SLOBOZHANSKYI HERALD OF SCIENCE AND SPORT

UDK 796.035:[796.412-055.2:612.662]

ISSN (English ed. Online) 2311-6374
2019, Vol. 7 No. 6(74), pp. 37-41
DOI: 10.5281/zenodo. 3675418

Effect of different kinds of fitness based on the ovarian-menstrual cycle on the psychophysical state of young women

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Purpose: *to determine the effect of different kinds of fitness, based on the ovarian-menstrual cycle on the psychophysical state of young women.*

Material & Methods: *the research involved young women aged 21–25 years (n=84), which are divided into two groups: control (CG, n=36) and experimental (EG, n=48). The control group was doing basic aerobics, pilates and stretching without taking into account the phases of the ovarian-menstrual cycle, experimental was doing different kinds of fitness according to the phases of the OMC. Exercises were conducted 3 times a week, the research lasted for 12 months. Functional capabilities were determined according to the following indicators: resting heart rate, blood pressure, recovery time after 20 squats in 30 s; physical fitness by the following indicators: "shuttle running 4x9 m", with; "Long jump from place", cm; "Lifting the torso into the saddle" in one minute, the number of times; "Leaning forward from sitting position", cm Level of demonstration of psychological sphere according to the method of N. E. Vodopianova "Assessment of satisfaction with quality of life".*

Results: *a comparative analysis of both groups showed that there was a significant ($p<0,05–0,01$) improvement in functional capacity in the EG. The greatest impact of the use of various fitness tools had on resting heart rate, bit·min^{-1}: from a rating of "fair" to "good"; recovery time after 20 squats in 30 s, from: 'below average' to 'above average'. Physical fitness in the EG compared to CG also improved significantly ($p<0,05–0,01$). It was found that the biggest changes occurred in the indices of the endurance test of the abdominal muscles and flexibility: from the rating "unsatisfactory" to "excellent". It was found that the personal assessment of the quality of life satisfaction with EG was significantly ($p<0,05–0,01$) different from CG. The former improved their attitude, self-control, self-esteem, health perception, support of friends and optimism while reducing tensions and expressing negative emotions.*

Conclusions: *the use of the wellness method of combining different kinds of fitness has a positive effect on the psychophysical state of young women. There is an opportunity to apply the developed methodology to the practice of wellness training.*

Keywords: *wellness fitness, psychophysical state, ovarian-menstrual cycle, young women, training load.*

Introduction

In today's context, the social importance of health in terms of health is increasing in Ukraine. The health at this hour reveals a civilization that adheres to the socio-economic condition [3].

Due to the low birth rate, the problem of protection and preservation of reproductive function, health of the population of Ukraine is of particular importance. In recent years, a negative trend has been seen, which is associated with an increase abnormalities in the work of the most important systems of the body, a decrease in its resistance, an increase in the number of chronic diseases of young women [15]. The concept of physical culture proposes to maintain the optimum level of physical activity in order to maintain health [17; 21]. One of the leading tasks of wellness training is to improve the psychophysical condition of young women, which predetermines the level of health of the next generation [5; 23]. In this context urgent problem is the search for innovative ways to optimize physical education of youth.

Scientists [2; 22; 24] believe that fitness is a system of physical training that aims not only to stay in shape but also including intellectual, emotional, social and spiritual components. Today, it is this concept that fully shows the social (healthy lifestyle), biological (physical activity, physical training and physical fitness), psychological (motives, interests) and other characteristics of the use of physical education for health purposes.

The analysis of scientific and methodological literature shows that with the modern development of the fitness industry young women are given a wide choice of various fitness programs [12; 13; 18; 25]. At the same time, there is a small amount of books that have planning of the amount, intensity and focus of training loads, taking into account the ovarian-menstrual cycle in wellness fitness trainings. Some books are devoted to the study of the influence of health trainings on physical efficiency [4; 9; 19], on physical development [7; 10], on physical fitness [11; 20].

