ANALYSIS OF THE RESULTS OF THE PERFORMANCES OF THE NATIONAL TEAM OF UKRAINE IN WOMEN'S WRESTLING AT OFFICIAL COMPETITIONS (1992–2021): SECOND MESSAGE

АНАЛІЗ РЕЗУЛЬТАТІВ ВИСТУПІВ ЗБІРНОЇ КОМАНДИ УКРАЇНИ ІЗ ЖІНОЧОЇ БОРОТЬБИ НА ОФІЦІЙНИХ ЗМАГАННЯХ (1992–2021 РР.): ПОВІДОМЛЕННЯ ДРУГЕ

Shandrygos V. I.¹, Blazheyko A. I.², Latyshev N. V.³, Tropyn Y. N.⁴, Boychenko N. V.⁴, Myroshnychenho Y. S.⁴

¹Ternopil Volodymyr Hnatyuk National Pedagogical University, Ternopil, Ukraine

²Ministry of Youth and Sports of Ukraine, Kyiv, Ukraine

³Borys Grinchenko Kyiv University, Kyiv, Ukraine

⁴Kharkiv State Academy of Physical Culture, Kharkiv, Ukraine

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Summaries

Purpose – to analyze the results of performances of athletes of the national team of Ukraine in women's wrestling at international competitions from 1992 to 2021 and to make a forecast for future competitions. Material and methods of research. Analysis of scientific and methodical literature and sources of the Internet; analysis of official competition protocols; methods of mathematical statistics. The performances of the sportswomen of the national team of Ukraine in women's wrestling at the European Championships, World Championships and Olympic Games among adults from 1992 to 2021 are analyzed. The number of medals won was counted. For more detailed analysis and forecasting, the competitions were combined into four-year Olympic cycles. The initial results of the performances are taken from the official website of the International World Wrestling Federation. MS Excel was used for statistical data processing and graphical presentation of results. Results. The analysis of the results shows that during the years of independence women wrestlers won 111 medals at the European Championships (including the II European Games 2019), of which 29 (26,13 %) gold. On average, athletes won 3.96 medals during the analyzed period. Statistics of awards at world championships show 42 medals, of which 11 (26,19 %) are gold. This is 2,64 times less than the number of medals at the European Championships, and gold medals 2,63 times less. On average, 1,5 medals were won at each world championship. Analyzing the data for each Olympic cycle, it was determined that the number of medals won at the European Championships is increasing and 29 medals were won in the last Olympic cycle. Looking at the world championships, there is a wave-like trend: in the 2005–2008 Olympic cycle won 8 medals; in 2009–2012 – 7 medals. The last Olympic cycle (2017–2021) turned out to be the best in terms of the number of medals won – 13 medals. Ukrainian women wrestlers have always claimed medals at the Olympic Games. However, the awards were won only in three Olympic cycles (2001–2004; 2005–2008; 2017–2021). Since 2004, Ukrainian athletes have been represented at all Olympic Games, obtaining the maximum number of licenses. In 2016 and 2021, out of six weight categories, our team was represented in five. Conclusions. The number of medals won by the Ukrainian women's wrestling team at the European Championships is increasing, there is a wave-like trend at the World Championships, however, the last Olympic cycle was the best in the number of medals won, including two Olympic medals. Analyzing the previous performances, taking into account the young and strong team, we can confidently predict the effectiveness of our women's wrestling team in official competitions.

Key words: women's wrestling, analysis, competitive activity, medals, highly qualified athletes, forecasting.

Мета – проаналізувати результати виступів спортсменок збірної команди України із жіночої боротьби на міжнародних змаганнях із 1992 р. по 2021 р. та скласти прогноз на майбутні змагання. **Матеріал і методи дослідження.** У роботі застосовані аналіз науково-методичної літератури

