UDK 797.212.7/612.2 055.2

ISSN (English ed. Online) 2311-6374
2019, Vol. 7 No. 1(69), pp. 34-37
DOI: 10.5281/zenodo.2590562

Physical development and functional status of women 20–35 years old, involved in swimming

Liliia Sheiko

Kharkiv State Academy of Physical Culture, Kharkiv, Ukraine

Purpose: *determining changes in physical development and functional state of women 20–35 years old, engaged in swimming.*

Material & Methods: *20 women aged 20–35 years old took part in the study, which consisted of two groups: the main group (MG) and the control group (CG). The MG included women swimming in the fitness and fitness groups of the author's swimming school of Yu. V. Bliznyuk and Pioneer pool (water sports school named after Yana Klochkova); in the CG – women who lead active lifestyles, but in health groups are not engaged, swimming only on weekends. The tested people had the same swimming preparedness. Applied: survey, testing, instrumental methods for studying the cardiovascular system. Lung capacity and dynamometry were determined. To study the functional reserves of the respiratory and cardiovascular systems, the Skibinsky index was used. The obtained quantitative data were processed by the methods of mathematical statistics.*

Results: *the study suggests that in women of 20–35 years old swimming lessons cause changes in physical development and functional state. According to the parameters of the physical development of women of MG and CG swimming during the year has a positive effect on the body. First of all, swimming helps to improve the state of the cardio-respiratory system and the strength abilities of women.*

Conclusions: *the positive effect of swimming on the physical development and functional status of women aged 20–35 years engaged in recreational swimming is substantiated and proved.*

Keywords: *swimming, women, indicators, physical development, functional state.*

Introduction

At present, the preservation and strengthening of health, the prevention of various kinds of diseases in the population are of particular social importance (N. N. Cardamonov, 2001; V. V. Ponomareva, 2001; Brian J. Sharkey, Steven E. Gaskill, 2006). The increasing value of life, health, active longevity and the realization of human individuality are increasingly viewed as criteria for the social progress of society [6; 8; 17].

According to a number of authors (I. V. Amosov, E. A. Zemskov, 2000; L. Sh. Aptsiauri, 1990; L. V. Sheiko, 2014), an increase in interest in issues related to the content and location of physical culture in women's lives are caused by poor health, declining childbirth and physical development rates. This leads to the search for new ways to increase women's mobility in order to improve their health, improve their cultural and educational levels, and unlock their personal potential [1; 2; 12].

It is known that the aquatic environment and swimming have a powerful effect on the body involved. However, the use of swimming for recreational purposes requires a specially organized pedagogical approach taking into account the specifics of the aquatic environment [3; 5; 13].

Swimming lessons, depending on the tasks, can be divided into sports, conditioning, recreational. Recreational swimming is of great importance for the implementation of the program for the development of physical culture and the formation of a healthy lifestyle of the population of Ukraine. It combines therapeutic effects in a specific training process: general (health promotion, hardening, acquisition of skills of correct movements, volitional qualities), and special (restoration of impaired body functions). The main objectives of recreational swimming are to achieve and further maintain the desired state of health, improve the quality of life, prevent diseases (age, labor, from the harmful effects of the environment). The optimal load is determined by many factors: the need to improve the functional performance or maintain them at the level achieved; mode of habitual motor activity; lifestyle and things like that [10; 11]. The pedagogical process is to educate people involved in recreational swimming with a conscious attitude to the use of physical exercises, teach them rational movements in the water, accustom them to body hygiene, inculcate skills for optimal planning of the daily routine, etc. Healthy swimming is recommended 3–4 times a week for 45–60 min [4]. Recreational swimming is aimed at improving the psycho-emotional and physical state of the body through active rest. Usually it is used on its own, irregular classes (swimming and swimming at weekends) and occur once or twice a week. Thus, it can be argued that both recreational swimming activities contribute to maintaining a certain level of health and hardening [12; 16].

In the work "Like a fish in water. Effective swimming techniques available to everyone" T. Laughlin (2012) argues that in modern economic conditions, to attract women to recreational swimming, you need a comprehensive study of traditional and non-traditional means adequate to the state of health, fitness level, needs and individual characteristics of those engaged. All this requires a comprehensive scientific substantiation of the impact of swimming lessons on women of different ages, the development and validation of new means and methods of conducting classes, the dissemination of physical culture knowledge among the population, the improvement of their educational and cultural level, as well as the training of spe-

cialists in this field of knowledge [7; 14; 15]. During its development, recreational swimming as an integral part of the discipline "Swimming" has undergone qualitative changes in technology, teaching methods, training, but so far the scientific and methodological foundations of conducting recreational swimming with people of different ages and levels of preparedness have not been formed. All this determines the relevance of the chosen research direction.

