World Rank List of Female Judokas and its Relation to Results of Tokyo Olympics (2020)

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Abstract: Aim:

This study aimed to analyze the rank list and competition results of female judokas participating in Tokyo Olympics (2020) to identify the relationship between the female judokas ranking in the World Rank List (WRL) and their results during Tokyo Olympics. **Methods:** The researchers used the descriptive approach to analyze the competition results of Tokyo 2020 Olympics for Judo. Sample included (192) female judokas in all seven weight categories. Data was extracted from the official results book of Tokyo 2020 Olympics. Through treating data, the researchers calculated frequency and percentage of winning/losing for high-rank and low-rank female judokas according to the WRL. In addition, Chi-Square test was calculated to identify the correlation between WRL and match results (winning/losing). **Results:** It was clear that winning percentages were higher for high-rank female judokas according to WRL in all weight categories as follows: (74.19%) for (-48 kg) – (81.25%) for (-52 kg) – (67.86%) for (-57 kg) – (76.47%) for (-63 kg) – (74.19%) for (-70 kg) – (74.07%) for (-78 kg) – (76.67%) for (+78 kg). Winning percentages for low-rank female judokas were between (18.755%) for (-52 kg) and (32.14%) for (-57 kg). Chi-square results indicated a statistically significant correlation on $P<0.05$ in favor of the high-rank female judokas. The researchers concluded that there is a significant correlation between the World Rank List and Olympic results as the higher the rank of a female judoka the higher the chance to achieve an advanced Olympic rank. Low-rank female judokas have smaller chances to win in spite of the deep gab in rank for those who have the offensive/defensive abilities and the talent to win, in addition to the contribution of Olympic Preparation Stage.

Keywords: World Ranking List (WRL) - Qualification System - Competition results - Female judoka.

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Introduction:

In May 1882, "Jigoro Kano" created a physical, intellectual, and ethical education method out of traditional combat forms and called it "Judo". Judo became one of the well-acknowledged combat sports due to its educational, physical, and personal values. Nowadays, Judo is an international Olympic sport with and international federation that includes 207 national federations and 5 continental federations as members. (**IJF, 2021a**; **Callan, et al, 2022**)

As part of its improvement efforts, the International Judo Federation (IJF) initiated a categorization system for all weight categories in 2009. This system depends on a list of international ranking for the top 10 points gained 24 months before the Olympic Games. (**Ferreira et. al., 2013**).

For the first time in the history of Judo competitions, there were systemic standards to compare judokas from different countries in the form of an official world ranking list. The main use of this list is to order the qualified judokas for participation in the Olympics. It is also used to order judokas in specific places inside competitions and to distribute them so as to avoid competition among best judokas during preliminary rounds. (**Franchini, Julio, 2015; Franchini, & Takito, 2015**).

Judo competitions are different from other combat and non-combat individual sports. Differences are not limited to gender only, but also include different weight categories. In Judo, seven different competitors gain the first world rank for each gender. This means that each weight category is an independent competition. In world competitions, and according to rules and regulations, only two judokas can be chosen to represent their country in each weight category with a maximum number of nine judokas for each national federation for each gender. This means that if two judokas were chosen for one weight category, only one judoka can be chosen for each of the six other weight categories in the same championship. Therefore, it is important for each judoka to understand his/her chances of success among other candidates of his/her national team, his/her weight category, and other weight categories (**Krumer, 2017**).

World Ranking List (WRL) was used in many studies due to its high predictability oof judokas' performances in many competitions. (**Breviglieri et al., 2018; Courel-Ibáñez et al., 2018; Franchini et al., 2017; Guilheiro & Franchini, 2017**).

Studying Olympic games and world championships to identify the needs and challenges faced by competitive teams is of specific significance for coaches and competitors to improve their performance and achieve advances. For judokas, Olympic games are the best model that summarizes what was achieved during years of training and the advance of technical and competitive judo performance.

In one competition, a judoka may play more than one match. A match may end in a few seconds in

case of winning a full point (Ippon). Time may extend in case no result between the two opponents is achieved. Each judoka does his/her best in each match to win and reach the best possible rank and medal. (**Baioumy, & Ghazy, 2015**).

In judo, match duration may exceed four minutes in case "Golden Time" is reached. For example, some female matches reached 16.41 minutes while some male matches reached 12.15 minutes during competitions of Tokyo Olympics 2020. (**Kons et. al. 2022**).

