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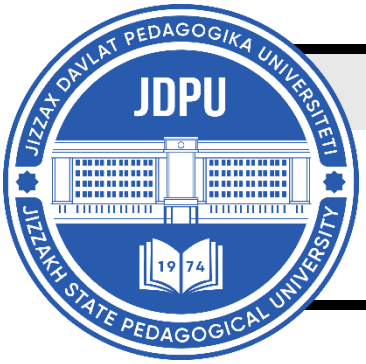

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THE ROLE OF DATA ANALYTICS IN IMPROVING TECHNICAL AND TACTICAL PERFORMANCE IN WOMEN'S FOOTBALL

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ABOUT ARTICLE

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Abstract: In recent years, women's football has been developing rapidly. Along with physical training, technical and tactical indicators are also one of the important factors in the team's success. This article analyzes the role of data analytics in improving technical and tactical indicators in women's football. The possibilities of obtaining accurate data through game statistics, GPS tracking, video analytics, and models based on artificial intelligence are shown. Based on practical examples and experiments, it has been proven that data analysis helps coaches make scientifically based decisions.

Introduction. In scientific literature, physical preparation and technical skills in women's football have been studied separately (Carling et al., 2014; FIFA, 2019). Research indicates that the physiological and tactical aspects of women's football differ from men's football (Andersson et al., 2020). In recent years, GPS tracking technologies, video analytics systems such as InStat and Wyscout, and artificial intelligence-based models have been widely applied in sports analysis (Liu et al., 2021). However, there is a lack of specific methodological

approaches for applying data analytics to improve technical and tactical indicators in women's football.

Data analytics has become a crucial tool in football, particularly in women's football, for improving game quality, enhancing technical and tactical performance, and making strategic decisions. Modern football processes are now managed not only based on coaches' experience but also on precise figures and analyses. Through data analytics, numerous indicators of players' performance are recorded in real-time, including all movements during the game, running speed, distance covered, number of accelerations, heart rate, ball control quality, pass accuracy, and shot power and direction. This data is subsequently subjected to in-depth analysis, enabling the identification of strengths and weaknesses for both individual players and the entire team.

During the analytical process, coaches make evidence-based decisions to optimize players' training loads, reduce injury risks, and maintain peak physical fitness. Additionally, the opposing team's game is thoroughly analyzed: their tactical elements, such as pressing intensity, speed of attacking and defensive transitions, positioning, and combination attack styles, are digitally modeled. This aids in developing effective strategies against the opponent during game preparation.

Using analytical tools, coaches and sports analysts can monitor player movements in real-time, quickly identify errors, and refine individual and team strategies. For instance, video analytics software highlights each footballer's mistakes in ball handling and positioning.

Some of the popular analytical technologies currently used in women's football are:

GPS trackers measure players' movement, speed, and running distance.

Video analytics platforms (Hudl, Wyscout) - deep analysis of games and training.

Data visualization tools make statistical data understandable through graphs and diagrams.

Research methods. Data analytics is the process of making effective decisions through the collection, processing, and analysis of large volumes of statistical data. In women's football, it is used in the following areas:

1. Analysis of physical indicators such as player movement speed, running distance, and pulse rate.

2. Study of technical elements (pass accuracy, shot force, quality of receiving the ball).

3. Statistical modeling of the opposing team's playing style.

Optimization of training loads and prevention of injuries.

Results. For a comparative analysis, let us consider the individual indicators of the motor activity of the female football players of the Uzbekistan national team in the game against the Ukrainian national team (see Table 1)

Table-1

Indicators of the movement activity of the female football players of the Uzbekistan women's national team in the match against the Ukrainian national team at the international tournament in Turkey (n=13)

No.	Full Name of players	Game minute	Total distance (m)	Maximum speed (km/h)	Sprints	Distance in the 1st speed zone (m) (0.1 - 7.19 km/h)	Distance in the 2nd speed zone (m) (7.20 - 18.39 km/h)	3-speed zone distance (m) (18.40 - 22.79 km/h)	Distance in the 4th speed zone (m) (22.80 - 24.99 km/h)	Distance in speed zone 5 (m) (25.00- km/h)
1	Z-va T.	90	11061	24,4	4	3703	5621	562	1143	32
2	T-va I.	90	10663	23,5	1	3943	5839	458	417	6
3	P-va M.	90	10413	21,9	0	3485	6077	466	385	0
4	X-va S.	90	10400	27,3	10	3643	5474	399	737	147
5	K-va U.	90	10020	25,3	9	3578	5012	430	892	108
6	K-va N.	90	9457	26,2	6	4025	4357	375	625	75
7	X-va D.	75	8793	28,2	11	2998	4443	454	752	146
8	K-va N.	65	7365	26,5	6	2721	3644	338	575	87
9	T-va Sh.	65	6295	26,7	6	2769	2905	170	391	60
10	Z-va Sh.	49	5965	22,9	0	1972	3243	255	495	0
11	Z-va U.	41	5081	25,1	5	1574	2717	297	425	68
12	V-va M.	25	2969	24,9	3	942	1521	178	305	23
13	Z-va K.	25	2544	26,0	2	1012	1191	105	201	35
	In total meters		**101026**		**63**	**36365**	**52044**	**4487**	**7343**	**787**
	In % total					**37**	**51**	**4**	**7**	**1**

As can be seen from the table, the total volume of movements during the game was 101026 m, which is a good indicator. A large number of movements performed by female soccer players were performed at a speed of up to V=7.19 km/h, the distance was equal to 36365 m, this indicator constitutes 37% of the total volume of movements. Also, movement at a speed of V=7.20-18.39 km/h was 52044 m or 51%. These speed zones include walking, running at a steady pace, acceleration at low speeds, and running.