Health and fitness trainings are usually conducted in a group method without taking into account the physical, functional and biological capabilities of young women, which does not allow effective dosing of physical activity. With regard to the

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psychological criterion, it should be noted that it is practically not used to analyze the impact of physical education on health of youth, although recommendations are found in some studies; In addition, the authors conclude that girls' psycho-emotional state is increased without using psychological tests in their studies.

To solve these problems, there is a need for an individual approach to load planning, as well as use not a particular type of fitness, but a combination of several types of fitness. In this case, the complex application of different types of fitness requires a more sophisticated planning system, where a rational combination of exercises of different orientation, taking into account the biorhythmics of the female body is possible.

Purpose of the study: to determine the effect of different kinds of fitness trainings, based on the ovarian-menstrual cycle on the psychophysical condition of young women.

Material and Methods of the research

The research involved young women aged 21–25 years (n=84). The research was conducted on the basis of the sports club of Dnipro State Technical University. The main research was conducted within 12 months. A survey was conducted to determine the individual characteristics of the biological cycles of young women. The results showed that the majority of women (67–81%) experience negative changes in body pain and depression of the emotional state in the menstrual, premenstrual and ovulatory phases of the cycle, which makes it impossible to fully engage fitness trainings in these phases. In connection with it, the participants of the research were voluntarily divided into control (n=36) and experimental (n=48) groups on the basis of individual wishes.

The control group (CG) was engaged in basic aerobics, pilates and stretching without taking into account the ovarian-menstrual cycle (OMC). Trainings were conducted three times a week for 65–80 minutes and were medium and high intensity. The structure of the lesson included preparatory, main and final parts. The heart rate in the main part ranged from 90 to 160 beats·min^{-1}, at the peak of load for 13–15 minutes the heart rate ranged from 140 to 160 beats·min^{-1}. Exercise during training has mainly aerobic orientation (35%), strength (25%) and dance (20%), stretching and figure correction exercises were used.

In the experimental group (EG), girls attended different types of fitness trainings according to the OMC phases. Classes were also conducted three times a week. In the post-menstrual and post-ovulatory phases they were engaged in basic aerobics (joined the control group), in the ovulatory one – they do pilates training. The duration of pilates training was 55–65 minutes, the training was conducted in the medium intensity. The heart rate in the main part of the class ranged from 90 to 130 beats·min^{-1}. Training is mainly corrective (45%), strength exercises (25%), stretching (25%), and aerobic exercises (5%) were proportionally used to restore muscle balance; the training ended with auto-training and muscle relaxation (5%). In the menstrual phase of the biological cycle, girls engaged in stretching. The duration of the training was 45–50 minutes, the training was low intensity. The heart rate in the main part of the session ranged from 90 to 120 beats·min^{-1}. The main focus of training is the development of flexibility (50%). Strength exercises (20%) performed in static and dynamic muscle contraction. A significant amount of training time (15%) was given to auto-training to get rid of negative psycho-emotional manifestations in the unfavorable phases of the cycle. During the pedagogical experiment, the operative control of girls' psychophysical condition was performed. If necessary, an individual correction of the training program was carried out.

To determine the functional state of the cardiovascular system, the following parameters were examined: heart rate (heart rate, beats·min^{-1}) was determined by palpation on the carotid or radial artery at rest; blood pressure was determined with a medical tonometer; recovery time after 20 squats in 30 s [1].

The following tests were used to examine the level of fitness: "4x9 m shuttle running", sec; "Long jump", cm; "Lifting the torso into the saddle" in one minute, the number of times; "Leaning forward from sitting position", cm [14].

To determine the level of the psychological sphere, the method of N. E. Vodopianova "Assessment of satisfaction with quality of life" [8] was used to characterize satisfaction with current activities, well-being and mental health of a person. Testing was performed at the beginning and end of the experiment.