Some researchers studied the effects of World Ranking List (WRL) on predicting performance and medal distribution in the Olympic games using several methods like simple frequency and multiple regression. This led to various conclusions. (**Guilheiro& Franchini, 2017; Franchini & Julio, 2015; Daniel & Daniel, 2013**)

Considering Tokyo Olympics 2020, (352) male and female judokas were qualified through the World Ranking List (WRL) of IJF either through Direct Qualification Places (DIR) or through Continental Qualification Places. Another (41) male and female judokas were qualified either through Host Country Places (HST) or Tripartite Commission Invitation Places (TPC). Table (1) shows judokas qualified to Tokyo Olympics 2020 either through WRL places or other qualification places (**IJF 2021b**).

Table (1)
Judokas Qualified to Tokyo Olympics 2020 through WRL Places and Other Qualification Places

Type of Qualification / Gender	WRL Places				Other Qualification Places				Total
	"DIR"	CTL "	Total Number	Total Percentage %	"HST"	"TPC"	Total Number	Total Percentage %	
Females	126	50	176	%44.78	7	9	16	%4.07	192
Males	127	49	176	%44.78	7	18	25	%6.36	201
Sum	253	99	352	%89.57	14	27	41	%10.43	393

***DIR =Direct Qualification; *CTL= Continental Qualification; * HST = Host Country Places; * TPC = Tripartite Commission Invitation Places**

Table (1) showed qualification places of judokas participating in Tokyo Olympics 2020. The highest percentage was for WRL places with (352) qualified judokas and a percentage of (89.57%) with equal share between males and females. Other qualified participants (n=41) were qualified either through Host Country Places or Tripartite Commission Places with a percentage of (10.43%) (4.07% for females and 6.36% for males). This indicates the importance of having a high rank in

WRL for all participants to ensure a place of participation in the Olympic Games and World Championships in addition to suitable distribution inside match sheets.

Although studying World Rank List (WRL) is very important for judokas and their qualification for Olympic and worlds competitions, very few studies dealt with it recently to show its relation with competition results and the chances of high-rank vs. Low-rank judokas in achieving winning and advances results. This led the researchers to study this effect in all weight categories for female judokas participating in Tokyo Olympics 2020.

Aim:

This study aimed to analyze data and results of female judokas participating in Tokyo Olympics 2020 and to identify the relationship between the judoka's rank in the World Rank List (WRL) and her results in Tokyo Olympics 2020.

Hypotheses:

- High-rank female judokas in WRL won more matches.
- Low-rank female judokas in WRL achieved winning over high-rank female judokas.
- There is a correlation between high ranks on WRL and winning.

Scientific Ethics:

Data and results processed in this study were obtained from the official website of the International Judo Federation (IJF) (http://www.ijf/org) and Tokyo Olympics 2020 official website (http://olympics.com). These websites are open-access and there is no ethical conflicts in using such data.

Methods:

Approach: The researchers used the descriptive (survey) approach.

Research Community: Research community included data and results of all male and female judokas who participated in Tokyo Olympics 2020 (n=393) representing (128) countries and (5) continents. Data included (434) matches held from 24 to 31 July 2021. Table (2) shows research community.

Table (2)
Number and Matches of Judokas Participating in Tokyo Olympics 2020

Continents	Countries	Competitors	Female matches	Male matches	Sum of matches
5	128	393	213	222	435

Research Sample: Sample included all data and results of female judokas who participated in Tokyo Olympics 2020 (n=192) on all weight categories with total of (213) matches. Table (3) shows number of judokas, matches and qualification places for each weight category.

Table (3)
Number of Matches and Qualification Places for Female Judokas in Tokyo Olympics 2020

S	Weight category	WRL Qualification Places				Other Qualification Places				Total Number of Judokas	Matches (n)
		DIR	CTL	Total	Percentage %	HST	TPC	Total	Percentage %		
1	-48 kg	18	7	25	13.02	1	2	3	1.56	28	31
2	-52 kg	18	9	27	14.06	1	1	2	1.04	29	32
3	-57 kg	18	5	23	11.98	1	1	2	1.04	25	28
4	-63 kg	18	10	28	14.58	1	2	3	1.56	31*	34
5	-70 kg	18	8	26	13.54	1	1	2	1.04	28	31
6	-78 kg	18	4	22	11.46	1	1	2	1.04	24	27
7	+78 kg	18	7	25	13.02	1	1	2	1.04	27	30
-	Total	126	50	176	91.67%	7	9	16	8.33%	192	213

***DIR =Direct Qualification; *CTL= Continental Qualification;* HST = Host Country Places;* TPC = Tripartite Commission Invitation Places**
*** Cergia David (HON) didn't pass the official weight category of 63 kg and didn't qualify.**

Table (3) showed the number of matches for each weight category in female judo competitions of Tokyo Olympics 2020 in addition to details of qualification places in each weight category where (176) female judokas qualified according to WRL (91.7%) and (16) female judokas were qualified according to other qualification places (8.3%). The lowest number of qualified judokas was in (-78 kg) weight category while the highest number of qualified judokas was in (-63 kg) weight category.

