Chronological Age and its Relation to Results of Tokyo Olympic Games 2020 as a Basis for Preparing Male Judokas for Olympic Participation

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Abstract:

Aim: This study aims to identify the relationship between chronological age and the competition results of male judokas during the Tokyo Olympic Games 2020 as a basis for improving the preparation of Olympic male judokas.

Methods: The descriptive approach was used to analyze data and results from 201 competitors in 222 matches during the Tokyo Olympic Games 2020. The "DATEDIF" function in Excel software was utilized to calculate competitors' chronological age on January 1st, 2020. Frequency and percentage (winning/losing) among older and younger male judokas were calculated, in addition to the Chi-square test.

Results: A higher percentage of wins among younger male judokas was noticed in 124 matches, with a percentage of 53.11%, while older male judokas won in 97 matches with a percentage of 43.89%. A statistically significant relation ($P \leq 0.05$) favored younger male judokas in the (-60kg and -90kg) weight categories, with a mean chronological age of 23.3 years and 16 days. Similarly, there was a statistically significant relation ($P \leq 0.05$) in favor of older male judokas in the (+100 kg) weight category, with a mean chronological age of 29.1 years and 27 days. As for (-66kg, -73kg, -81kg, and -100kg) weight categories, younger male judokas showed higher frequency and a percentage of winning, but without statistical significance, and their mean chronological age was 24.2 years and 18 days.

Conclusions: Chronological age is a suitable factor to focus on during the preparation for Olympic Games to achieve the best results among male judokas in the (-60kg and -90kg) weight categories, with a mean chronological age of 23.3 years and 16 days, and the (+100kg) weight category, with a mean chronological age of 29.1 years and 27 days. It is important to revise the early participation of young male judokas in the Olympic Games and to direct them towards competitions suitable for their age groups to acquire competitive experience without overloading, to maintain their physical, bone endings and injuries and muscular, health, in addition to avoiding negative side effects that may lead them to drop out and early retirement.

Keywords: male judoka, selection, birthdate.

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Introduction:

Chronological age is a crucial factor in the selection of elite judokas for Olympic and world tournaments, alongside other considerations such as technical, physical, psychological, and mental levels that distinguish elite judokas. The chronological age of athletes selected for participation typically varies. It is determined based on the World Ranking List and performance in previous competitions, irrespective of the chronological age at which peak competitive performance is achieved. This approach is designed to yield the best results for judokas. (Wakwak et al 2023).

Olympic Games, in general, are considered as the best model for summarizing results of years of training and details of technical/tactical improvements of judokas. Therefore, it should be studied carefully to identify current requirements and challenges that coaches and athletes should consider to improve themselves and achieve progress (Ghazy et al 2023).

It was conditioned that judokas participating in Tokyo Olympic Games 2020 should reach a specific chronological age as their date of birth should be before or on December 31st, 2006, according to the International Judo Federation(IJF 2021). This means that participants' age should equal or exceed (15) years in January 1st, of the year of holding the Olympic Games. This indicates that chronological age is one condition, among others, for qualification to participate in judo competitions during the Olympic Games.

Older athletes are characterized by higher anthropometric and physical qualities, compared with younger ones (Lovell et al, 2015; Romann & Cobley, 2015; Cobley et al, 2009).

Older athletes are also more advanced in cognitive (decision-making – absolute thinking – creativity) and psychological (motivation – self-efficacy – self-respect) aspects. (Baker, et al,2014; Cobley, et al,2009; Musch and Grondin, 2001)

Several researchers studied chronological age of younger and older athletes with its relative variables and its effects on performance results in several sports like: the effect of relative age on track and field results, the effects of relative age in some individual sports on selecting best athletes, the effect of relative age on competitive performance among those who were born in the first half and second half of the year, the effect of relative age on older track and field athletes with conclusion of selects the best athletes not the older ones, and finally, the variations in effects of relative age in some Olympic combat sports according to gender differences and the nature of each sport. (Figueiredo, et al,2021; Jakobsson, et al,2021; Lucena, et al,2020; Brustio, et al,2019; Campideli, et al,2018)