However, in football, it is necessary to take into account not only the total distance (metraj) of motor activity, but also such indicators as the volume of movements in zones 4 and 5, i.e., the volume of movements performed at speeds exceeding 22.8 km/h. When analyzing the movements of female soccer players in these speed zones, the data were as follows: V=22.80-24.99 km/h with a movement volume of 7343 m (7%); V with a speed of more than 25 km/h - 787 m (1%). These are not high indicators of movement intensity. Highly qualified female soccer players perform up to 10% of the total movement volume in the speed zone above 25 km/h.

It is advisable to highlight the indicator of motor activity, such as the number of sprint runs at a speed of V≥6.94 m/s. The number of sprints in this game was 63, which is a low indicator, not corresponding to the characteristics of high-speed movement of female football players.

When characterizing the volume of motor activity, it is necessary to compare them with the indicators of physiological intensity according to HR. This comparative characteristic makes it possible to assess the motor activity of female athletes in different intensity zones (Table 2).

Table 2

Players of the Uzbekistan women's national football team in the match against Ukraine at the international tournament held in Turkey

Heart rate indicators (n=13)

No.	Player's Full Name	Playing minutes on the field	Max. value of HR. [pound/min.]	Time in the 1st HR zone (100-120 bpm).	Time in the 2nd heart rate zone (121-140 bpm).	Time in the 3rd heart rate zone (141-159 bpm).	Time in the 4th heart rate zone (160-179 rpm).	Time in the 5th heart rate zone (above 180 bpm)
1	K-va N.	90	196	00:37	10:37	06:22	15:56	1:07:08
2	T-va I.	90	197	03:13	09:15	08:13	13:42	55:43
3	X-va D.	75	198	17:53	09:22	07:40	20:14	20:09
4	K-va U.	90	193	11:02	07:23	10:41	23:14	34:20
5	K-va N.	65	193	00:44	11:02	12:20	20:41	20:53
6	Z-va T.	90	183	09:42	08:18	11:41	21:58	38:21
7	T-va Sh.	65	199	20:57	07:07	04:48	14:19	14:55
8	Z-va Sh.	49	196	00:33	06:17	12:24	12:33	17:13
9	X-va S.	90	192	02:42	12:41	11:06	26:56	37:35
10	P-va M.	90	186	08:00	09:34	09:13	28:31	35:42
11	V-va M.	25	189	00:00	00:00	01:42	06:37	17:41
12	Z-va U.	41	190	01:56	08:09	03:26	12:22	16:07
13	Z-va K.	25	179	00:00	02:45	10:04	04:32	08:39

As can be seen from Table 2, the maximum heart rate in female soccer players averaged 191.6 bpm. When analyzing the total heart rate in 5 intensity zones, it was found that the female soccer players spent the most time in the game in the zone of intensity above 180 bpm. 160-179 bpm in the intensity zone - 3:41:32 minutes; 141-159 bpm zone - 1:49:04 min.; 121-140 bpm zone - 1:43:04 min.; In the zone of 100-120 bpm - 1:16:56 min.

Comparative analysis of the obtained data on the intensity of heartbeat and the speed of movements shows that female soccer players did not spend much time in the high-intensity zone - more than 160 bpm, and if we look at the total volume of movements, it can be seen that a very small number of movements performed by them were performed at high speed. Thus, with a speed of "V=22.8-24.99 km/h," the traffic volume in zone IV was 165 7m (1.7%), and with a speed of "V=25 km/h and higher" in zone V - 787 m (0.8%). In individual players, in the zone above 160 bpm, the HR indicators - N.K-vada - were 92.2%, the volume of movement at a speed of V=22.8-24.9 km/h was 575 m, and at a speed of V≥ 25 km/h - 87 m. In the zone above 160 bpm, the HR indicators were 76.9%, at a speed of V=22.8-24.9 km/h the running volume was 417 m, and at a speed above V≥ 25 km/h - only 6 m.

These facts confirm that the level of heart rate in female soccer players was very high, but the speed of movement during the game was low. The obtained results showed that in the game, the majority of female soccer players had a high heart rate, and the indicators of motor activity in the high-speed zone were low.

Conclusion. Improving technical and tactical indicators in women's football is a complex and multifaceted process, in which data analysis plays an important role. With the help of modern technologies, coaches will be able to improve the quality of individual and team play of players, improve strategies, and create a competitive team.

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