

The Significance of U23 Competitions in Wrestling Career

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ABSTRACT

Background. Designing the training of athletes should be based on specific goals and objectives at each stage of the long-term development. Each age stage in the development of an elite athlete has its own significance. The U23 competitions are organized to facilitate a smoother and more effective transition of wrestlers from junior to senior levels. The aim of the study is to determine the significance of performances in the U23 competitions for the subsequent development process of wrestlers. Materials and Methods. The following research methods have been used in the paper: the analysis of the scientific and methodological literature, the analysis of the official results, and methods of mathematical statistics. We have studied the sports careers of participants in the 2017, 2018, and 2019 World Championships in freestyle, Greco-Roman, and women's wrestling. A total of 1277 wrestlers' sporting biographies have been analyzed. Results. The majority of participants (73.7 %) in the U23 age category competitions previously competed at the junior level. Moreover, more than half of the athletes (58.4 %) had prior experience of participating in cadet competitions. It is worth noting that 63.7 % of all wrestlers participated in senior-level competitions, and 31.5 % of them achieved podium finishes. Among women, a higher percentage of athletes continue their careers (46.3 %) and achieve success (20.1 %) on the international stage after the U23 competitions. For male freestyle wrestlers, the figures are lower, with only 38.2 % continuing their careers. Conclusion. The analysis demonstrated that the U23 competitions, which serve as a continuation of the cadet and junior age groups, are part of the overall sequence of competitions in the development of wrestlers at the international level. However, the importance of the U23 competitions varies depending on the level of athletes, and they serve both as preparatory and main competitions within the athletes' training system.

Keywords: Wrestling; pathway; U23; results, championships

INTRODUCTION

The modern level of athletes' competitive activity is very high. Today, athletes participate in numerous competitions at different levels (Blach et al., 2021). Long-term athlete preparation should be conducted gradually, and competitions should be a harmonious element of this system (Bompa & Haff, 2009; Latyshev et al., 2022). Another important element of modern long-term training of athletes is forecasting, which is substantiated by scientific research (Wunderlich & Memmert, 2020; Korobeinikova et al., 2020; Romanenko et al., 2022).

Designing the training of athletes should be based on specific goals and objectives at each stage of the long-term development. Currently, specialists strive to create various models of athlete development with specific pathway trajectories (Gulbin, Weissensteiner, Oldenzel & Gagné, 2013; Allen, Vandembogaerde & Hopkins, 2014). There is also a debated issue regarding the conceptualization of talent (Baker, Wattie & Schorer, 2019; Taylor & Collins, 2022) and the national sports development system (Güllich & Cobley, 2017; Morley et al., 2022).

According to the conducted research, the peak competitive performance for wrestlers occurs at the age of 25–26 years (Biac, Hrvoje & Sprem, 2014; Karninčić, Baić & Sprem, 2017; Franchini, Fukuda & Lopes-Silva, 2020; Latyshev et al., 2021). Many athletes go through specific milestones in their career before achieving success at the international level. These stages help athletes develop gradually, reaching the peak of athletes' abilities (Allen & Hopkins, 2015; Haugen et al., 2018). However, there are currently conflicting studies regarding the significance of early achievements (Kearney & Hayes, 2018; Boccia, Cardinale & Brustio, 2020).

Each age stage in the development of an elite athlete has its own significance (Bruce, Farrow & Raynor, 2013; Lee et al., 2018). The U23 competitions are organized to facilitate a smoother and more effective transition of wrestlers from junior to senior levels (flowrestling.org, 2023). These competitions are intended to allow athletes to reach their peak performance more effectively. For Olympic wrestling disciplines, U23 competitions were introduced only in 2017, and by now, participants in the first competitions of this age category may have already achieved success.

For many sports, research has been conducted on the development and progression of athletes at each age stage, primarily focusing on sports with outcomes measured in terms of distance, weight, or time (Allen, Vandembogaerde & Hopkins, 2014; Huxley, O'Connor & Larkin, 2017) or team sports (Bjørndal, Luteberget & Holm, 2018; Taylor & Collins, 2022). However, when it comes to combat sports, especially Olympic wrestling disciplines, we have found only fragmented research related to the analysis of the U23 competitions.

METHOD

The following research methods were used in the paper: the analysis of the scientific and methodological literature, the analysis of official results, and methods of mathematical statistics.

We have studied the sports careers of participants in the 2017, 2018, and 2019 U23 World Championships in freestyle, Greco-Roman, and women's wrestling. A total of 1277 sporting

biographies have been analyzed. The data were obtained from the official website of United World Wrestling (unitedworldwrestling.org, 2023).

