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Distinctive features of somatometric indicators of women of the first period of mature age with different types of posture

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Abstract

Purpose. The purpose of the study was to determine the distinctive features of somatometric indicators of women 25-34 years old with different types of posture.

Material & Methods. The scientific study involved 36 women aged 25-34 years (25-29 years (n=18), 30-34 years (n=18)). The tasks defined in the course of the study were solved using generally accepted methods: theoretical analysis of scientific literature on the selected research topic, the Torso program was used to determine the types of posture, anthropometry. All data obtained in the empirical study were processed using mathematical statistics methods.

Results. It has been established that women aged 25-29 years have more pronounced anthropometric differences, which may be associated with structural features. The fact that women with scoliotic posture have a greater body length and lower Quetelet and Rohrer indices may indicate a tendency towards a taller and slimmer physique, which is typical for scoliotic posture, where vertical "stretching" of the spine may

occur. These characteristics of younger women may be important for developing exercises aimed at correcting posture and strengthening the muscular corset, which will help prevent further development of scoliosis or other disorders. As for women aged 30-34, less pronounced or absent statistical differences may be due to the fact that with age, anthropometric parameters become less sensitive to the influence of posture type due to general changes in the body, such as decreased muscle mass and changes in metabolism. There is also a version that the influence of the type of posture on physical characteristics may decrease with age due to the body's adaptation to long-term postural loads or habituation to a certain lifestyle and physical activity. Such data are important for understanding how age and structural features affect physical development and health, as well as for planning appropriate health measures for mature women with different types of posture.

Conclusions. The practical aspects of the scientific work presented above will be the basis for the theoretical justification and implementation of corrective and preventive measures in the process of health fitness classes for women in the first period of mature age.

Key words: health, mature age, women, musculoskeletal system, posture, somatometric indicators, anthropometric indices.

Introduction

During the first mature age, a woman carries out active social and professional activities, the issue of improving her quality of life by, in particular, maintaining and improving her health seems to be extremely relevant (Stopa et al. 2024). The consequences of hypokinesia and physical inactivity inherent in women at this age include: overweight, obesity, diseases of the cardiovascular system, musculoskeletal system (MSS), metabolic disorders and other problems (Kashuba et al. 2020; Demjokhin et al. 2024).

In the modern historical context, the increase in the proportion of pathological conditions associated with the musculoskeletal system brings the situation to a threatening level, moves it beyond the medical and gives it a distinct social significance (Lazko et al. 2021; Kozlovska et al. 2023). Scientists (Tkachova et al. 2020; Kashuba et al. 2021; Asaulyuk et al. 2023) distinguish between various forms of MSS disorders, such as: deformation of the arch of the foot, as well as posture disorders against the background of a low level of physical development and poor physical fitness as a pre-disease condition due to a decrease in the adaptive reactions of the muscular-ligamentous apparatus to fatiguing effects.

Material and methods

Study Design

The research was conducted at the Department of Kinesilology and Physical Culture and Sports Rehabilitation of the National University of Physical Education and Sports, the Department of Theory and Methodology of Physical Education of the Vinnytsia State Pedagogical University named after M. Kotsiubynsky. The studies were conducted in compliance with the requirements of the Declaration of Helsinki of the World Medical Association "Ethical principles of medical research involving humans as the subject of research".

Subjects

The scientific study involved 36 women aged 25-34 years (25-29 years (n=18), 30-34 years (n=18)). *Research methods*. Analysis of literary sources, pedagogical experiment. Photography and posture analysis (Kashuba et al. 2021). The analytical data obtained during the experiment, reflecting certain types of posture disorders, were subsequently processed by an orthopedic doctor to formulate conclusions about the type of posture of the experimental women of the first period of mature age. Anthropometry. Chest circumference was measured with a tape measure in centimeters with an accuracy of 1 mm in the standard position. Body weight was determined in kilograms (kg)

using medical scales that ensured weighing accuracy of up to 100 g. The data obtained were further analyzed using calculated indices. The study examined the ratio of the length and body weight of women in the first period of mature age using the Quetelet body mass index ($kg \cdot m^2$). Additionally, the ratio of length and body weight of women was analyzed using the Rohrer weight-height index (conventional units). The ideal body weight for women's height was calculated using the Beringard formula.