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та джерел інтернету, аналіз офіційних протоколів змагань, методи математичної статистики. Проаналізовано виступи спортсменок збірної команди України із жіночої боротьби на чемпіонатах Европи, чемпіонатах світу та Олімпійських іграх серед дорослих із 1992 р. по 2021 р. Підраховувалася кількість здобутих медалей. Для більш детального аналізу та прогнозування всі змагання були об'єднані в чотирирічні олімпійські цикли. Вихідні дані результатів виступів узяті з офіційного сайту міжнародної федерації спортивної боротьби "United World Wrestling". Для статистичної обробки даних і графічного представлення результатів використовувалася програма MS Excel. Результати. Аналіз результатів показує, що за роки незалежності борчині завоювали 111 медалей на чемпіонатах Європи (включно з II Європейськими іграми 2019 р.), з них 29 (26,13 %) – золоті медалі. У середньому спортсменки за аналізований період завойовували 3,96 медалей. Статистика нагород на чемпіонатах світу показує, що були завойовані 42 медалі, з них 11 (26,19 %) – золотих. Це у 2,64 раза менше, ніж кількість медалей на чемпіонатах Європи, а золотих медалей – у 2,63 раза менше. У середньому на кожному чемпіонаті світу було завойовано 1,5 медалі. Унаслідок аналізу даних щодо кожного олімпійського циклу ми визначили, що кількість завойованих медалей на чемпіонатах Європи збільшується, в останній олімпійський цикл виграно 29 медалей. За підсумками розгляду чемпіонатів світу спостерігається хвилеподібна тенденція: у 2005–2008 рр. в олімпійському циклі виграно 8 медалей, у 2009–2012 рр. – 7 медалей. Останній олімпійський цикл (2017–2021 рр.) виявився найкращим за кількістю завойованих медалей – 13 медалей. Українські борчині завжди претендували на медалі в Олімпійських іграх. Проте здобути нагороди вдалося лише у трьох олімпійських циклах (2001–2004 рр., 2005–2008 рр., 2017–2021 рр.). З 2004 р. українські спортсменки були представлені на всіх Олімпійських іграх та здобули максимальну кількість ліцензій. У 2016 р. та 2021 р. із шести вагових категорій наша збірна була представлена в п'яти. Висновки. Кількість завойованих збірною командою України медалей із жіночої боротьби на чемпіонатах Європи збільшується, на чемпіонатах світу спостерігається хвилеподібна тенденція, однак останній олімпійський цикл виявився найкращим за кількістю завойованих медалей (з огляду на дві олімпійські медалі). Унаслідок аналізу попередніх виступів, а також з огляду на молодість і силу команди можемо з упевненістю прогнозувати результативність нашої збірної команди із жіночої боротьби на офіційних змаганнях.

Ключові слова: жіноча боротьба, аналіз, змагальна діяльність, медалі, висококваліфіковані спортсменки, прогнозування.

Цель – проанализировать результаты выступлений спортсменок сборной команды Украины по женской борьбе на международных соревнованиях с 1992 г. по 2021 г. и составить прогноз на предстоящие соревнования. Материал и методы исследования. В работе применен анализ научнометодической литературы и источников интернета, анализ официальных протоколов соревнований, методы математической статистики. Проанализированы выступления спортсменок сборной команды Украины по женской борьбе на чемпионатах Европы, чемпионатах мира и Олимпийских играх среди взрослых с 1992 г. по 2021 г. Подсчитывалось количество добытых медалей. Для более подробного анализа и прогнозирования все соревнования были объединены в четырехлетние олимпийские циклы. Исходные данные о результатах выступлений взяты с официального сайта международной федерации спортивной борьбы "United World Wrestling". Для статистической обработки данных и графического представления результатов использовалась программа MS Excel. Результаты. Анализ результатов показывает, что за годы независимости борчихи завоевали 111 медалей на чемпионатах Европы (включая ІІ Европейские игры 2019 г.), из них 29 (26,13 %) – золотые медали. В среднем спортсменки за рассматриваемый период завоевывали 3,96 медалей. Статистика наград на чемпионатах мира показывает, что были завоеваны 42 медали, из них 11 (26,19 %) – золотые. Это в 2,64 раза меньше количества медалей на чемпионатах Европы, а золотых медалей – в 2,63 раза меньше. В среднем на каждом чемпионате мира было завоевано 1,5 медали. В результате анализа данных по каждому олимпийскому циклу мы определили, что количество завоеванных медалей на чемпионатах Европы увеличивается, в последний олимпийский цикл выиграно 29 медалей. По итогам рассмотрения чемпионатов мира наблюдается волнообразная тенденция: в 2005–2008 гг. в олимпийском цикле выиграно 8 медалей, в 2009–2012 гг. – 7 медалей. Последний олимпийский цикл (2017–2021 гг.) оказался лучшим по количеству завоеванных медалей – 13 медалей. Украинские борчихи всегда претендовали на медали в Олимпийских играх. Однако получить награды удалось только в трех олимпийских циклах (2001–2004 гг., 2005–2008 гг., 2017–2021 гг.). С 2004 г. украинские спортсменки были представлены на всех Олимпийских играх и получили максимальное количество лицензий. В 2016 г. и 2021 г. из шести весовых категорий наша сборная была представлена в пяти. Выводы. Количество завоеванных сборной командой Украины медалей по женской борьбе

