

Study of the influence of recreational swimming classes on the physical development, functional status and physical preparedness of women

Liliia Sheiko

Kharkiv State Academy of Physical Culture, Kharkiv, Ukraine

Purpose: to study the influence of recreational swimming classes on physical development, functional state and physical preparedness of women aged 17–19.

Material & Methods: data collection was carried out in the fitness groups of the Pioneer pool. A group of 15 women aged 17–19 years was formed. Classes were held for 21 weeks, 3 times a week. The duration of one lesson is 45 minutes. During the study, testing was conducted of the physical development, functional state and physical preparedness of the subjects. To analyze physical development, anthropometric data were measured; functional status was determined using the Harvard step test and heart rate measurement. Testing of physical preparedness was carried out in accordance with State tests and standards for assessing physical fitness of the population of Ukraine. The obtained quantitative data were processed by methods of mathematical statistics.

Results: studies indicate that in women aged 17–19 years of health-improving swimming cause positive changes in physical development, physical preparedness and functional status. Changes in indicators are reliable.

Conclusions: at the initial stage of the study, the anthropometric indicators of the respondents were age-appropriate; the physical preparedness of women aged 17–19 years on almost all indicators was at the level of “unsatisfactory”; Harvard step test indices were below the average. After lengthy swimming lessons, the majority of anthropometric indices of the studied contingent improved ($P(t) < 0,01-0,001$). All indicators of physical fitness of young women improved ($P(t) < 0,01-0,001$). Recovery processes after dosed muscular work (Harvard step test) and heart rate ($P(t) < 0,05-0,01$) significantly improved.

Keywords: women, swimming, physical preparedness, functional state.

Introduction

Physical education is an organic part of general education, should ensure the development of mental, physical, strong-willed qualities and professionally applied skills of youth. The level of their physical fitness and health, as well as their attitude to physical culture in general, depends on the quality of organization and conduct of classes with young people [8; 9].

Scientific studies indicate that human health is more than 50% determined by the conditions and lifestyle, that is, most depends on the proper organization of motor activity. Motor activity is an unconditional component of the life of every person. The optimal level of locomotor activity is such a volume and content of locomotor activity, which should provide a person's natural need for movement in order to strengthen and ensure his health in the future, contribute to the prevention of non-communicable diseases and increase professional ability to work, and also positively affect the intellectual component of human life. However, with the active introduction of computer technology, motor activity of both children and adults has sharply decreased, especially for young people. The consequence is an increase in the percentage of young people with poor health. Therefore, the search for new, non-traditional forms and methods of conducting organized classes on various forms of physical activity, which contribute to a healthy lifestyle, which in turn positively affects the general state of health, prevention of noncommunicable diseases, is relevant today; reduction of the influence of bad habits on the body, the number of asocial manifestations and depression [1; 4; 7; 12–15].

One of the types of motor activity is recreational swimming [1; 2]. Regular swimming classes train the body, have a healing effect on the body systems, that is, make

those engaged more healthy. In addition, those engaged in recreational swimming, possess the ability to differentiate tension and muscle relaxation, to perform various movements in an unusual environment - in water. Improving swimming, in addition to recovery, also actively contributes to the aesthetic education of youth [3; 11].

I.V. Adamova, E.A. Zemskov (2000), V.S. Cheburaev, G.M. Legostaev, S.I. Izaak, T.V. Chibizova (2002), L.V. Sheiko (2016; 2017; 2018) and other authors investigated changes in various indicators under the influence of occupations with health-improving types of physical activity [8–10; 12–14; 16–20]. However, in their works there is little scientific data on changes in anthropometric indicators, the level of physical and functional fitness of young women under the influence of recreational swimming classes. Thus, in the available literature an insufficient amount of scientific research in this area was found, which was the reason for the development of this problem.

Purpose of the study: to determine the impact of recreational swimming classes on physical development, functional status and physical fitness of women aged 17–19.

Objectives of the study:

1. Determine the level of physical development, physical fitness and functional status of women 17–19 years old.
2. To identify changes in physical development, physical fitness and functional state of the studied contingent under the influence of swimming classes.

Material and Methods of the research

The study was carried out in the fitness groups of the Pioneer pool (Sports School for Water Sports of Yana Klochkova). To conduct the study, a group of 15 women aged 17–19 years was formed. Classes were held for 21 weeks 3

times a week. The duration of one lesson is 45 minutes.