Judo competitions are different from other non-combat individual sports. This difference is not only limited to gender but it extends to weight categories as there are seven judokas gain the first world rank for both males and females. This means that each weight category in each

gender is a separate competition. (Krumer,2017)

Several researchers performed analytical studies to anticipate performance and results of athletes using several approaches including frequency and multiple regression. This led to various conclusions. (Ghazy, et al, 2023; Guilheiro & Franchini, 2017; Franchini & Julio, 2015; Lascau, & Rosu,2013)

Judokas play several matches in one competition; each match may end in a few seconds when one competitor gains full point (Ippon). But match duration may be prolonged in case the "Ippon" is not recorded. Each judoka does his/her best in each match to win the best possible medal (Baioumy & Ghazy 2015).

Peak Competitive Performance Age refers to the athletic content that is affected by the skills and qualities required for winning a specific competition. It is identified according to the best recorded performances of athletes in one sport like track and field or swimming. (Haugen, et al,2018; Allen, & Hopkins,2015; Moesch, et al,2011)

In combat sports, there is no digital record, with seconds or centimeters, for performance. Therefore, tournaments of Olympic Games and World Championships are the most important indicators for evaluating Peak Competitive Performance. (Franchini et al,2020)

Rushing towards getting young judokas involved in competitions with higher age categories and facing 2-6 years older competitors may allow young judokas to acquire various experiences and win more medals. But initiating this for a long time may have negative effects on their future results. Therefore, the best practice for young judokas is to organize their participation in national and international competitions around their age group to achieve balanced advances on physical, technical and tactical aspects as this is required for elite competitions (Simenko 2022).

Reaching higher ranks in the Olympics can be achieved through the availability of factors contributing to success and this includes athletes' proper chronological age. Therefore, the researchers think that it is important to revise chronological age as a condition of qualification and eligibility for judo Olympic matches. As (15) years is the minimum chronological age acceptable for judo competitions without maximum age condition for Olympic competitions, the researchers tried to investigate the relationship between chronological age of male judokas and their results in judo competitions during Tokyo Olympic Games 2020 as a basis for preparing male judokas for Olympic Games. In addition, we tried to identify the mean age for achieving best performance and results as it should be considered when selecting candidate male judokas for Olympic and World competitions.

Aim: The research aims to identify the relationship between chronological age of male judokas and their results in Tokyo Olympic Games 2020 as a basis for preparing male judokas for Olympic Games.

Question: What is the relationship between chronological age of male judokas and their results in Tokyo Olympic Games 2020?

Methods:

Approach: The researchers used the descriptive approach.

Research Sample: Research Community included data and results of all male judokas who participated in Tokyo Olympic Games 2020 representing (128) countries from (5) continents. Judo competitions were held from 24th to 31st July 2021. Tables (1) and (2) showed numeric and age statistical description of research sample.

Table (1)

Total number of matches and male judokas participating in Tokyo Olympic Games 2020 competitions

Continents	Countries	male Judokas	Matches	Mean age (Y/M)
5	128	201	222	25.9

Table (1) indicated that total number of male judokas participating in Tokyo Olympic Games 2020 was (201) who played (222) matches.

Age Calculation: To calculate age (day – month, year), the researchers used birth date data and "DATEDIF" equation in "Excel" software on 1st January 2020, the year of Tokyo Olympic Games 2020. In addition, they calculated the date of reaching minimum age for participation (15 years).

Table (2)

Age Categorization for male Judokas Participating in Tokyo Olympic Games 2020

Weight category	Mean age for younger judokas			Mean age for older judokas			The youngest judoka among older competitors (max)			The oldest judoka among older competitors (min)			The youngest judoka among younger competitors (max)			The oldest judoka among younger competitors (min)		
	Day	Month	Year	Day	Month	Year	Day	Month	Year	Day	Month	Year	Day	Month	Year	Day	Month	Year
-60 kg	16	5	23	24	11	26	5	0	21	17	0	32	0	7	19	0	8	27
-66 kg	12	8	23	13	8	26	12	0	22	11	2	32	28	0	21	7	8	28
-73 kg	6	8	24	6	10	27	28	11	23	8	2	33	18	6	20	28	2	28
-81 kg	18	9	23	0	4	27	13	10	22	9	1	35	0	1	20	29	5	29
-90 kg	7	2	23	19	11	26	22	6	25	0	9	33	6	5	19	25	11	26
-100 kg	4	8	24	16	7	28	5	9	21	28	1	33	23	4	21	5	10	30
+100 kg	19	11	24	27	1	29	27	10	24	15	8	34	0	4	19	25	8	30