Statistical data analysis

All data obtained in the empirical study were processed using mathematical statistics methods (Kashuba et al. 2020). To assess the reliability of differences in the biomechanics of the spatial organization of the body of women aged 25-29 and 30-34 years, methods for comparing independent samples were used using the Student's t-test for independent samples when it came to normally distributed data, or the Mann-Whitney U-test when the distribution was not normal. If the comparison involved data presented in percentages, either the Fisher angular transformation method for analyzing paired proportions or the χ^2 criterion was used in cases where there were more than two comparison categories, especially since it is considered one of the most commonly used and understandable tools for analysis, and therefore, where possible, preference was given to it.

These methods were integrated using the IBM SPSS Statistics 21 statistical package and additional computer data processing tools, providing a comprehensive approach to analyzing the impact of corrective and preventive technologies on the selected population.

The purpose of the study was to determine the distinctive features of somatometric indicators of women 25-34 years old with different types of posture.

Results of the study

Based on the data of medical records of women aged 25-34, it was established that the most common type of posture among women in the first period of mature age is the round back type, which is found in 44.4% of women, while normal posture and scoliotic posture occur with the same frequency of 27,8%.

It has been determined that among women with normal posture, the difference in body weight between age groups is minimal, while women with a round back and scoliotic posture show a noticeable increase in body weight with age. Body length does not differ between age groups, but women with a round back in the age group of 25-29 years have the smallest average body length, and women of this age with scoliotic posture have the largest. These data will help in further analysis of age and typological differences in groups of women.

Differences in the ratios of body weight and length in the groups of women aged 25–29 and 30–34 years are presented in Table 1.

Based on the data in the table on the ratio of body weight and length in groups of women aged 25-29 and 30-34, we make a number of important observations. Thus, the table shows that with age, women experience a slight increase in body weight (by 0.8 kg), however, this trend is stable and has the character of a regularity ($p<0,01$). This is probably due to a decrease in metabolic activity, changes in physical activity, hormonal changes after age 30, accumulation of fat tissue and a decrease in muscle mass. Body length is a stable indicator, any age-related changes in the first period of mature age in women may be insignificant and express random individual variability. Therefore, it is not surprising that there are no differences between the groups. Note also that although body weight increased with age and body length remained stable, this usually resulted in a small increase in the Quetelet index, such changes reflect a general trend towards increasing body weight, but they are not large enough to be statistically significant. Also, the Rohrer index, which takes into account the ratio of body weight and length, as in the case of the Quetelet index, showed a slight increase in values with age, but the difference was not large enough. As can be seen from the data, body weight increases with age, but

the overall proportions of the body remain relatively stable.

Table 1. Differences in the ratio of body weight and length in groups of women aged 25-29 (n=18) and 30-34 (n=18)

Indicators	Age	Initial statistics and quartiles of the distribution					Reliability of differences	
		$\bar{x}$	s	Me	Q_1	Q_3	t	p
Body weight, kg	25-29 years old	60,64	0,8	60,95	60	61	2,952	p<0,01
	30-34 years old	61,44	0,83	61,5	61	62		
Body length, cm	25-29 years old	166,9	2,13	167	166	168	0,396	p>0,05
	30-34 years old	166,7	1,07	167	166	167		
Quetelet index, kg/m^2	25-29 years old	21,77	0,57	21,69	21,36	21,94	1,938	p>0,05
	30-34 years old	22,11	0,49	22,11	21,87	22,5		
Rohrer Index, c.u.	25-29 years old	13,04	0,5	12,98	12,64	13,31	1,493	p>0,05
	30-34 years old	13,26	0,36	13,30	13,03	13,55		

Notes: $\bar{x}$ - mean value; s – standard deviation; Me–median of distribution; Q_1 – lower quartile; Q_3 – upper quartile of distribution; t - result of Student's test for independent samples; p – level of significance of differences; $t_{cr}(34; 0.01) = 2.75$.

Next, we will analyze these differences taking into account the type of posture of women (Table 2).