We have examined all performances of athletes from the beginning of their careers up to the data collection point (February 2023). The following international competitions have been considered: the Continental Championships, the World Championships, the Olympic qualification tournaments, and the 2020 Olympic Games. Performances at the Continental Championships and the World Championships have been separately analyzed for the cadet and junior age groups. Additionally, competitions among seniors have been divided into those before (earlier or within the same calendar year) or after participation in the U23 competitions.

In the given paper, the following indicators are analyzed:

- the number of athletes who participated in the competitions, regardless of their final ranking;
- the number of athletes who achieved success in the competitions, achieving a podium finish (Medalist, the 1st to 3rd places);
- the number of athletes who won the competitions (Winner, the 1st place).

These parameters have been calculated in both absolute and percentage terms relative to all athletes in each group.

In the process of data analysis, methods of descriptive statistics have been used. To test the statistical hypotheses and determine the statistical significance between the number of successful athletes in specific groups, the two-sample proportion test was used; the significance level was set at 0.05. To work with data (sorting, grouping, mathematical analysis, and visualization), we used the programming language Python 3.9 (libraries NumPy, Pandas, and Seaborn).

RESULTS

The Results section sequentially analyzes the athletes' performance at different stages of their careers: before participating in U23 competitions, after these competitions, as well as considering the level of competitions and gender and style characteristics. The analysis of athletes' performance results is considered sequentially by age levels: cadets, juniors, U23, and seniors. It is worth noting that prior to athletes' competing in the U23 championships, the analysis of their results is retrospective, after which time it becomes a prospective analysis of the results. Table 1 presents the percentage of athletes among the U23 World Championship participants who have previously taken part or achieved success in cadets or juniors level competitions.

Table 1. Previous performance in cadets and juniors competitions of U23 World Championship wrestlers

Level	Achievements		
	Participation	Medalist (1–3 place)	Winner (1 place)
Cadets	58.4 % (n = 746)	31.2 % (n = 398)	12.3 % (n = 157)
Juniors	73.7 % (n = 946)	41.5 % (n = 946)	15.2 % (n = 946)

The data analysis demonstrated that the majority of participants (73.7 %) in the U23 age category competitions previously competed at the junior level (U20). Moreover, more than half of the athletes (58.4 %) had prior experience participating in cadets competitions (U17). The total number of analyzed sports careers was 1277, which is 100% when considering the data in the results (Table 1).

The next stage of the research involves determining the athletic achievements of the wrestlers in seniors-level competitions. These achievements are of the utmost importance in understanding the significance of the U23 competitions for wrestlers' future careers. Table 2 presents the percentage of athletes and their accomplishments in seniors-level competitions. Furthermore, the participating wrestlers in the U23 World Championships are categorized into different groups to examine the relationship between their performance at the U23 level and their subsequent achievements.

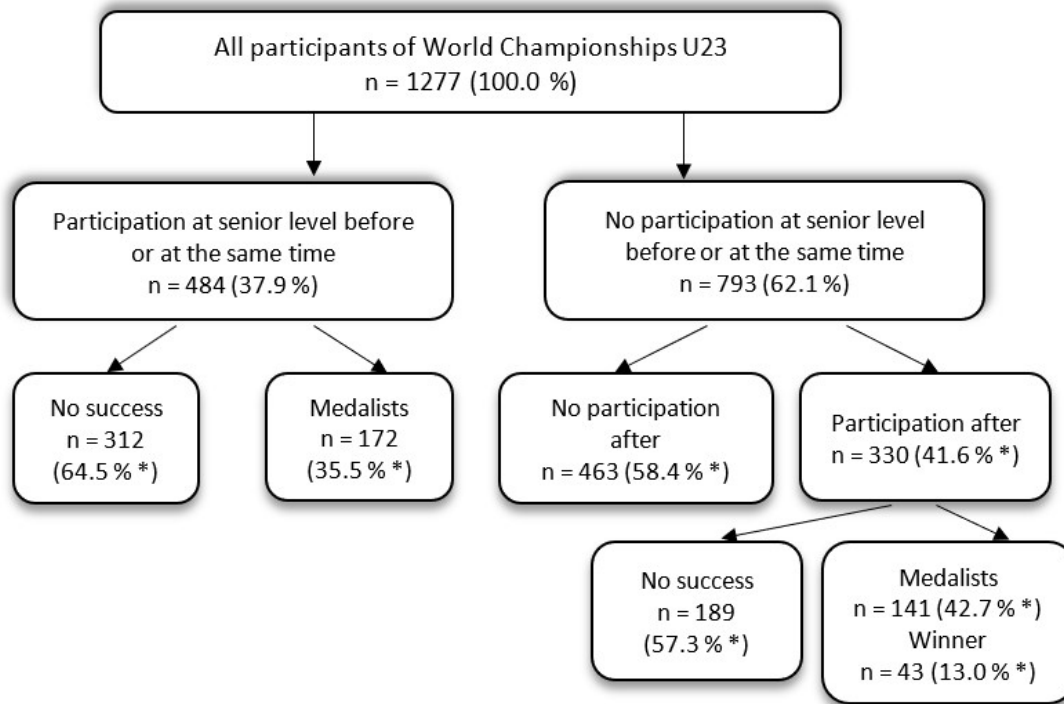
Table 2. Performance in seniors-level competitions among U23 World Championship participants by ranks