Results:

results indicated that WRL high-rank female judokas achieved higher percentage of winning over WRL low-rank female judokas in Tokyo Olympics 2020. Table (4) shows frequency and percentage of winning for both WRL high-rank and low-rank female judokas in Tokyo Olympics 2020.

Table (4)
frequency and percentage of winning for both WRL high-rank and low-rank female judokas in Tokyo Olympics 2020

S	Weight category	Matches (n)	High-rank winning		Low-rank winning		CHI^2	P-value
			Frequency	Percentage %	Frequency	Percentage %		
1	-48 kg	31	23	74.19%	8	25.81%	7.258	0.007
2	-52 kg	32	26	81.25%	6	18.75%	12.500	0.000
3	-57 kg	28	19	67.86%	9	32.14%	3.571	0.059
4	-63 kg	34	26	76.47%	8	23.53%	9.529	0.002

Follow Table (4)
frequency and percentage of winning for both WRL high-rank and low-rank female judokas in Tokyo Olympics 2020

S	Weight category	Matches (n)	High-rank winning		Low-rank winning		CHI^2	P-value
			Frequency	Percentage %	Frequency	Percentage %		
5	-70 kg	31	23	74.19%	8	25.81%	7.258	0.007
6	-78 kg	27	20	74.07%	7	25.93%	6.259	0.012
7	+78 kg	30	23	76.67%	7	23.33%	8.533	0.003
-	Total	213	160	75.12%	53	24.88	53.751	0.000

Table (4) showed frequencies and winning percentages of WRL high-rank and low-rank female judokas where high-rank judokas won (160) matches (75.12%) while low-rank judokas won only (53) matches (14.88%). CHI2 results indicated statistically significant correlations on P ≤0.05 between winning and WRL rank un favor of high-rank judokas. The following analysis shows results for each weight category.

(-48 kg) weight category included (31) matches where high-rank judokas won (23) matches (74.19%) while low-rank judokas won only (8) matches (25.81%). Chi^2 value reached (7.258), a statistically significant value on P ≤0.001 in favor of high-rank judokas. Although percentage of winning among high-rank judokas were high, there were matches where low-rank won in spite of the wide difference in ranking. For example, in match (18) Chen-Hao Lin of Chinese Taipei (rank 42) vectored Irina Dolgova of ROC (rank 9) and in match (20), Shira Rishony of Israel (rank 15) vectored Julia Figueroa of Spain (rank 5) in addition to another (6) matches where low-rank judokas vectored high-rank ones.

(-52 kg) weight category included (32) matches where high-rank judokas won (26) matches (81.25%) while low-rank judokas won only (6) matches (18.75%). Chi^2 value reached (12.500), a statistically significant value on P ≤0.001 in favor of high-rank judokas. Although percentage of winning among high-rank judokas were high, there were matches where low-rank won in spite of the wide difference in ranking. For example, in match (5) Raka Pupp of Hungary (rank 19) vectored Majlinda Kelmendi of Kosovo (rank 5) and in match (18), Da Sol Park of Republic of Korea (rank 21) vectored Natalia Kuziutina of ROC (rank 5) in addition to another (4) matches where low-rank judokas vectored high-rank ones.

(-57 kg) weight category included (28) matches where high-rank judokas won (19) matches (67.86%) while low-rank judokas won only (9) matches (32.14%). Chi^2 value reached (3571), a statistically significant value on P ≤0.001 in favor of high-rank judokas. Difference in the (9) matches where low-rank judokas achieved winning ranged from (2) as the least difference and (7) as the highest difference among judokas.

(-63 kg) weight category included (34) matches where high-rank judokas won (26) matches (7647%) while low-rank judokas won only (8) matches (2353%). Chi^2 value reached (9.529), a statistically significant value on P ≤0.001 in favor of high-rank judokas. In match (7), it was noticed that Ketleyn Quadros of Brazil (rank 8) vectored Cergia David of Honduras (rank 268) with withdrawal as the later didn't pass the official weight and didn't get any ranking in this competition. Although percentage of winning among high-rank judokas were high, there were matches where low-rank won in spite of the wide difference in ranking. For example, in match (15) Szofi Ozbas of Hungary (rank 25) vectored Martyna Trajdos of Germany (rank 9) with Waza-ari and in match (23), Agata Ozdoba-Blach of Poland (rank 21) vectored Miku Tashiro of Japan (rank 3) with Ippon in addition to another (6) matches where low-rank judokas vectored high-rank ones.