The table demonstrated that certain differences in the ratios of body weight and length in women aged 25-29 with different types of posture were significant. And if the differences in body weight were not statistically significant (p>0,05), then in other indicators the groups with impaired posture were not the same. For example, the average body length of women aged 25-29 with normal posture was 167,50 cm, women with a round back – 165,78 cm, and women with scoliotic posture – 169,33 cm. The differences in body length between these groups were statistically significant (p<0.05), and Tukey's post hoc test showed that women with a round back had a shorter body length compared to those with scoliotic posture (p=0,021). In the 30-34 year old group, the average body length of women with normal posture was 166,75 cm, with a round back – 166,71 cm, with scoliotic posture – 166,71 cm, and such small differences were not statistically significant. (p>0,05).

The average Quetelet index of women aged 25-29 with normal posture was 21,6 kg/m², in women with a round back – 22,08 kg/m², and in women with scoliotic posture – 21,16 kg/m². The differences in the Quetelet index between these groups were statistically significant (p<0,05), and Tukey's post hoc test showed that women with a round back had a higher Quetelet index compared to those with scoliotic posture (p=0,026). In the group of women aged 30-34, there was no significant difference in this index. (p>0,05).

Table 2. Differences in the ratio of body mass and length in groups of women aged 25-29 and 30-34 years with different types of posture

Statistical indicators	25-29 years old			30-34 years old		
	Normal posture (n=6)	Round back (n=9)	Scoliotic posture (n=3)	Normal posture (n=4)	Round back (n=7)	Scoliotic posture (n=7)
	Body weight, kg (F=1,71; df_1=5; df_2=30; n=36; p>0,05)					
$\bar{x}$	60,58	60,67	60,67	61,20	61,63	61,40
s	0,68	0,97	0,76	0,73	0,80	0,99
Me	60,6	61,0	60,5	61,3	61,8	61,0
Q_1	60,0	60,2	60,3	60,7	61,3	60,9
Q_3	61,0	61,0	61,0	61,8	62,0	62,0
Reliability of differences	F=0,02; df_1=2; df_2=16; n=18; p>0,05			F=0,32; df_1=2; df_2=16; n=18; p>0,05		
	Body length, cm (F=2,91; df_1=5; df_2=30; n=36; p<0,05)					
$\bar{x}$	167,50	165,78	169,33	166,75	166,71	166,71
s	1,38	1,99	1,53	1,26	0,76	1,38
Me	13,0	13,3	12,4	13,3	13,4	13,3
Q_1	12,6	13,0	12,4	13,0	13,1	13,0
Q_3	13,1	13,8	12,6	13,4	13,5	13,6
Reliability of differences	F=5,12; df_1=2; df_2=16; n=18; p<0,05			F=0,01; df_1=2; df_2=16; n=18; p>0,05		
Post hoc Tukey test	$\bar{x}_к$ <$\bar{x}_c$; p=0,021			-		
	Quetelet index, kg/m^2 (F=2,73; df_1=5; df_2=30; n=36; p<0,05)					
$\bar{x}$	21,60	22,08	21,16	22,01	22,18	22,10
s	0,31	0,59	0,24	0,28	0,37	0,69
Me	13,0	13,3	12,4	13,3	13,4	13,3
Q_1	12,6	13,0	12,4	13,0	13,1	13,0
Q_3	13,1	13,8	12,6	13,4	13,5	13,6
Reliability of differences	F=4,89; df_1=2; df_2=16; n=18; p<0,05			F=0,14; df_1=2; df_2=16; n=18; p>0,05		
Post hoc Tukey test	$\bar{x}_c$ <$\bar{x}_к$; p=0,026			-		
	Rohrer Index, c.u. (F=2,85; df_1=5; df_2=30; n=36; p<0,05)					
$\bar{x}$	12,90	13,33	12,50	13,20	13,30	13,26
s	0,27	0,49	0,24	0,24	0,26	0,52
Me	13,0	13,3	12,4	13,3	13,4	13,3
Q_1	12,6	13,0	12,4	13,0	13,1	13,0
Q_3	13,1	13,8	12,6	13,4	13,5	13,6
Reliability of differences	F=5,42; df_1=2; df_2=16; n=18; p<0,05			F=0,09; df_1=2; df_2=16; n=18; p>0,05		
Post hoc Tukey test	$\bar{x}_c$ <$\bar{x}_к$; p=0,019			-		

Notes: $\bar{x}$ - mean value; s – standard deviation; Me–median of distribution; Q_1 – lower quartile; Q_3 – upper quartile of distribution; F – Fisher criterion value; p – level of reliability of differences; index "k" – round back; "c" – scoliotic posture; $F_{cr}(2;\ 16;\ 0{,}05)$=3,63. $F_{cr}(5;\ 30;\ 0{,}05)$=2,57.