на чемпионатах Европы увеличивается, на чемпионатах мира наблюдается волнообразная тенденция, однако последний олимпийский цикл оказался лучшим по количеству завоеванных медалей (учитывая две олимпийские медали). В результате анализа предыдущих выступлений, а также учитывая молодость и силу команды, можем с уверенностью прогнозировать результативность нашей сборной команды по женской борьбе на официальных соревнованиях.

Ключевые слова: женская борьба, анализ, соревновательная деятельность, медали, высококвалифицированные спортсменки, прогнозирование.

Introduction. Athletes of Ukraine during the years of independence of the state participated and successfully performed in all the Olympic Games (in seven times). Since 2004, women's freestyle wrestling (further – women's wrestling) is included in the program of the Olympic Games and since then Ukrainian wrestlers have consistently participated in the main competitions of the four years [9; 14; 15]. In 2021 (postponed due to the coronavirus pandemic), Ukraine was represented at the Olympic Games for the seventh time. This period indicates that most athletes are students of schools in already independent Ukraine. In general, this is a long enough period to draw some conclusions about the effectiveness of the training system for athletes in Olympic sports [2; 6; 8; 16; 18; 24].

Women's wrestling as a sport occupies a leading position in the country, and our team has always held high positions among the world's teams. It was represented at all the Olympic Games and always returned with medals. Analysis of the national team's performances at official international competitions allows us to identify trends and features of women's wrestling in Ukraine and to predict the results of future competitions. This is an urgent task of high-achievement sports.

The analysis of performances of national teams in different types of wrestling is devoted to a large number of scientific works [5; 6; 7; 13; 14; 18; 21; 22], also the performances of athletes are closely monitored by various committees and federations, regularly monitor the results and outline prospects for further development [5; 16; 18].

Based on the data of the analysis, the training of athletes is planned and adjusted, as well as the modernization, reform and search for ways to develop sports of higher achievements and freestyle wrestling in particular [16].

However, at the moment there are no works devoted to studying the dynamics of the results of the performances of the national team of Ukraine in women's wrestling for a long time. Analysis of the performances of the national team at official international competitions will identify trends and features of women's wrestling in Ukraine and predict the results of future competitions.

Connection of work with important scientific programs and practical tasks. The work was performed in accordance with the research theme of the Department of Theory and Methods of Olympic and Professional Sports of Ternopil Volodymyr Hnatyuk National Pedagogical University "Scientific and methodological foundations of long-term technical and tactical training in freestyle wrestling".

The purpose of the study is to analyze the results of performances of athletes of the national team of Ukraine in women's wrestling at international competitions from 1992 to 2021 and to make a forecast for future competitions.

Material and research methods. In the study were used the following common methods: analysis of scientific and methodological literature and Internet sources; analysis of official competition protocols; methods of mathematical statistics.

The performances of the athletes of the national team of Ukraine in women's wrestling at the European Championships, World Championships and Olympic Games among adults from 1992 to 2021 are analyzed. The number of medals won was counted. For more detailed analysis and forecasting, the competitions were combined into four-year Olympic cycles. The initial results of the performances are taken from the official website of the International Wrestling Federation (United World Wrestling, https://unitedworldwrestling.org/database). MS Excel was used for statistical data processing and graphical presentation of results.

Research results and their discussion. Based on the analysis of scientific and methodological literature [3; 8; 11; 19; 25; 26], Internet sources and generalization of best practices, it was found that the problem of studying competitive activities in modern sports is one of the most pressing [14; 16; 18].