Purpose: determining changes in physical development and functional state of women 20–35 years old, engaged in swimming.

Objectives of the study:

1. To determine the level of physical development of women 20–35 years old, engaged in swimming.
2. Evaluate the features of the functional state of the subjects.
3. To carry out a comparative analysis of changes in the indices of the physical development and functional state of women aged 20–35 who are engaged in swimming.

Material and Methods of the research

In order to accomplish the tasks, 20 women aged 20–35 years were examined, which consisted of two groups: the main group (MG) and the control group (CG). The MG included 10 women who regularly (throughout the year) go swimming in fitness and recreation groups of the author's swimming school of Yu. V. Bliznyuk and the Pioneer swimming pool (water sports school named after Yana Klochkova); in the CG – 10 women who lead an active lifestyle, but do not engage in recreational groups: they do not swim regularly, only on weekends. MG women engaged in recreational swimming 2–3 times a week for 45 or 60 minutes; CG subjects swam 1–2 times a week, i.e., they did recreational swimming. The subjects had the same swimming preparedness.

Studies were conducted in the period from October 2017 to June 2018; determined the level of physical development and functional status of women 20–35 years old, who are engaged in recreational swimming. In the course of the study, the state of physical development and functional state of the subjects was tested at the beginning of the experiment and after 9 months (in October 2017, initial indicators were recorded; in June 2018, indicators were recorded after a year of swimming). At the final stage of the study, a comparative analysis of changes in the physical development and functional state of the studied population was conducted.

During data collection, the following methods were used: survey, testing, instrumental methods for studying the cardiovascular system. Vital capacity of the lungs (VC) and dynamometry were determined. To study the functional reserves of the respiratory and cardiovascular systems, the Skibinsky index was used [9]. The obtained quantitative data were processed by the methods of mathematical statistics.

Results of the research

Taking into account the above, the features of the physical condition of these groups of women were determined. Namely, the parameters of physical development and functional reserves of the respiratory and cardiovascular systems at the beginning of the study and after a year of training.

The survey included a set of body measurements (body length, body weight, circumference and chest excursion, shoulder and thigh girth); determined: heart rate (HR), blood pressure (BP), lung capacity (VC) and dynamometry. Taking into account most indicators of physical development, the vital and strength index, body mass index was calculated. To study the functional reserves of the respiratory and cardiovascular systems, the Skibinsky index was used. The data of

Table 1

Measurement data of body parameters, cardiovascular system and calculation indexes of women's MG at the beginning of the study and after a year of classes

No. i/o	Measurement indicators	MG, n=10		t	P(t)
		Initial data	After a year of training		
1.	Body length, cm	169,64±1,33	169,89±1,48	1,28	>0,05
2.	Body weight, kg	68,57±1,45	62,21±1,17	3,63	<0,001
3.	Chest circumference (pause), cm	86,97±1,86	82,29±2,58	1,48	>0,05
4.	Chest circumference (inhale), cm	90,9±1,9	87,51±1,7	1,52	>0,05
5.	Chest circumference (exhalation), cm	83,64±2,1	80,34±0,97	1,43	>0,05
6.	Excursion, cm	7,27±0,2	7,17±0,73	1,42	>0,05
7.	Shoulder girth (relaxed), cm	27,9±0,7	26,1±0,61	2,0	>0,05
8.	Shoulder girth (tense), cm	30,8±0,51	28,5±0,8	2.55	<0,01
9.	Hip girth, cm	56,57±1,51	51,4±1,4	2,56	<0,01
10.	HR, beats min^{-1}	81,14±2,75	72,58±1,70	2,67	<0,01
11.	BP systolic, mm Hg	119,29±2,07	110,21±1,97	2,59	<0,01
12.	BP diastolic, mm Hg	82,14±1,88	71,72±3,96	2,42	<0,01
13.	BP pulse, mm Hg.	37,15±0,19	38,49±1,99	0,71	>0,05
14.	VC, l	3115±25,6	3218±21,7	3,07	<0,001
15.	Dynamometer right, kg	22,9±0,18	26,1±1,3	2,66	<0,01
16.	Dynamometer left, kg	21,2±0,8	23,95±1,1	2,03	<0,01
17.	Body mass index, $kg \cdot m^{-2}$	23,72±1,3	21,5±0,6	1,55	>0,05
18.	Life Index, $ml \cdot kg^{-1}$	45,42±1,7	51,72±1,8	2,62	<0,01
19.	Power index, %	32,1±3,3	40,2±1,2	2,32	<0,01
20.	Skibinsky index	1987,5±189,1	2228,3±193,2	0,38	>0,05