The Rohrer index in the age group of women aged 25-29 with normal posture was on average 12,9 conventional units, with a round back – 13,3 conventional units, and with scoliotic posture – 12,5 conventional units. The differences in the Rohrer index between these groups were statistically significant ($p < 0,05$), and Tukey's post hoc test showed that women with a round back had a higher Rohrer index compared to scoliotic posture ($p = 0,019$). In the group of women aged 30-34, such differences were not found. ($p>0,05$).

Thus, for women aged 25-29, significant differences were found in body length, Quetelet index and Rohrer index between groups with different types of posture, namely, women with scoliotic posture had greater body length, but lower Quetelet and Rohrer indices compared to women with a round back. In women aged 30-34, these differences were less pronounced or absent, indicating a smaller effect of posture type on these indicators at an older age.

A study of data on the chest circumference of women in the first period of mature age and indices that take this indicator into account in the ratio of length, body weight and chest circumference (Pinier index, ideal body weight according to the Beringard formula, deviation of actual weight from ideal) showed that chest circumference ranged from 86 to 90 cm, with an average value of 88 cm (87,92±1,23). Consequently, the value of the ideal body weight calculated using the Beringard formula was on average (61,11±0,97) kg with individual variations within the range from 59,13 to 63 kg. That is, the actual body weight of women in the general sample did not differ much from the ideal body weight. This difference ranged from -3,2 kg to +3,2 kg and on average was (-0,1±1,4) kg. This indicated the normal proportionality of the figure of most women (72,2%), where the ratio of weight, body length and chest volume corresponded to the standards. Only 16.7% of the total sample had deviations indicating low body weight, while 11.1% of women had excess body weight. The use of the Pinier index made it possible to establish that among the subjects there was not a single woman with an asthenic or pyknic body type, because all values of this indicator were determined by the range from 12 conventional units up to 20 conventional units Both in general and on average, the group can be characterized as one where the normosthenic body type dominated. This is evidenced by the value of the distribution center - (17.88±2.35) conventional units and the fact that all 100% of individual index values belong to the boundaries of the normosthenic type.

Considering the fact that the chest circumference in the sample was distributed abnormally, and the Pigner index, ideal body weight according to the Beringard formula, deviation of the actual weight from the ideal - had a normal distribution, statistical comparison of two ages for them was carried out on the basis of various methods (Table 3).

The table shows data that showed that the median chest circumference of women aged 25-29 years was 88 cm, with the lower and upper quartiles being 87 cm and 89 cm, respectively. Women in the 30-34 year old group also had a median chest circumference of 88 cm, with quartiles of 87 cm and 89 cm. It is therefore not surprising that the Mann-Whitney test confirmed that the differences between these groups were not statistically significant. ($U=148,5$, $p>0,05$). The Pignet index, which assessed body type, for women aged 25-29 had an average value of 18,47 conventional units with a standard deviation of 2,55 conventional units, and for women aged 30-34 the average Pigner index was 17,28 conventional units with a standard deviation of 2,04 conventional units, and such a difference in means (1,19 conventional units in favor of the younger group) was determined by the Student's test as statistically insignificant. ($t=1,564$, $p>0,05$). Also, the ideal body weight of women aged 25-29 years was on average 61,09 kg with a standard deviation of 1,16 kg, for women aged 30-34 years, the average ideal body weight was 61,13 kg with a standard deviation of 0.76 kg, which according to Student's criterion means no differences ($t=0,128$,

p>0,05). The deviation of the actual body weight from the ideal in the younger group of women was on average -0,46 kg with a standard deviation of 1,53 kg, i.e. it had a certain tendency towards dissatisfaction. In women of the older group, the average deviation of weight from the ideal was 0,31 kg with a standard deviation of 1,18 kg (in the direction of excess body weight). However, the Student's test showed that the differences between the two groups were not statistically significant. (t=1,689, p>0,05).

Thus, the results showed that no statistically significant differences were found between women aged 25-29 and 30-34 for all the indicators considered. Consequently, the age factor within the first period of mature age did not have a significant effect on chest circumference, Pigner index, ideal body weight, and deviation of actual weight from ideal.