Sports competitions in Olympic sports are a central element, which, according to V. N. Platonov [10], "determines the entire system of organization, methods and training of athletes for effective competitive activities. Without competitions, the existence of sport itself is impossible". The Olympic Games, held every four years, are the most significant and prestigious competitions in the world. All four-year training of high-class athletes is aimed at obtaining the right to participate in these competitions (obtaining a license) and winning medals [1; 6; 7; 10; 12; 16; 18; 21].

A large number of official international competitions are held annually, however, the most important are the world championships, continental championships (for Ukraine it is the European championship) and the World Cups.

The results of performances at these competitions are the main result of the annual training cycle, and the dynamics of the results characterizes the effectiveness of the athlete's training system [6; 10; 13; 16; 18; 19; 23; 25].

However, the right to participate in World Cup competitions depends on the performances of national teams at the last World Cup. Thus, during the years of independence, our women's wrestling team has participated in World Cups 10 times (from 18), so a comparative analysis of the results of these competitions is almost impossible and is not considered further [16; 18].

When analyzing competitive activities in women's wrestling, it is necessary to take into account that the number of weight categories changed in different years. This, in turn, affected the number of medals that could be won. Thus, by 1996 there were 9 weight categories reduced. From 1996 to 2001, the number of categories decreased to 6. From 2001 to 2013, inclusive, there were 7 weight categories, including

4 Olympic (at the Games 2004, 2008, 2012). In 2014, the rules of the competition were changed and the number of categories was increased to 8, of which 6 were represented at the Olympic Games. Since 2018, two more "intermediate" weight categories have been added to participate in competitions under the auspices of UWW. In total, 10 weight categories were represented at the last European and world championships [17; 18]. This should be taken into account when analyzing data and forecasting results.

It should be noted that in 2015 the firstever European Games were held in the capital of Azerbaijan (Baku). In terms of significance and prestige, they can be equated to the European Championships.

Consistently consider the performance of the women's wrestling team in official competitions. Table 1 presents the number of medals won by athletes of the national team of Ukraine in women's wrestling at the European Championships, World Championships and Olympic Games from 1992 to 2021 inclusive.

Ukrainian freestyle wrestlers started their international performance at the World Championships in 1992, the European Championships in 1993, and the Olympic Games in 2004. Since then, domestic representatives have consistently participated in all official international competitions [16; 18].

The analysis of the results shows that during the years of independence women wrestlers won 111 medals at the European Championships (including the II European Games 2019), of which 29 (26,13 %) gold (fig. 1).

In women's wrestling in general, there is a noticeable tendency to increase the number of medals won from one Olympic cycle to another. Women's wrestling is a young sport, and it is developing rapidly in Ukraine.

For example, at the European Championship in 2012, the national team of Ukraine performed brilliantly, winning four gold and three silver medals in seven weight categories, in each weight category was taken a prize. Also very successful were 2020 – 8 medals, 2016 and 2021 – 7; 2011, 2013 and 2019 – 6 each; 2004, 2008, 2009 – 5 awards of different kinds. On average,

athletes won 3,96 medals during the analyzed period. Throughout the history of performances at the European Championships, the female wrestlers have never returned without awards and became champions in the unofficial medal standings in 2004, 2009, 2011, 2012, 2019 [16].

Since 2004, there has been a sharp increase in results, with more than 50 % of teams fighting in the finals or returning home with European Championship medals.

Statistics of awards at world championships show 42 medals, of which 11 (26,19 %) are gold (fig. 1). This is 2,64 times less than the number of medals at the European Championships, and gold medals 2,63 times less. Thus, we can conclude that 1,5 medals were won on average at each world championship.

If we analyze the number of awards in relation to the number of weight categories (fig. 2), the most successful was the European

Table 1
Number of medals won by athletes of the national team of women's wrestling of Ukraine
at the European Championships, World Championships and Olympic Games