Rank of World Championships U23 participants	Achievements on seniors level		
	Participation	Medalist (1–3 place)	Winner (1 place)
1 place (Winner)	86.7 %	70.0 %	42.2 %
1–3 place (Medalist)	82.5 %	55.1 %	24.4 %
5–10 place (Middle ranks)	67.6 %	31.6 %	8.1 %
All participants	63.7 %	31.5 %	11.2 %

It is worth noting that 63.7 % of all wrestlers participated in senior-level competitions, and 31.5 % of them achieved success. The percentage of senior-level wrestlers is substantially higher among U23 winners and medalists: over 80 % are participants and over 50 % are medalists. It should be highlighted that for medalists, these U23 competitions may serve as preparatory and/or control events before they take part in senior-level competitions, which is another aspect of their athletic preparation.

However, Table 2 presents the data from athletes' entire careers, and there are instances of athletes who simultaneously compete in both U23 and senior-level competitions within the same calendar year or earlier. It is crucial to differentiate between performances that occurred prior to (or simultaneously with) the U23 competitions and those that took place later, in which case the U23 competitions serve as a seamless transition in athletes' careers.

Figure 1 provides the number of athletes who participated in the U23 World Championships and their subsequent achievements in their seniors careers.



* percentage relative to the previous number of athletes

Figure 1. U23 World Championship participation and subsequent achievements throughout seniors career

One of the important objectives of this study was to track the extent to which U23 competitions facilitate athletes in their development and transition to the seniors level. As shown in the figure, 37.9 % of athletes participated at both U23 and senior-level competitions simultaneously. These athletes are considered to have great potential as they can manage to combine their participation in these competitions. However, only 35.5 % of them achieved notable results.

Unfortunately, more than half of the athletes (58.4 %) finished their international careers after competing in the U23 competitions. On the other hand, their sporting careers have a longer duration at the international level, which is also a positive aspect. More significantly, 330 athletes (41.6 %) continued their international careers at the seniors level. The majority of them (57.3 %) did not achieve success in seniors competitions, but 141 athletes won medals (including 43 winners).

It has been established that 17.8 % of athletes achieved success in senior-level competitions after participating in the U23 competitions. Statistically significant differences ($p < 0.05$) were found between the proportions of athletes who participated in seniors-level competitions before and after the U23 competitions. Therefore, we consider there to be a positive effect of the U23 competitions, which allow some athletes to continue their international careers and serve as a stepping stone towards transitioning into their seniors sporting careers.

Table 3 examines the subsequent careers of athletes who did not participate in seniors-level competitions prior to their involvement in the U23 competitions, based on wrestling style and gender.

Table 3. Performance of athletes after the U23 Competitions

Style of participants of World Championships U23	Achievements on seniors level		
	Participants	Medalist (1–3 place)	Winner (1 place)
Women wrestling (n = 164)	46.3 % (n = 76)	20.1 % (n = 33)	6.1 % (n = 10)
Man, Greco-Roman (n = 291)	42.9 % (n = 125)	16.8 % (n = 49)	6.5 % (n = 19)
Man, Freestyle (n = 338)	38.2 % (n = 129)	17.5 % (n = 59)	4.1 % (n = 14)
All participants (n = 793)	41.6 % (n = 330)	17.8 % (n = 141)	5.4 % (n = 43)

Among women, a higher percentage of athletes continued their careers (46.3 %) and achieved success (20.1 %) at the international stage after the U23 competitions. For male freestyle wrestlers, the figures are lower, with only 38.2 % continuing their careers. The percentage of medalists is almost the same for all styles and both genders. In general, it can be concluded that the introduction of the U23 competitions is more effective for the career development of promising female athletes.

A separate analysis of Olympic results was conducted to assess the significance of the further performances of athletes participating in the U23 competition. We examined the results of their performances at the Games of the XXXII Olympiad (Tokyo, 2021), when some of the wrestlers' had participated in the U23 competitions for several years (Table 4). In this context, the U23 competitions served as preparatory/supplementary events for some athletes, while for others, they represented a significant milestone in their careers. The table presents separate data for athletes who competed before and after the U23 competitions in seniors-level competitions. It must be stressed that the Olympic Qualification Tournament is one of the main pathways for securing a license to participate in the Olympic Games, although there are other options available (for example, medalists of the 2019 World Championships obtained licenses for the Games).