Table (2) asserted that all male judokas passed age condition (15 years) to qualify for the Olympics through revising their dates of birth and calculating their chronological age on January 1st, 2020. Mean age for the youngest male judoka was (19 Y – 4 M – 0 D) on (+100 kg) weight category. Mean age for the oldest male judoka was (35 Y – 1 M – 9 D) on (-81 kg) weight category. Mean age for all participating judokas was (25 Y – 9 M

– 1 D) while median value was (25 Y – 8 M – 0 D). Age description for each male judoka was identified for each match as one male judoka could be described as younger in one match and older in another.

Scientific Ethics: all treated data was obtained from the IJF official website (http://ijf.org) and Tokyo Olympic Games 2020 official website (http://olympics.com). There were no ethical conflicts that may prohibit the use of such data as it is available through an open-access archive.

Statistical Treatment: "Excel" software (DATEDIF function) for calculating age – frequency – percentage – Chi^2.

Results:

Table (3)
Frequency and Percentage of Winning for Older and Younger male Judokas on Tokyo Olympic Games 2020

S	Weight category	Matches	Winning for Older Judokas		Winning for Younger Judokas		Chi2	P-value
			Frequency	Percentage %	Frequency	Percentage %		
1	-60 kg	26	10	%38.46	16	%61.54	1.358*	0.451
2	-66 kg	30	14	%46.67	16	%53.33	0.133	0.715
3	-73 kg	39*	17	%43.59	21	%53.85	0.421	0.516
4	-81 kg	38	18	47.37%	20	52.63%	0.105	0746
5	-90 kg	36	11	%30.56	25	%69.44	5.444*	0.020
6	-100 kg	28	12	%42.83	16	%57.14	0.571	0.450
7	+100 kg	25	15	%60.00	10	%40.00	1.000**	0.057
Sum		222	97	%43.89	124	%56.11	Significant on freedom degree (1)	
		Chi2 value (3.299) is significant on P ≤0.05 and freedom degree (1)						

* Total number of matches for (-73 kg) weight category was (39) as match number (4) didn't count in winning results as there was no winner due to the fact that "Nourine Fethi" (Algeria) didn't pass weight condition and "Abd El-Rasool Mohamed" (Sudan) didn't show on competitions.

Table (3) indicated statistically significant differences on number and percentages of winnings between older and younger male judokas on weight categories (-60 kg, -90 kg) in favor of younger male judokas. Chi2 value was significant on P ≤0.05. This indicates a positive correlation between younger age and results as the younger the age the better the results of judokas in these two weight categories. As for (+100 kg) weight category, it was significant in favor of older male judokas. Chi2 value was significant on P ≤0.05. This indicates a positive correlation between older age and results as the older the age the better the results of male judokas in this weight category. Considering (-66 kg, -73 kg, -81 kg, -100 kg) weight categories, there were no statistically significant differences in winning

frequency and percentage between older and younger male judokas although winning frequency and percentages were in favor of younger male judokas as winning percentages ranged from 52.63% to 57.14%.