Table 3. Differences in the ratios of length, body weight and chest circumference in groups of women aged 25-29 years (n=18) and 30-34 years (n=18)

Indicators	Age, years	Initial statistics and quartiles of the distribution					Reliability of differences		
		$\bar{x}$	s	Me	Q_1	Q_3	U	t	p
Chest circumference, cm	25-29	87,83	1,42	88	87	89	148,5	-	p>0,05
	30-34	88	1,03	88	87	89			
Pinier index, conventional units	25-29	18,47	2,55	18,4	17	20,5	-	1,564	p>0,05
	30-34	17,28	2,04	16,85	16	18,5			
Ideal body weight, kg	25-29	61,09	1,16	60,9	60,2	62,25	-	0,128	p>0,05
	30-34	61,13	0,76	60,9	60,5	61,6			
Deviation of weight from ideal, kg	25-29	-0,46	1,53	-0,37	-1,47	0,44	=	1,689	p>0,05
	30-34	0,31	1,18	0,15	-0,25	0,96			

Notes: $\bar{x}$ - mean value; s – standard deviation; Me–median of distribution; Q_1 – lower quartile; Q_3 – upper quartile of distribution; U – Mann-Whitney test results; t - result of Student's test for independent samples; p – level of significance of differences; $U_{cr}(18; 18; 0,05) =99$; $t_{cr}(34; 0,05)=2,04$.

Comparison of groups of women aged 25-29 and 30-34 years with different types of posture revealed that in all 6 groups formed by the parameters “age” and “type of posture” the intra-group differences were higher than the inter-group differences (Table 4).

For example, the chest circumference in women aged 25-29 years with normal posture with a median of 88,5 cm and quartiles of 88 cm and 90 cm, respectively, was higher than in the group with a round back with a median of 87 cm and quartiles of 86 cm and 88 cm; than in the group with scoliotic posture with a median of 88 cm and quartiles of 87,5 and 88,5 cm. In the 30-34 year old group, on the contrary, women with normal posture with a median of 87.5 cm and quartiles of 87 cm and 88,5 cm had lower results than women with a round back with a median of 88 cm and quartiles of 87,5 cm and 88,5 cm, as well as women with scoliotic posture with a median of 88 cm and quartiles of 87 and 88,5 cm. According to the Kruskal-Wallis criterion, the differences between the groups for this indicator were not statistically significant.

Table 4. Differences in the ratios of length, body weight and chest circumference in groups of women aged 25-29 and 30-34 years with different types of posture

Statistical indicators	25-29 years old			30-34 years old		
	Normal posture (n=6)	Round back (n=9)	Scoliotic posture (n=3)	Normal posture (n=4)	Round back (n=7)	Scoliotic posture (n=7)
	Chest circumference, cm (H=3,9; df=5; n=36; p>0,05)					
$\bar{x}$	88,5	87,33	88	87,75	88,14	88
s	1,52	1,41	1	0,96	1,07	1,15
Me	88,5	87	88	87,5	88	88
Q_1	88	86	87,5	87	87,5	87
Q_3	90	88	88,5	88,5	88,5	88,5
Reliability of differences	H=2,53; df=2; n=18; p>0,05			H=0,37; df=2; n=18; p>0,05		
	Pigner index, conventional units (F=1,26; df_1=5; df_2=30; n=36; p>0,05)					
$\bar{x}$	18,42	17,78	20,67	17,80	16,94	17,31
s	2	2,97	0,76	1,81	1,58	2,7
Me	18,1	18,1	20,5	17,6	16,5	17
Q_1	17	16	20,3	16,4	16	15,5
Q_3	20,5	19,8	21	19,3	17,7	18,6
Reliability of differences	F=1,54; df_1=2; df_2=16; n=18; p>0,05			F=0,21; df_1=2; df_2=16; n=18; p>0,05		
	Ideal body weight, kg (F=3,1; df_1=5; df_2=30; n=36; p<0,05)					
$\bar{x}$	61,74	60,32	62,1	60,95	61,23	61,14
s	1,12	0,66	1,04	0,66	0,76	0,9
Me	62,1	60,5	62,7	60,7	60,9	61,3
Q_1	61,2	60,2	61,8	60,5	60,7	60,6
Q_3	62,3	60,8	62,7	61,4	61,6	61,8
Reliability of differences	F=6,89; df_1=2; df_2=16; n=18; p<0,01			F=0,15; df_1=2; df_2=16; n=18; p>0,05		
Post hoc Tukey test	$\bar{x}_к$ <$\bar{x}_н$; p=0,022; $\bar{x}_к$ <$\bar{x}_c$; p=0,023					
	Weight deviation from ideal, kg (F=2; df_1=5; df_2=30; n=36; p>0,05)					
$\bar{x}$	-1,18	0,35	-1,42	0,23	0,40	0,27
s	1,24	1,48	1,15	0,50	1,20	1,54
Me	-0,9	0,4	-1,2	0,1	0,4	-0,3
Q_1	-2,1	-0,3	-1,9	-0,1	0,0	-0,8
Q_3	-0,2	1,3	-0,8	0,5	0,9	0,9
Reliability of differences	F=3,16; df_1=2; df_2=16; n=18; p>0,05			F=0,02; df_1=2; df_2=16; n=18; p>0,05		