At the beginning of the study, a preliminary familiarization with the level of swimming preparedness of the subjects was carried out. As you know, during training in swimming for adults, the applied task of mastering the technique of one, and not necessarily sports, way of swimming is primarily related. Some experts emphasize that the swimming technique for the adult contingent should be based on modern swimming techniques, since sports swimming methods have significant advantages over original ones, primarily in terms of speed. Many authors argue that most likely adults can be taught to swim on their backs, breaststrokes or on their sides, since when swimming with these methods it is not necessary to exhale into the water. When determining the swimming method, age, individual abilities to master one method (because adults are more capable of mastering one swimming method) are taken into account. However, the final choice of the method is up to the person to master swimming skills, since many people have a coordination tendency to certain movements – in particular, to more efficiently perform movements of the legs with a crawl or breaststroke [10; 15].

At the beginning of our study, young women were offered, using the re-interval method, to fix the technique of at least one swimming method (crawl on the chest or on the back, breaststroke, on the side) in order to master the wellness distance corresponding to the age (the norm of wellness swimming for individuals age from 14 to 50 years is a distance of 1000 m [10; 11]). To overcome the wellness distance, respondents were asked, using elements of various methods of technology, to swim on their sides, crawl on their chest and back, breaststroke on their chest and back with gradual acceleration and at high speed. In the future, in addition to the already mentioned repeated-interval method, repeated, distance, uniform methods were used in the classes.

Having previously familiarized with the level of swimming preparedness, taking into account the level of health, interests and needs of women, as well as adhering to the main stages of planning, a program of recreational swimming was compiled. This program included general physical exercises, special and preparatory exercises, as well as exercises that stimulate aerobic and anaerobic sources of energy production. When compiling the program, we were also

guided by the methodology for constructing and conducting training sessions of a health-improving orientation [2; 4; 20]. Wellness training is a standard form of training, in each part of which specific tasks were solved [1; 2; 15]. So, in the process of training ripe loads; constant pedagogical control of health, working capacity, desire to be engaged was provided.

At the beginning and at the end of the study, testing was carried out on the physical development, functional state and physical fitness of subordinates. To analyze the level of physical development, anthropometric data were measured (body length, body weight, chest, waist, hips); the functional state was determined using the Harvard step test and heart rate measurement [6]. Testing of physical fitness was carried out in accordance with State tests and standards for assessing the physical fitness of the population of Ukraine [5]. The obtained quantitative data were processed by methods of mathematical statistics.

Results of the research

During the study, measurements were made of such anthropometric indicators as body length, body weight, girth of the chest, waist, hips. The obtained primary and secondary data are shown in table 1.

Thus, the obtained initial anthropometric data testified to their correspondence to the age of the studied contingent. Having analyzed the primary and secondary indicators of the anthropometric data of table 1, we can state that positive changes have occurred in most indicators under the influence of recreational swimming classes. So, after long sessions of recreational swimming (21 weeks), we have significant differences to a smaller side from the initial data for such indicators as body weight, waist circumference ($P(t) < 0,01$), hip circumference ($P(t) < 0,001$). The exception was made by such parameters as body length, chest circumference during inhalation and exhalation ($P(t) > 0,05$). However, it should be noted that although the changes that have occurred with the indicators of the circumference of the chest on the inhale and exhale are not reliable, but they have a positive tendency.

There has been a tendency towards improvement in the indicators of the functional state of women aged 17–19 years who are engaged in recreational swimming groups (Table 2).

Table 1
Dynamics of indicators of physical development of women aged 17–19 years who are engaged in groups of recreational swimming

No.	Measurement indicators	Primary data	Secondary data	t	P(t)
1.	Body length, cm	167,25±4,92	167,72±4,82	0,70	>0,05
2.	Body weight, kg	61,36±0,91	57,14±1,32	2,65	<0,01
3.	Chest circumference (inhalation), cm	79,75±3,93	77,27±4,15	0,43	>0,05
4.	Chest circumference (exhalation), cm	74,89±4,31	72,94±3,84	0,34	>0,05
5.	Waist circumference, cm	70,76±0,81	65,82±1,63	2,71	<0,01
6.	Thigh circumference, cm	81,81±1,37	73,48±2,53	2,90	<0,001

Table 2
Dynamics of indicators of the functional state of women 17–19 years old who are engaged in groups of recreational swimming

No.	Measurement indicators	Primary data	Secondary data	t	P(t)
1.	Harvard step test, coefficient.	64,47±0,69	68,13±1,63	2,15	<0,01
2.	Heart rate (HR) at rest, beats min ⁻¹	87,43±2,76	79,31±2,57	2,15	<0,01
3.	Excursion of the chest, cm	4,86±1,88	4,33±1,31	0,23	>0,05

Table 3

Dynamics of physical preparedness indicators for women aged 17–19 years engaged in the group of recreational swimming