Sheiko, L. (2019), "Physical development and functional status of women 20–35 years old, involved in swimming", *Slobozhanskyi Herald of Science and Sport*, Vol. 7 No. 1(69), pp. 34-37, doi: 10.5281/zenodo.2590562

women of CG obtained at the beginning of the study and after a year of swimming, are shown in Table 1. In Table 2 the data of women of the CG were entered.

As can be seen from the Table 1, the parameters of the physical development of CG in women at the beginning of the study and after a year of swimming are significantly different in many respects.

First of all, you should pay attention to the fact that after a year of classes, the indicators of the body weight of women in the MG have significantly decreased. At the beginning of the study, this indicator was 68,57±1,45 kg, after a year of training it dropped to 62,21±1,17 kg (the difference – 6,36 kg, P(t)<0,001). According to all coverage measurements, except for indicators of shoulder circumference in a relaxed state (P(t)>0,05), women of MG significantly improved indicators (P(t)<0,01). Thus, the girth of the hip decreased by 5,17 cm, and the girth of the shoulder (tense) by 2,30 cm, which, of course, is associated with a decrease in body weight of the studied CG. First of all, attention should be paid to the fact that at rest there are significant differences in HR and BP (with the exception of pulse BP, (P(t)>0,05), which indicate a more economical and efficient cardiovascular system after year of swimming (P(t)<0,01). The greatest differences are observed in terms of VC (P(t)<0,001) and brush strength parameters (P(t)<0,01), they are significantly better compared to the original data. The most pronounced differences are also noted in the indices of the power and life indices, the indices of which have significantly improved in comparison with the initial data (P(t)<0,01).

Analysis Table 1 showed that in almost all of the parameters studied there were positive changes in the indicators, i.e., their improvement. However, some indicators of physical development, such as the circumference (pause, inspiration, exhalation) and chest excursions, as well as vital index indicators indicate unreliable differences (P(t)>0,05). For example, the indicators of the excursion of the chest of women MG at the beginning of the study were 7,27±0,2 cm, and at the end of the year – 7,17±0,73 cm. Separately, it should be added that unexpressed differences are also noted in the Skibinsky index (P(t)>0,05), which characterizes the state of the cardiorespiratory system. The values of this index in the CG have improved after swimming for a year of classes (from 1987,5±189,1 to 2228,3±193,2), however, they are still within the limits of "good".

If women of MG were engaged in recreational swimming organized and regularly, at least three times a week, then women of CG were engaged in swimming independently and only on weekends. However, it should be noted that positive changes in the indices of the parameters studied were also recorded from recreational swimming (only on weekends) (Table 2).

Data analysis Table 2, showed that the indicators of the physical development and functional status of women in the CG also underwent positive changes. Parameters such as the girth of a stressed shoulder (from 31,96±0,83 to 28,95±1,1 cm) have significantly improved; HR (decreased from 85,14±2,23 to 79,01±1,23 beats·min^{-1}); BP pulse (decreased from 44,97±1,13 to 42,56±0,04 mm Hg) (P(t)<0,01). Positive differences are observed in the performance of the VC (P(t)<0,001) and the power parameters of the brush (P(t)<0,01, P(t)<0,001). The most pronounced differences are also noted in the indices of the power and life indices, the indices of which have significantly improved in comparison with the initial data. (P(t)<0,01).