Year	European Championships		World Championships		Olympic Games		
	medals for 1–3 place	gold medals	medals for 1–3 place	gold medals	medals for 1–3 place	gold medals	Total medals
1992	_	_	0	0	_	_	0
1993	7	0	0	0			7
1994	_	_	1	0			1
1995	_	_	1	0			1
1996	2	0	_	_	_	_	2
1997	1	0	0	0			1
1998	1	0	0	0			1
1999	3	1	0	0			3
2000	2	1	2	1	_	_	4
2001	2	1	2	1			4
2002	3	1	1	1			4
2003	2	0	1	1			3
2004	5	3	_	_	1	1	6
2005	2	2	2	0			4
2006	2	0	1	0			3
2007	4	0	2	0			6
2008	5	1	3	0	1	0	9
2009	5	2	3	0			8
2010	3	0	2	1			5
2011	6	3	2	1			8
2012	7	4	0	0	0	0	7
2013	6	1	1	1			7
2014	4	0	2	1			6
2015*	3	1	3	1			6
2016	7	0	0	0	0	0	7
2017	3	0	1	0			4
2018	1	0	3	1			4
2019	6	4	2	0			8
2019**	4	1	_	_			4
2020***	8	1	6	1			14
2021	7	2	1	0	2	0	10
Total	111	29	42	11	4	1	157

Note: * in 2015, as the European Championship was not held, we took into account the European Games.

^{**} in 2019 – in addition to the European Championship, the results of the II European Games were also taken into account.

^{***} in 2020 – due to the coronavirus pandemic, the individual World Cup was held instead of the World Cup, and the Olympic Games were postponed to 2021, due to the coronavirus epidemic.

Championship in 2012 – 100 % of the medals won by the team and in 2016–87.5 %.

At the world championships, the best indicators of medals won in terms of the number of participants were in 2008 and 2009-42,85% each and at the individual world cup in 2020-60%.

In 2021, this figure is only 10 %, but in the team standings, the national team of Ukraine took a high 4th place, losing to strong national teams of Japan,

USA and Mongolia (due to the equal performance of the whole team – six female wrestlers fought for prizes) (https://cdn.uww.org/s3fs-public/2021-10/results_10_oslo.pdf?VersionId=UgagAfhEcXd7kcBVbaPwtKqLWuhzX32s).

These facts generally reflect the wave-like results with declining achievements in women's wrestling by 2019 and a marked improvement over the past two years. The correlation coefficient between the medals won at the European Championships and the World Championships is less than 0,12. This shows that there is no relationship between these data, but from our point of view, this is due to low representativeness and rather limited options for parameter values. This fact confirms the statement that the national team of Ukraine in women's wrestling is a "European team" [16].

In general, if we do not take into account the period of formation of women's wrestling, then since 1996 (at the European Championships) and since 2000 (at the World Championships, except for 2012 and 2016, when the World Championships were held only for non-Olympic weight categories) Ukraine's national women's wrestling team did not return home without medals.

In order to model and predict the results of performance at the Olympic Games, we will consider the results for each Olympic cycle [4; 20]

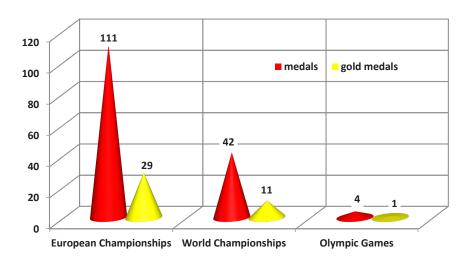


Fig. 1. The number of medals won by the wrestlers of the national team of Ukraine

which is common and corresponds to the natural periodization of sports training [10; 16].

In fig. 3 presents the total number of medals won in each Olympic cycle. It is worth noting that the current Olympic cycle (2017–2021) due to the coronavirus epidemic lasted one year longer, as the Olympic Games were postponed to 2021.

Analyzing the data for each Olympic cycle, we determine: the number of medals won at the European Championships is increasing and in the last current Olympic cycle won 29 medals.

Looking at the world championships, there is a wave-like trend: in the 2005-2008 Olympic cycle won 8 medals; in 2009-2012-7; and the last Olympic cycle (2017-2021) was the best in the number of medals won -13 medals.

The same applies to the analysis of the number of awards in relation to the number of weight categories for each Olympic cycle separately (fig. 4).

The maximum percentage of awards won at the European Championships is observed in the cycle of 2009–2012 (70%) and 2013–2016 (64,52%). At the world championships, the best percentage of medals won was in the cycle of 2009–2012 (28,57%) and 2013–2016 (28%).

The last Olympic cycle (2017–2021) turned out to be high: at the European Championships – 60,42 %; at the world championships – 27,08 % and at the Olympic Games – 33,33 %.

