Based on the previous studies high level athletes spend most time to take effective gripping and make a good position to throws.

It is interesting to discuss second phase of the competition. There were identified reverse results between the samples. Mean time duration of European championship increased at 222.37seconds comparing to National Championship of Uzbekistan (199.58 seconds). It was confirmed by the authors that elite and non-elite athletes have different physical fitness and anthropometrical differences [7]. It can be seen from the results that in European Championship more skilled judokas participate in the competition. It is difficult to win in a short time and this factor impacts to time durations of the fights. Also, it was identified by the authors that during the different types of competition (regional and interregional championships) some factors impact to the fighting style such as psychophysiological stress [8].

Physiological approach of discussing the problem could be clear to understand of the explaining topic. In physiologically, full judo fight times are divided as “work” and “rest” period [14]. The HR and Lactate concentration are very high in “work” period with 180 to 190 beats min and Lactate values 8mmol L was found. These findings are directly connected with the time demands of the fights and during the contests this factor plays and crucial role. Moreover, other studies confirm that in judo fights both aerobic and anaerobic capacity of athletes is significant. In short period of fights the anaerobic power and in additional time of the fights (Golden Score) aerobic capacity is more important. These findings indicate that in judo fights time durations and physiological indicators are mutually related with each other. Here, it would be close to reality if the coaches take into account of this factor. According to the results, there could be concluded that in International competitions athletes need anaerobic power than the anaerobic. The time limits in European Championship stay stable in both analyzed groups. While, in national Championship this indicator fluctuated. After first subgroups the time durations are reached peak at 222.38 seconds.

The mean fight time for all rounds were 198.61 and 179.77 seconds at the European and Uzbekistan Championships, respectively. By contrast in the research by other studies [9], the overall mean time was 179 ± 135 seconds and our results coincide with previous studies. While, comparing this with other studies [10], the overall average was 284 ± 172 seconds, and the results for women and men were 289 ± 209 seconds and 279 ± 144 seconds, respectively. In biomechanical term [11], some internal and external factors influence to fight style such as Referee rules, changing in Competition Invariant, preferred pace of competition, changing in kumi kata, kind of throws utilized (Classic, Innovative, Chaotic), type of Throwing Techniques (Lever or Couple), training methodology, skill of athletes, high dynamical situations and so on. Our findings differ from that described in the literature cited above. The present analysis show that time structure of the judo fights are various in each rounds between the European and National Championship. However, this did not analysis technical-tactical variables of the different types of the competitions.

5. Conclusion

The current study investigated time characteristics of different level of judo competitions. Research findings indicate that in international level of competitions combat durations last more than the national tournaments. This result shows that in international championships aerobic power of the athletes might be useful to win the contest. During the long period fights aerobic capacity of the athletes plays a significant role. Therefore, judo coaches should consider this specific aspect as a main indicator of the preparing. The results of the present study might be useful for coaches and judo athletes to plan their training design. Moreover, results would be clear indicator to better understanding of differences of energy demands of the judokas during the international and national championships.

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