All other indicators of female CG are not significantly better compared with the baseline data obtained at the beginning of the study (P(t)>0,05). The most significant indicators, which did not increase significantly, are indicators of the Skibinskaya index. At the beginning of the study, the indicators were at the

Table 2

Measurement data of body parameters, cardiovascular system and calculation of indices of women's in the CG at the beginning of the study and after a year of swimming

No. i/o	Measurement indicators	CG, n=10		t	P(t)
		Initial data	After a year of training		
1.	Body length, cm	170,43±2,37	170,83±2,63	1,14	>0,05
2.	Body weight, kg	72,57±1,95	69,57±2,59	0,92	>0,05
3.	Chest circumference (pause), cm	94,53±1,58	92,28±2,76	0,71	>0,05
4.	Chest circumference (inhale), cm	97,91±2,0	95,10±0,95	1,33	>0,05
5.	Chest circumference (exhalation), cm	91,17±1,9	89,8±2,0	0,51	>0,05
6.	Excursion, cm	6,74±0,1	5,3±1,05	1,37	>0,05
7.	Shoulder girth (relaxed), cm	29,6±1,1	27,5±1,2	1,75	>0,05
8.	Shoulder girth (tense), cm	31,96±0,83	28,95±1,1	2,31	<0,01
9.	Hip girth, cm	59,32±2,00	56,7±1,4	1,08	>0,05
10.	HR, beats min^{-1}	85,14±2,23	79,01±1,23	2,45	<0,01
11.	BP systolic, mm Hg	130,43±2,25	123,57±2,8	1,91	>0,05
12.	BP diastolic, mm Hg	85,46±1,12	81,01±2,04	1,93	>0,05
13.	BP pulse, mm Hg.	44,97±1,13	42,56±0,04	2,13	<0,01
14.	VC, l	3013±25,1	3112±23,2	2,90	<0,001
15.	Dynamometer right, kg	23,5±0,9	27,2±1,4	2,31	<0,01
16.	Dynamometer left, kg	20,9±0,7	25,8±1,2	3,76	<0,001
17.	Body mass index, kg·m^{-2}	25,19±1,1	24,15±0,9	0,73	>0,05
18.	Life Index, ml·kg^{-1}	41,51±1,2	44,73±0,9	2,17	<0,01
19.	Power index, %	30,5±2,02	38,0±0,5	3,60	<0,01
20.	Skibinsky index	1798,6±201,4	1995,7±171,8	0,74	>0,05

level of 1798,6±201,4, which characterized the state of the cardiorespiratory system of women in the CG within the limits of "satisfactory". After a year of recreational swimming, the index of this index came very close to the "good" mark and became at the level of 1995,7±171,8 (P(t)>0,05).

Thus, it can be stated that, according to the dynamics of the physical development parameters of women of MG and CG, swimming during the year has a positive effect on the body. First of all, it contributes to the improvement of the cardiorespiratory system and the strength abilities of women. It should also be noted that the most significant differences in indicators are observed in the MG of women. The percentage of indicators of this group, which significantly improved after a year of classes, was 55% (11 indicators out of 20), whereas in the CG this indicator was only 40% (8 indicators out of 20).

Conclusions / Discussion

Studies of 20–35-year-old women engaged in recreational swimming throughout the year made it possible to establish differences in the physical development and functional status of women in the MG who were engaged in recreational swimming 2–3 times a week for 45 or 60 minutes, and CG who swam 1–2 times a week, i.e., we were engaged in recreational swimming. Thus, the most pronounced significant differences are observed in the indices of the power and life indices (P(t)<0,01), as well as in the indicators of the VC (P(t)<0,001) and the force parameters of the brush (P(t)<0,01), which significantly improved in both groups, compared with baseline data.

According to a study of the state of the cardiorespiratory system, after a year of swimming in both groups of women, more economical activities were established at rest (P(t)>0,05). The greatest significant differences in performance are observed in the MG of women. The percentage of indicators of this group, which significantly improved after a year of classes, was 55%, while in the CG – 40%.

Dissemination of experience of such work meets the requirements of practice, and the proposed information can be taken into account in the further planning of the training process in order to optimize the physical condition of women involved in swimming; will help teachers, instructors, methodologists of physical culture, doctors and people engaged in their own, more effectively use the means of recreational swimming to improve health and improve physical fitness

Prospects for further research. Further research is supposed to be carried out in the direction of studying the physiological mechanisms of adaptation processes to physical loads during classes of recreational swimming.

Conflict of interests. The author declares that no conflict of interest.
Financing sources. This article didn't get the financial support from the state, public or commercial organization.