No.	Measurement indicators	Primary data	Secondary data	t	P(t)
1.	Strength (flexion and extension of the arms in an emphasis lying down), number of times	15,37±6,68	20,78±7,18	0,55	>0,05
2.	Strength (raising the torso in gray for 1 min), number of times	38,25±5,86	42,84±7,82	0,47	>0,05
3.	Speed-strength ability (long jump from a place), cm	146,47±3,64	174,36±7,92	3,20	<0,001
4.	Stamina (Cooper 12-minute swimming test), s.	399,8±35,5	593,7±45,5	3,36	<0,001
5.	Dexterity (shuttle run 4x9 m), s	13,12±0,53	10,86±0,59	2,80	<0,01
6.	Flexibility (torso forward from a sitting position), cm	12,37±1,71	18,01±1,42	2,55	<0,01

An important indicator for assessing the functional state of the body and the effectiveness of training is an indicator such as heart rate. It is known that an increase in fitness is accompanied by a decrease in heart rate [1; 12; 14; 15]. In our study, heart rate decreased by 8.12 beats min^{-1} ($P(t)<0,01$), which convincingly indicates an increase in the fitness of the tested women.

The Harvard step test index values obtained as a result of the initial study were at the border below the average score (64,47±0,69). As can be seen from table 2, under the influence of swimming, there were significant changes in the rates of recovery processes in women after dosed muscular work, they significantly improved ($P(t)<0,01$) and correspond to the average grade.

Changes in chest excursion indicators, although not reliable ($P(t)>0,05$), are positive. So, according to the initial data, the chest excursion was at the level of 4,86±1,88 cm, according to the secondary examination – 4,33±1,31 cm.

Testing of physical preparedness was carried out in accordance with State tests and standards for assessing the physical fitness of the population of Ukraine [5]. Analyzing the primary indicators of the physical fitness of the tested women, it can be argued that the physical fitness of the studied population was at a low level. The results of the endurance test (Cooper's 12-minute swimming test) and the indicators of flexion-extension of the arms in a lying emphasis satisfactory. When lifting a torso in gray for one minute, tilting the torso forward from a sitting position, in a long jump from a standstill, in shuttle race it was "unsatisfactory" (Table 3).

After a 21-week training process, there was a noticeable improvement in the physical fitness of the subjects in terms of speed-strength abilities, endurance, dexterity and flexibility. These changes are significant ($P(t)<0,01-0,001$). The results of tests "flexion and extension of the arms in an emphasis lying down" and "raising the torso in gray in 1 minute" turned out to be unreliable, but positive dynamics can also be seen in the indicators of these tests.

Conclusions / Discussion

Based on the analysis of special scientific and

methodological literature, practical work experience and the results of our own research, we revealed a high need for women in physical education and fitness types of physical education, in particular, recreational swimming. An analysis of literary sources shows that existing physical education programs do not fully provide motivational attitudes to a healthy lifestyle, do not involve in mental and physical activity, and do not take into account the peculiarities of changes in the biorhythms of the female body. In this regard, one of the promising directions in the innovation of physical education of women may be the development and implementation of recreational swimming programs with controlled physical activity.

The study found that the physical development, functional state and physical fitness of women 17–19 years old significantly change during training in the health swimming groups ($P(t)<0,01$; $P(t)<0,001$). So, at the initial stage of the study, the physical fitness of women 17–19 years old on almost all indicators was on the verge of «unsatisfactory». Anthropometric indicators corresponded to age; Harvard step test indices were below the average.

Upon completion of the study, it can be stated that after prolonged swimming, an improvement in most of the anthropometric parameters of the studied population ($P(t)<0,01-0,001$) occurred. Almost all indicators of physical fitness of young women improved ($P(t)<0,01-0,001$). Recovery processes after dosed muscular work (Harvard step test) and heart rate indicators significantly improved ($P(t)<0,01$).

Dissemination of the experience of such work answers the question of practice, and the information provided will help teachers, instructors, physical education practitioners, doctors, as well as those who are engaged in their own activities, to use recreational swimming facilities more effectively to improve health and increase physical preparedness.

Prospects for further research include research in the direction of studying the physiological mechanisms of adaptation processes to physical activity during recreational swimming classes and the development of swimming programs for adults, which will take into account not only physiological and functional indicators, but also the characteristics of work.

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Information about the Authors

Liliya Sheyko: Kharkiv State Academy of Physical Culture: Klochkivska Street 99, Kharkiv, 61058, Ukraine.

ORCID.ORG/0000-0002-0020-1959

E-mail: sheiko.liliya@gmail.com