Notes: $\bar{x}$ - mean value; s – standard deviation; Me–median of distribution; Q_1 – lower quartile; Q_3 – upper quartile of distribution; H – value of the Kruskal-Wallis criterion; F – Fisher criterion value; p – level of reliability of differences; index «н» - normal posture; "k" – round back; "c" – scoliotic posture; $H_{cr}(2; 0,05)=5,991$; $H_{cr}(5; 0,05)=11,070$; $F_{cr}(2; 16; 0,05)=3,63$; $F_{cr}(2; 16; 0,01)=6,23$. $F_{cr}(5; 30; 0,05)=2,57$.

Discussion.

Achieving a normal level of human vital activity requires adequate skeletal muscle activity (Lazko et al. 2021). The absence of muscle work makes it impossible to change a person's location in space (Kozlovska et al. 2023). These remarks are especially true in the context of addressing the female contingent of the Ukrainian nation - at the age stage of the first period of their maturity. The spectrum of deviations in the musculoskeletal system that arise due to unbalanced asymmetry of a person is supplemented by other destructive changes in posture, such as kyphosis and lordosis, which manifest themselves in primary dysfunction of the sagittal plane (Asaulyuk et al. 2023). In the process of work, data on the features of posture types in mature women were supplemented (Kashuba et al. 2023). Data on functional disorders of posture in mature women were confirmed (Asaulyuk et al. 2023; Demjokhin et al. 2024).

A significant research focus on the practice of determining somatometric indicators of mature women is represented by studies (Tkachova et al. 2020; Asaulyuk et al. 2023). Further development was given to the idea of the features of somatometric indicators of women aged 25-34 (Stopa et al. 2024).

Conclusions. It was found that women aged 25-29 years have more pronounced anthropometric differences, which may be associated with structural features. The fact that women with scoliotic posture have a greater body length and lower Quetelet and Rohrer indices may indicate a tendency to a taller and slimmer physique, which is typical for scoliotic posture, where vertical "stretching" of the spine may occur. These characteristics of younger women may be important for developing exercises aimed at correcting posture and strengthening the muscular corset, which will help prevent further development of scoliosis or other disorders. As for women aged 30-34, less pronounced or absent statistical differences may be due to the fact that with age, anthropometric parameters become less sensitive to the influence of posture type due to general changes in the body, such as decreased muscle mass and changes in metabolism. There is also a version that the influence of the type of posture on physical characteristics may decrease with age due to the body's adaptation to long-term postural loads or habituation to a certain lifestyle and physical activity. Such data are important for understanding how age and structural features affect physical development and health, as well as for planning appropriate health measures for mature women with different types of posture.

The practical aspects of the scientific work presented above will be the basis for the theoretical justification and implementation of corrective and preventive measures in the process of health fitness classes for women in the first period of mature age.

Author's contribution

Conceptualization, V.K.; methodology, V.K.; software, V. U.; check, O.S.; formal analysis, V. U.; investigation, O.S.; re-sources, V. U.; data curation, I.V.; writing – rough preparation, O.S.; writing – review and editing, S. L.; visualization, S. L.; supervision, Y. K.; project administration, Y. K. All authors have read and agreed with the published version of the manuscript.