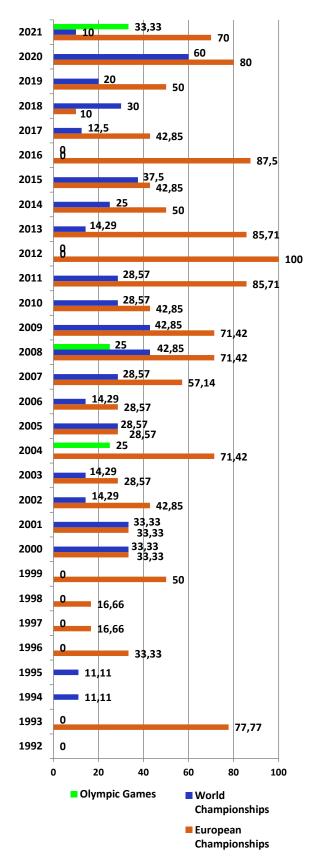


Fig. 2. The share of medals won by Ukrainian female wrestlers from the maximum possible number of medals played at official international competitions (%)

It is worth noting that women's wrestling has been included in Olympic sports only since 2002, and the first sets of medals were drawn at the Olympic Games in Athens (2004) [16].

Ukrainian female wrestlers have always claimed medals at the Olympic Games. However, the awards were won only in three Olympic cycles (2001–2004; 2005–2008; 2017–2021). In another (2009–2012), two athletes competed in the bronze finals, however, stopped a step away from the awards. At the 2016 Olympic Games, the best result was 9th place. It should also be noted the representation of our athletes at the main competitions of the four years. Since 2004, Ukrainian athletes have been represented at all Olympic Games, obtaining the maximum number of licenses. In 2016 and 2021, out of six weight categories, our team was represented in five [18] (fig. 5).

Forecasts and work of the Association of Freestyle Wrestling of Ukraine together with the Ministry of Youth and Sports of Ukraine, NOC of Ukraine brought the desired results and at the Games in Tokyo our female wrestlers won two bronze awards.

Given the above, we can take into account the fact that currently in the UWW ranking are 17 athletes (table 2), including the results of the World Cup (Oslo, 2021), and the U23 World Cup (Belgrade, 2021), on which, in the absence of Japanese athletes, the national team of Ukraine won the team championship. Over the past month, all athletes have improved their positions at once.

Analyzing previous performances and taking into account the young and strong team, we can confidently predict the effectiveness of our national team in women's wrestling and winning medals in the future.

Conclusions. The analysis of the performances of the national team of Ukraine in women's wrestling at competitions of European and world level since 1992 showed that the most productive yearis 2020–14 medals; 2021–10; 2008–9; 2009, 2011 – 8 medals each. The analysis of the share of awards won in relation to the number of weight categories revealed that the most successful was the European Championship in 2012 –

100 % of the medals won by the team and in 2016 - 87.5 %. At the world championships, the best indicators of medals won in terms of the number of participants were in 2008 and 2009 - 42.85 % each and at the individual world cup in 2020 - 60 %.

The number of medals won at the European Championships is increasing and in the current Olympic cycle, given that it lasted one year longer, 29 medals were won. At the world championships there is a wave-like trend, the maximum number of medals won (8 medals) in the 2005–2008 Olympic cycle and in the 2009–2012 Olympic cycle – 7 medals. The last Olympic cycle (2017–2021) turned out to be the best in terms of the number of medals won (13 medals), taking into account the results of the individual World Cup in 2020.

Table 2 Ukrainian female wrestlers in the UWW (Top-20) ranking in freestyle wrestling (as of December 15, 2021)