Table 4. Performance at the Olympic Games and Tournaments among U23 World Championship participants

Achievements	Competition activity		
	U23 before seniors level	U23 and seniors level simultaneously	All
Participation in Olympic Qualification	8.2 %	41.1 %	20.1 %
Medallist of Olympic Qualification	2.6 %	20.0 %	9.2 %
Winner of Olympic Qualification	1.1 %	5.8 %	2.9 %
Participation in Olympic Games	2.4 %	16.9 %	7.9 %
Medallist of Olympic Games	0.6 %	2.9 %	1.5 %
Winner of Olympic Games	0.1 %	0.4 %	0.2 %

The analysis indicates that among athletes who participated simultaneously in U23 and seniors competitions, all indicators are significantly higher (in most cases several times higher). The conducted analysis shows that for achieving the highest results, such as participation in the Olympic Games and winning medals, the U23 competitions serve as an essential development stage for only several athletes (2.4 %). However, among these athletes, there is one Olympic champion and three medalists, which is an important aspect.

Summing up, for majority elite athletes who can realize their potential and achieve the highest results, the U23 competitions serve as auxiliary or preparatory stages in their careers (these athletes' transition directly from juniors to seniors level). However, the U23 competitions play a meaningful role in the development of wrestlers' careers.

DISCUSSION

In general, summarizing the significance of the U23 competitions, let's consider the age levels in the process of athletes' development and reaching the peak of their sporting careers. Looking at the retrospective part of the study (the participation of wrestlers in the U23 World Championships at the cadets and juniors levels), from the retrospective analysis perspective, athletes continue their path in the world of sports, transitioning from one age level to another. In our case, the majority of athletes (73.7 %) participating in the U23 age category competitions were previously participants in juniors (U20) competitions, and over half of the athletes (58.4 %) had participated in cadets competitions. When comparing these results with those of Olympic champions: 85.4 % of wrestlers participated in the continental or world championships (Latyshev et al., 2020). Comparing the success rates in juniors competitions, a similar ratio of athletes achieved success: 41.5 % of the U23 competition participants achieved success in juniors competitions, and 43.1 % of the top 8 participants in the World Championships achieved success at the juniors level (Karninčić, Baić & Sprem, 2017; Latyshev et al., 2021). However, among Olympic champions, this figure is significantly higher (78.1 %).

According to conducted research, wrestlers reach the peak of their competitive performance at the age of 25–26 (Biac, Hrvoje & Sprem, 2014; Karninčić, Baić & Sprem, 2017; Franchini, Fukuda & Lopes-Silva, 2020; Latyshev et al., 2021). However, among athletes in other sports, wrestlers start their professional careers later (27th out of 29 sports). The average age at which elite wrestlers started their sport is 12.2 years, and the age at which athletes received club and government support is 19. This is one of the latest indicators compared to other sports (De Bosscher & De Rycke, 2017). Therefore, the U23 competitions fit into the overall sequence of competitions for the development of athletes at the international level. Additionally, it is important to acknowledge the existence of internal competition at the national level for some countries, which affects the opportunity to compete in international tournaments. In countries with high levels of competition at the national level, the U23 events can provide an additional opportunity for participants at the international level (Bruce, Farrow & Raynor, 2013; Franck & Stambulova, 2019).

Based on the obtained results, we can formulate the main objectives that the U23 competitions serve:

- the competitions serve as a meaningful bridge between the juniors and seniors levels, allowing wrestlers to effectively build their sports careers and achieve high results in the future;
- the competitions serve as auxiliary and preparatory events for athletes who are already capable of delivering strong performances among seniors. This also positively influences their ability to achieve high results;

- the competitions serve as the main focus for certain athletes. Although they may not achieve success and finish their careers after the U23 competitions, it provides them with the opportunity to prolong their careers and gain international competitive experience, which they can later utilize in coaching or partnership activities.

CONCLUSION

The analysis revealed that 17.8 % of athletes achieved success in seniors-level competitions after participating in the U23 competitions. However, statistically significant differences ($p < 0.05$) were found between the proportions of athletes who participated in seniors competitions during and after participating in the U23 competitions. The analysis demonstrated that the U23 competitions are part of the overall sequence of competitions in the development of wrestlers at the international level. They serve as a continuation of the cadets and juniors age groups. However, their importance varies depending on the level of athletes, and they serve both as preparatory and main competitions within the athletes' training system. It was revealed that the introduction of the U23 competitions is more effective for the career development of promising female athletes.

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