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References

Asaulyuk I., Nosova N., Demjokhin D., Pokropivny O., Marinchuk P. (2023). Set biomechanics as a criterion for differentiation in the process of physical culture and sports rehabilitation. *Physical culture, sports and the health of the nation.* №. 15 (34). pp. 406-420. https://doi.org/10.31652/2071-5285-2023-15(34)-406-420

Asaulyuk I., Afanasyev S., Kozlovska S., Marinchuk P. (2023). The current state puts a special emphasis on the mature age, as a change of mind in the development of preventive health care. Physical culture, sports and the health of the nation. №.15 (34). P.394-405. https://doi.org/10.31652/2071-5285-2023-15(34)-394-405

Asaulyuk, I. O., Demjokhin, D. Yu. (2023). Individual SMART goals are the obligatory component of the process of physical culture and sports rehabilitation of women with impaired biogeometric profile. *Physical culture, sports and the health of the nation*. №16. pp. 127-134. DOI: https://doi.org/10.31652/2071-5285-2023-16(35)-127-134.

Asaulyuk I. O., Kozlovska S. O. (2023). Age-related features of the physical development of women of mature age from the different stages of the musculoskeletal apparatus. Physical culture, sports and the health of the nation. №. 16 (35). P.14-22. https://doi.org/10.31652/2071-5285-2023-16(35)-14-22

Demjokhin D., Asaulyuk I. (2024). The study of biomechanics will reveal the peculiarities of somatometric indicators of women of another period of adulthood. *Sports newsletter of the Dnieper region*. №. 1. pp. 34–42. https://doi.org/10.32540/2071-1476-2024-1-034

Kashuba, V., Stepanenko, O., Byshevets, N., Kharchuk, O., Savliuk, S., Bukhovets, B., Grygus, I., Napierała, M., Skaliy, T., Hagner-Derengowska, M., Zukow, W. (2020). Formation of Human Movement and Sports Skills in Processing Sports-pedagogical and Biomedical Data in Masters of Sports. *International Journal of Human Movement and Sports Sciences*, 8(5), 249-257. https://doi.org/10.13189/saj.2020.080513

Kashuba, V, Khmelnitska, I, Andrieieva O, et al. (2021). Biogeometric Profile of the Posture as a Factor of Men's Functional Assessment of Movements in the Early Middle Age. Sport Mont. 19(2):35-9.

Kashuba V., Tkachova A., Futornyi S. Differential approaches in the organization of preventive and health care for adults in the development of morpho-functional and biomechanical indicators. *Physical culture, sports and health nation.* №15(34). 2023, pp. 28-36. https://doi.org/10.31652/2071-5285-2023-15(34)-28-36.

Kozlovska S. O. Asaulyuk I. O. (2023). Features of the physical development of women 36-40 years old from different types of delivery. *Rehabilitation & Recreation.* №. 17. pp. 171–180. https://doi.org/10.32782/2522-1795.2023.17.21

Lazko, O, Byshevets, N., Plyeshakova, O, Lazakovych, Yu, Kashuba, V, Grygus, I., Volchinskiy A, Smal J, Yarmolinsky L. (2021). Determinants of office syndrome among women of working age. *Journal of Physical Education and Sport*, Vol 21 (Suppl. issue 5), 2827 – 2834. https://doi.org/10.7752/jpes.2021.s5376

Lazko, O., Byshevets, N., Kashuba, V, Lazakovych, Yu., Grygus, I., Andreieva, N., Skalski, D. (2021). Prerequisites for the Development of Preventive Measures Against Office Syndrome Among Women of Working Age. Teoriâ ta *Metodika Fìzičnogo Vihovannâ*, 21(3), 227-234. https://doi.org/10.17309/tmfv.2021.3.06

Stopa M. (2024). Features of the spatial organization of the body of women 23-26 years old. *Physical culture, sports and the health of the nation.* №. 17 (36), 406-420. https://doi.org/10.31652/2071-5285-2023-15(34)-406-420

Tkachova, A., Dutchak, M., Kashuba, V., Goncharova, N., Lytvynenko, Y., Vako, I., ... & Lopatskyi, S. (2020). Practical implementation of differentiated approach to developing water aerobics classes for early adulthood women with different types of body build. *Journal of Physical Education and Sport*, *20*, 456-460. https://doi.org/10.7752/jpes.2020.s1067

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