Weight category	Athletes	Current place (previous place)
50 kg	Livach, Oksana	7 pl. (5)
50 kg	Kokozei Yashchuk, Bogdana	16 pl. (−) ↑
53 kg	Bereza, Kristina	10 pl. (25) ↑
55 kg	Khomenets, Aleksandra	8 pl. (−) ↑
55 kg	Demko, Khristina Zoryana	17 pl. (11)
57 kg	Kit, Tatyana	9 pl. (17) ↑
57 kg	Vynnyk, Solomiia	17 pl. (−) ↑
57 kg	Hrushyna Akobiya, Alina	20 pl. (12)
59 kg	Lisovska, Yulia	20 pl. (−) ↑
62 kg	Koliadenko, Irina	4 pl. (3)
62 kg	Prokopevniuk, Ilona	7 pl. (27) ↑
65 kg	Rizhko, Tatyana	9 pl. (7)
68 kg	Cherkasova, Alla	9 pl. (6)
68 kg	Lavrenchuk, Anastasia	15 pl. (–)
68 kg	Berezhna, Alina	17 pl. (12)
72 kg	Belinska, Alla	5 pl. (1)
76 kg	Osniach Shustova, Anastasia	8 pl. (23) ↑

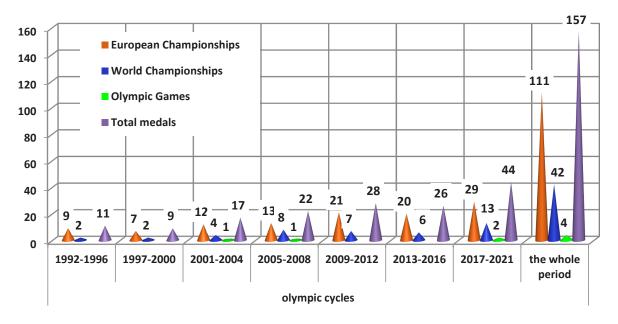


Fig. 3. The number of medals won by the female wrestlers of the national team of Ukraine in each Olympic cycle

The maximum percentage of awards won at the European Championships is observed in the cycles of 2009–2012 (70%), 2013–2016 (64,52%) and 2017–2021 (60,42%). At the world championships, the best percentage of medals won was in the cycles of 2009–2012 (28,57%), 2013–2016 (28%) and 2017–

2021 (27,08 %). At the Olympic Games, the best indicator was in the current cycle – 33,33 %.

Ukrainian female wrestlers have always claimed medals at the Olympic Games. However, the awards were won only in three Olympic cycles (2001–2004; 2005–2008; 2017–2021). In another (2009–2012), two athletes competed in

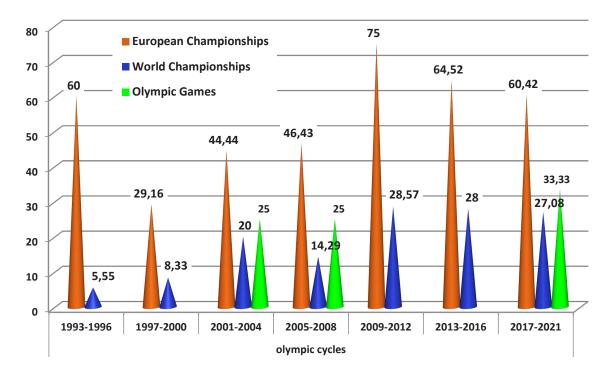


Fig. 4. The share of medals won by Ukrainian wrestlers from the maximum possible number of medals played at official international competitions in each Olympic cycle (%)

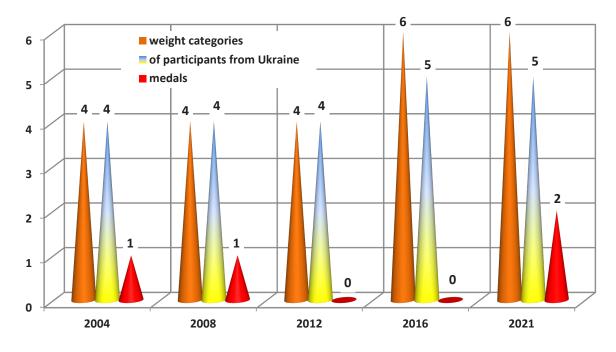


Fig. 5. Representation of Ukrainian female wrestlers at the Olympic Games

the bronze finals, however, stopped a step away from the awards.

Analyzing the previous performances, given the young and strong team, we can confidently predict the effectiveness of our national team in women's wrestling. Making a forecast for the future, it should be noted that the stability of the performance

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of the national team of Ukraine in women's wrestling allows you to positively assess the ability to show high results and bring medals in official competitions.

Prospects for further research will be aimed at conducting a comparative analysis of the performances of national teams of other countries by types of wrestling and identifying patterns.

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