(-70 kg) weight category included (31) matches where high-rank judokas won (23) matches (74.19%) while low-rank judokas won only (8) matches (25.81%). Chi^2 value reached (7.258), a statistically significant value on P ≤0.001 in favor of high-rank judokas. Although percentage of winning among high-rank judokas were high, there were matches where low-rank won in spite of the wide difference in ranking. For example, in match (2) Alic Bellandi of Italy (rank 30) vectored Anna Bernholm of Sweden (rank 12) with Waza-ari and in match (21), Elisavet Teltsidou of Greece (rank 28) vectored Margaux Pinot of France (rank 4) with Ippon in addition to another (6) matches where low-rank judokas vectored high-rank ones.

(-78 kg) weight category included (27) matches where high-rank judokas won (20) matches (74.07%) while low-rank judokas won only (7) matches (25.93%). Chi^2 value reached (6.259), a statistically significant value on P ≤0.001 in favor of high-rank judokas. Although percentage of winning among high-rank judokas were high, there were matches where low-rank won in spite of the wide difference in ranking. For example, in match (20) Hyunji Yoon of Republic of Korea (rank 23) vectored Natalie Powel of Great Britain (rank 7) with Ippon and in match (26), Hyunji Yoon of Republic of Korea (rank 23) vectored Steenhuis Gusje of Netherlands (rank 5) with Ippon in addition to another (6) matches where low-rank judokas vectored high-rank ones.

(+78 kg) weight category included (30) matches where high-rank judokas won (23) matches (76.67%) while low-rank judokas won only (7) matches (23.33%). Chi^2 value reached (8.533), a statistically significant value on P ≤0.001 in favor of high-rank judokas. Although percentage of winning among high-rank judokas were high, there were matches where low-rank won in spite of the wide difference in ranking. For example, in match (22) Mijin Han of Republic of Korea (rank 20) vectored Maryna Slutskaya of Belarus (rank 9) with Ippon and in match (29), Shiyan Xu of

People's Republic of China (rank 13) vectored Maria Suelen Altheman of Brazil (rank 5) with "Fusen-Gachi" in addition to another (5) matches where low-rank judokas vectored high-rank ones.

According to this analysis, low-rank judokas achieved victory over high-rank ones in spite of high differences on WRL that may reach over (20) points sometimes. This indicates the high level of low-rank judokas although they are in lower ranks. This means that WRL is not a decisive indicator in Olympic Games. The low rank of some judokas may be due to the lack of participation in international and world championships that may increase their rank. This is due to the lack of financial resources in some national federation as this lack prevents judokas from participation. (**Ferreira Julio et al,.2013**). Judokas can participate in major competitions like the Grand Slam, grand award, and world cup, mostly held in Europe. Few countries can host such competitions. Therefore, geographic distribution of these championships is of major concern not because it facilitates the participation of European athletes but because of the difficulty of participation for athletes from other continents due to their need for financial support to participate and gain points to increase their world rank. In addition, other athlete makes use of the advantage of competing in their homelands and among their fans. This is a competitive advantage as fans basically increase the athlete's motivation for winning. Therefore, it is better for the International Judo Federation to distribute grand competitions over all continents, especially Africa.

Conclusions:

The analysis included (213) matches for (192) female judokas who participated ub Tokyo Olympics 2020. Frequency and percentages of winning/losing for high-rank and low-rank judokas indicated an increase in winning rates in all wight categories as follows: 74.19% for -48 kg – 81.25% for -52 kg – 67.86% for -57 kg – 76.47% for -63 kg – 74.19% for -70 kg – 74.07% for -78 kg – 76.67% for +78 kg. Winning rates for low-rank judokas ranged from 18.755% (-52 kg) to 32.14% (-57).

It is also concluded that there is a correlation between high-rank winning over low-rank as CHI^2 values on $P \leq 0.001$ for six weight categories (-48 - -52 - -63 - -70 - -78 - +78) were significant in favor of high-rank judokas while the same value was significant for (-57) weight category on $P \leq 0.05$. this means that the higher the rank of a judoka on WRL the greater the chance for her to achieve an advanced rank in the Olympics. A few numbers of low-rank judokas achieved winning in spite the ranking differences between them and their opponents. This is due to their talent, motivation, and technical abilities.

Recommendations:

1. Judo National Federations should consider increasing the chances of participation of judokas in international competitions held by IJF to increase judokas' points of ranking on WRL.

2. IJF should consider the distribution of its competitions over several countries and continents of the world to provide all national federations, especially the ones with limited resources with equal chances of participation so that their judokas don't disappear due to the lack of resources.

3. All coaches should use the examples of low-rank judokas who achieved victory over their high-rank counterparts in Tokyo Olympics 2020 to increase their judokas' courage, confidence, talent and motivation to win.

4. As high ranks on WRL are closely related to winning, the researchers discovered the importance of checking the relative age effect on the results of Tokyo Olympics 2020 for female judokas and started to study it immediately.

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