Table (4)
Mean Age of male Judokas According to Significance of Results for Weight Categories in Tokyo Olympic Games 2020

Significance for winning	Weight category	Mean age of older judokas			Mean age of younger judokas		
		Day	Month	Year	Day	Month	Year
Significant in favor of younger judokas	-60 kg, -90 kg	21	11	26	19	3	23
Significant in favor of older judokas	+100 kg	27	1	29	19	11	24
Non-significant	-66 kg, -73 kg, -81 kg, -100 kg	9	7	27	18	2	24
Mean for all weight categories		9	7	27	2	2	24

Table (4) indicated statistically significant differences on weight categories (-60 kg, -90 kg) in favor of younger male judokas as their mean age was (23 Y – 3 M – 19 D). As for (+100 kg) weight category, it was significant in favor of older male judokas with mean age (29 Y – 1 M – 27 D). Considering (-66 kg, -73 kg, -81 kg, -100 kg) weight categories, there were no statistically significant differences although winning frequency and percentages were in favor of younger male judokas with mean age (24 Y – 2 M – 2 D).

Table (5)
Matches of male Judokas close in age in Tokyo Olympic Games 2020

	Weight Categories																				
-60kg			-66kg			-73kg			-81kg			-90kg			-100kg			+100kg			Sum
Match	Age difference		Match	Age difference		Match	Age difference		Match	Age difference		Match	Age difference		Match	Age difference		Match	Age difference		
	Day	Month		Day	Month		Day	Month		Day	Month		Day	Month		Day	Month		Day	Month	
17	25	10	8	16	3	16	23	2	4	-	10	26	26	7	11	12	4	-	-	-	-
18	27	-	31	16	4	17	5	7	6	5	1	-	-	-	28	-	3	-	-	-	-
19	8	4	-	-	-	30	12	2	8	10	4	-	-	-	-	-	-	-	-	-	-
29	25	1	-	-	-	32	8	1	29	9	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	35	2	-	30	10	5	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	36	6	8	-	-	-	-	-	-	-	-	-	-
4	-	-	2	-	-	5	-	-	6	-	-	1	-	-	2	-	-	-	-	-	20

* Match = order of match on the score sheet for each weight category.

Table (5) indicated that analyzing chronological age of participants showed closer chronological; ages with differences of (9) days as the least difference and (10 M – 25 D) as the highest difference.

Discussion:

Tables (3), (4) and (5) indicated that total number of matches for male judokas was (222). Older male judokas won (97) matches (43.89%) while younger male judokas won (124) matches (56.11%). In (20) matches the winner was born in the same year of the loser. The following is a detailed analysis for each weight category:

(-60 kg) weight Category: Total number of matches in this weight category was (26). Younger male judokas won (16) matches (61.54%) while older male judokas won (10) matches (38.46%). Chi^2 value was (1.358) which was statistically significant on P ≤0.05. In (4) matches, the two competitors were close in age as they were born in the same year. In match (17), the older male judoka, Mkheidze Luka (France), vectored the younger male judoka, Lesiuk Artem (Ukraine) with age difference of (10) months and (25) days. In match (18), the younger male judoka, Naohisa Takato (Japan), vectored the older male judoka, Chkhvimiani Lukhumi (Georgia) with age difference of (1) month and (27) days. In match (19), the younger male judoka, Smetov Yeldos (Kazakhstan), vectored the older male judoka, Kim Won Jin Lukhimi (Republic of Korea) with age difference of (4) months and (8) days. In match (29), the older male judoka, Tsjakadiea Tornjike (Netherlands), vectored the younger male judoka, Lesiuk Artem (Ukraine) with age difference of (1) month and (25) days.

(-66 kg) Weight Category: Total number of matches in this weight category was (30). Younger male judokas won (16) matches (53.33%) while older male judokas won (14) matches (46.67%). Chi^2 value was (0.133) which was not significant on P ≤0.01. In (2) matches, the two competitors were close in age as they were born in the same year. In match (8), the older male judoka, Adrian Gomboc (Slovenia), victoried the younger male judoka, Steven Mungandu (Zambia) with age difference of (3) months and (16) days. In match (31), the younger male judoka, Hifumi Abe (Japan), victoried the older male judoka, Daniel Cargnin (Brazil) with age difference of (4) months and (11) days.