References

1. Amosov, I.V. & Zemskov, Ye.A. (2000), "Peculiarities of the influence of complex exercises in gymnastics and swimming with a health-improving focus on the main components of physicalfitness of women aged 21-35", *Teoriya I praktika fiz.kultury*, No. 6, pp. 23-26. (in Russ.)
2. Apsiauri, L.Sh. (1990), *Socio-pedagogical aspects of the involvement of women in physical culture and sports activities: PhD thesis abstract*, Tbilisi, 23 p. (in Russ.)
3. Balamutova, N.M., Kozhukh, N.F., Sheyko, L.V. & Oleynikov, I.P. (2006), "Changes in the physical development and physical fitness of women aged 35–50 years who are engaged in recreational swimming groups", *Fizicheskoe vospitanie studentov tvorcheskih spezialnostej*, No. 1, pp. 57-61. (in Russ.)
4. Balamutova, N.M., Kozhukh, N.F., Sheyko, L.V. & Oleynikov, I.P. (2008), "A study of the relationship of indicators of physical development and physical fitness of female students with the initial level of ability to swim", *Pedagogika, psikhologiya ta medico-biologichni problemi fizichnogo vikhovannya i sportu*, No. 3, pp. 12-15. (in Russ.)
5. Balamutova, N.M. & Sheyko, L.V. (2016), "The positive effect of swimming lessons on the physical and functional state of female students in the conditions of the university", *Actual problems of the development of traditional and eastern martial arts: collection of sciences. The work of the X International internet Science. Method. conf. National Academy of National Guard of Ukraine*, Kharkiv, pp. 254-257. (in Russ.)
6. Kardamonov, N.N. (2001), *Plavanie: lechenie i sport* [Swimming: treatment and sport], Fizkultura i sport. (in Russ.)
7. Laflin, T. (2012), *Like a fish in water. Effective swimming techniques available to everyone*, Mann, Ivanov i Ferber. (in Russ.)
8. Ponomareva, V.V. (2001), *Fizicheskaya kultura i zdorove* [Physical Culture and Health], SGIFK, Smolensk. (in Russ.)
9. Romanchuk, O.P. (2010), *Medical and pedagogical control in the physical fitness: navch.-metod. pos.*, Odesa, 206 p. (in Ukr.)
10. Uilmor, Dz.H. (1997), "Physiology of sports and motor activity", Kostil, Kiev. (in Russ.)
11. Houli, T.E. (2000), *Improving fitness*, Kiev. (in Russ.)
12. Sheyko, L.V. (2014), "The relationship and differences of sports, recreational and recreational swimming", *Visnik Chernigivskogo nazionalnogo pedagodicheskogo universitetu*, Vol. 3, No. 118, pp. 314-317. (in Russ.)
13. Sheyko, L.V. (2016), "Estimation of the influence of recutational swimming on the level of the physical state of women", *Fizichna utabilitatsiya ta rekreatsiyno-ozdorovchi tekhnologii*, No. 3, pp. 263-269. (in Russ.)
14. Sheyko, L.V. (2017), "Dynamics of the physical and psychoemotional state of women under the influence of swimming", *Slobozans`kij naukovo-sportivnij visnik*, No. 1(57), pp. 121-126, doi: 10.15391/snsv.2017-1.021. (in Russ.)
15. Sheyko, L.V. (2018), "Dynamics of indicators of the functional state of the cardiovascular and respiratory systems of women under the influence of swimming", *Slobozans`kij naukovo-sportivnij visnik*, No. 1(63), pp. 121-125, doi: 10.15391/snsv.2018-1.022. (in Russ.)
16. Shulga, L.M. (2008), *Wellness swimming*, Olinpijska literatura. (in Ukr.)
17. Brian J. Sharkey & Steven E. Gaskill (2006), *Fitness & Health*, ISBN: 978-0736099370.

Received: 15.01.2019.
Published: 28.02.2019.

Information about the Authors

Liliya Sheyko: *Kharkov State Academy of Physical Culture: Klochkovska Street 99, Kharkov, 61058, Ukraine.*
ORCID.ORG/0000-0002-0020-1959
E-mail: sheiko.liliya@gmail.com

Sheiko, L. (2019), "Physical development and functional status of women 20–35 years old, involved in swimming", *Slobozhanskyi Herald of Science and Sport*, Vol. 7 No. 1(69), pp. 34-37, doi: 10.5281/zenodo.2590562