(-73 kg) Weight Category: Total number of matches in this weight category was (39). Younger male judokas won (21) matches (53.85%) while older male judokas won (17) matches (43.59%). Chi^2 value was (0.421) which was not significant. In (5) matches, the two competitors were close in age as they were born in the same year. In match (16), the older male judoka, Zhansay Smagulov (Kazakhstan), victoried the younger male judoka, Ferdinand Karapetian (Armenia) with age difference of (2) months and (23) days. In match (17), the older male judoka, An Changrim (Republic of Korea), victoried the younger juda, Fabio Basile) Italy) with age difference of (5) months and (7)

days. In match (30), the younger male judoka, Tsongtbaatar tsend-Ochir (Mongolia), victoried the older male judoka, Akul Gjakova (Kosovo) with age difference of (2) months and (12) days. In match (32), the younger male judoka, An Changrim (Republic of Korea), victoried the older male judoka, Tohar Butbul (Israel) with age difference of (1) month and (8) days. In match (35), the older male judoka, Ono Shohei (Japan), victories the younger male judoka, Lasha Shavdatuashvili (Georgia) with age difference of (5) days.

(-81 kg) Weight Category: Total number of matches in this weight category was (38). Younger male judokas won (20) matches (52.63%) while older male judokas won (18) matches (47.37%). Chi^2 value was (0.105) which was not significant. In (6) matches, the two competitors were close in age as they were born in the same year. In match (4), the older male judoka, Matthias Casse (Belgium), victoried the younger male judoka, Adrian Gandia (Puerto Rico) with age difference of (10) months. In match (6), the older male judoka, Alan Khubetsov (China), victoried the younger male judoka, Vladimir Zoloev (Kyrgyzstan) with age difference of (1) month and (5) days. In match (8), the younger male judoka, Takanori Nagase (Japan), victoried the older male judoka, Vedat Al-Bayrak (Turkey) with age difference of (4) months and (10) days. In match (29), the younger

male judoka, Takanori Nagase (Japan), victoried the older male judoka, Dominic Ressel (Germany) with age difference of (9) days. In match (30), the older male judoka, Shamil Borchashvili (Austria), victoried the younger male judoka, Sharofiddin Boltaboev (Uzbekistan) with age difference of (5) months and (10) days. In match (36), the younger male judoka, Dominic Ressel (Germany), victoried the older male judoka, Alan Khubetsov (China) with age difference of (8) months and (6) days.

(-90 kg) Weight Category: Total number of matches in this weight category was (36). Younger male judokas won (25) matches (69.44%) while older male judokas won (11) matches (30.56%). Chi^2 value was (5.444) which was statistically significant on P ≤0.05. In (1) match, the two competitors were close in age as they were born in the same year. In match (26), the younger male judoka, Mikhail Igolnikov (China), victoried the older male judoka, Nikoloz Sherazadishvili (Spain) with age difference of (7) months and (26) days.

(-100 kg) Weight Category: Total number of matches in this weight category was (25). Younger male judokas won (16) matches (57.14%) while older male judokas won (12) matches (42.83%). Chi^2 value was (0.571) which was not significan. In (2) matches, the two competitors were close in age as they were born in the same year. In match (11), the older

male judoka, Shady El-Nahas (Canada), victoried the younger male judoka, Zelym Kotsoiev (Azerbaijan) with age diference of (4) months and (12) days. In match (28), the older male judoka, Cho Guham (Republic of Korea), victoried the younger male judoka, Jorge Fonseca (Portugal) with age difference of (3) months.

(+100 kg) Weight Category: Total number of matches in this weight category was (25). Younger male judokas won (15) matches (60.00%) while older male judokas won (10) matches (40.00%). Chi^2 value was (1.000) which was statistically significant on P≤0.05.

Conclusions:

After analyzing results and birth dates of (201) male judokas who played (222) matches in Tokyo Olympic Games, and obtaining winning/losing frequency and percentages for older and younger male judokas, results indicated that mean age of younger male judokas was (24 Y – 2 M – 2 D) while the mean age for older male judokas was (27 Y – 7 M – 9 D).

Results of Chi^2 test indicated a statistically significant negative correlation on P≤0.05 in favor of younger male judokas of (-60 kg, -90 kg) weight categories. This means that the younger the male judoka the better the results. The researchers think that this is due to the fact that younger male judokas were in the proper age for winning as their mean age was (23 Y –

3 M – 16 D). On this chronological age of younger male judokas, the peak of physical and technical maturity appeared. This provided male judokas with the required physical, technical and tactical abilities necessary for winning. The mean age of older male judokas was (26 Y – 11 M – 21 D) and the increase in mean age of older male judokas were around three and half years. This may affect the regression of their physical abilities and increased the opportunities of younger male judokas to win.

Results also indicated a statistically significant positive correlation on P ≤0.05 in favor of older male judokas on (+100 kg) weight category. This means that the older the male judoka the better the results. Mean age of younger male judokas was (24 Y – 11 M – 19 D) while the mean age of older male judokas was (29 Y – 1 M – 27 D). The researchers think that this correlation is due to the fact that older male judokas in this weight category were less than (30) years and gained higher competitive experience compared with younger male judokas. This weight category is characterized by specific performance qualities that prefer muscular strength over speed as this weight category is one of the heavy weight categories that include the heaviest male judokas.

As for (-66 kg, -73 kg, -81 kg, -100 kg) weight categories, results didn't show any significant correlations between chronological age

and winning for older and younger male judokas as Chi^2 value was non-significant. Mean age of older male judokas in these weight categories was (27 Y – 7 M – 9 D) while the mean age of younger male judokas was (24 Y – 2 M – 18 D). Meanwhile, younger male judokas were higher in frequency and percentages of winning compared with older ones as their percentages for each weight category were (53.33% - 53.85% - 52.63% - 57.14%). The researchers think that this is due to the fact that younger male judokas were in the proper age for peak physical, technical and competitive performance as their mean age approaches (23) which is the age identified for male judokas to excel over their older counterparts. Significance was not achieved as in some matches; the mean age of younger male judokas was far away from the proper peak performance age. It should be noticed that (-66 kg, -73 kg, -81 kg) weight categories are light to moderate weights that require quick technical and motor performance that is affected by age.

Results also indicated that younger male judokas excelled in some weight categories. This is consistent with previous studies indicating that younger athletes in many sports achieve better than older ones. Nevertheless, they are ignored when selecting. (Apollaro et al 2021; Figueiredo et al 2021; Wakwak, et al 2023).

It is also consistent with another study indicating that younger athletes have less chance to participate in world competitions compared with older ones. This age bias should be eliminated to provide them with more participation chances (Brustio et al 2019). Failure in handling the age bias phenomenon leads to limited selection and losing the best athletes just because they are younger. Meanwhile, eagerness to achieve early success may burnout some young athletes in individual and team sports (Jakobsson et al 2021).

Results of (+100 kg) weight category are consistent with previous studies in that older athlete are more represented in the Olympic Games (2012 and 2016 Olympics) in combat sports (judo – wrestling – taekwondo) (Campideli et al 2018).

Results also asserted that the age of (23) is the best age for achieving the best Olympic results. But early participation of young judokas should be approached cautiously so as not to impose more pressure over them and assure that they enjoy sufficient musculoskeletal development in addition to technical and tactical skills required for competing with older judokas (Simenko 2022).

The researchers concluded the existence of statistically significant correlation between age and winning results in Tokyo Olympic Games 2020 for older and younger male judokas. This correlation was in favor of

younger male judokas in (-60 kg, -90 kg) weight categories with mean age of (23 Y – 3 M – 16 D). It was in favor of older male judokas in (+100 kg) weight category with mean age of (29 Y – 1 M – 27 D). as for (-66 kg, -73 kg, -81 kg, -100 kg) weight categories, younger male judokas excelled over older ones in frequency and percentages of winning but without any statistical significance. Mean age of these male judokas was (24 Y – 2 M – 18 D).

The researchers recommended that male judokas qualified to participate in the Olympic Games should be selected from among those who approach the peak competitive performance age to achieve the best results. Young male judokas should participate in competitions suitable for their age groups to elevate their rank on the World Ranking List of judo and to increase their competitive experience without exposing them to overloads during early participation with older male judokas. This is to maintain their health and musculoskeletal structure without any negative effects as such effects may lead them to dropout or early retirement.

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