Table 1

Functional indicators of control and experimental groups before and after the experiment

Indicators	CG, n=36 EG, n=48	Before the experiment $\bar{X}$±m	Assess	After the experiment $\bar{X}$±m	Assess	P
Heart rate at rest, beat·min^{-1}	CG	80,01±2,22	satisf.	76,03±1,25	satisf.	>0,05
	EG	77,25±1,24	satisf.	69,98±1,19	satisf.	<0,01
	P	>0,05		<0,01		–
BP syst, mm Hg	CG	115,06±3,08	optim.	114,19±1,82	optim.	>0,05
	EG	117,29±3,12	optim.	115,08±3,15	optim.	<0,05
	P	>0,05		<0,05		–
BP diast., mm Hg	CG	72,30±0,86	optim.	71,10±0,72	optim.	>0,05
	EG	75,30±1,22	optim.	74,15±1,33	optim.	<0,05
	P	>0,05		<0,05		–
Recovery time after 20 squats in 30 s, s	CG	129,23±4,23	Below the average	112,63±4,50	Below the average	>0,05
	EG	125,22±3,76	Below the average	89,93±2,24	Below the average	<0,01
	P	>0,05		<0,01		–

Table 2

Indicators of physical fitness of the control and experimental groups before and after the experiment

Test exercise	CG, n=36 EG, n=48	Before the experiment X̄±m	Assess	After the experiment X̄±m	Assess	P
Shuttle running 4x9 m, s	CG	11,75±0,13	poor	11,36±0,08	unsatisf.	>0,05
	EG	11,71±0,14	poor	11,18±0,06	satisf.	<0,01
	P	>0,05		<0,05		–
Long jump, cm	CG	159,75±2,63	poor	169,51±2,87	unsatisf.	>0,05
	EG	162,74±2,62	poor	179,12±3,15	satisf.	<0,05
	P	>0,05		<0,01		–
Lifting the torso into the saddle from the supine position, the number of times	CG	26,05±2,22	unsatisf.	37,24±1,88	satisf.	>0,05
	EG	27,55±1,85	unsatisf.	46,15±2,20	excellent	<0,05
	P	>0,05		<0,001		–
Lean forward from sitting position, cm	CG	12,05±1,14	unsatisf.	16,52±0,63	good	>0,05
	EG	12,45±1,05	unsatisf.	19,65±0,90	excellent	<0,01
	P	>0,05		<0,01		–

Results of the research

A research of the functional status of young women at the beginning of the pedagogical experiment showed that no significant changes were found between the control and experimental groups (p>0,05).

In the tabl. 1 presents changes in both groups. Comparative analysis of the functional status of young women in the control and experimental groups showed that, according to generally accepted norms for this age, during the experiment period, significant changes (p<0,05–0,01) occurred in the following parameters: systolic blood pressure, diastolic blood pressure mm Hg; Heart rate at rest, beats · min^{-1}; recovery time after 20 squats in 30 s. In CG, there were slight changes in all indicators (p>0,05). The greatest impact of the use of various

Table 3

Indicators of the "Assessment of satisfaction with quality of life" level of the control and experimental groups before and after the experiment

Indicators	CG, n=36 EG, n=48	Before the experiment X̄±m	After the experiment X̄±m	P
Work, career	CG	22,02±1,19	25,80±1,50	>0,05
	EG	22,40±1,17	29,31±1,44	<0,05
	P	>0,05	<0,01	–
Personal achievements and aspirations	CG	23,45±1,28	26,72±1,36	>0,05
	EG	22,48±1,17	30,12±1,72	<0,01
	P	>0,05	<0,01	–
Health	CG	21,35±1,26	29,45, ±1,74	<0,05
	EG	21,11±0,99	35,65±0,75	<0,01
	P	<0,05	<0,001	–
Communication with friends (family)	CG	28,20±1,73	32,05±0,88	>0,05
	EG	28,32±1,49	35,75±0,73	<0,01
	P	>0,05	<0,01	–
Support	CG	27,09±1,29	29,05±0,84	>0,05
	EG	26,55±1,37	31,45±1,12	<0,01
	P	>0,05	<0,01	–
Optimism	CG	24,04±1,32	29,45±0,95	<0,05
	EG	25,25±1,53	34,15±1,05	<0,01
	P	<0,05	<0,001	–
Tension	CG	24,90±1,40	28,55±1,21	>0,05
	EG	26,05±1,56	34,71±1,03	<0,05
	P	>0,05	<0,01	–
Self-control	CG	21,32±1,37	25,07±1,30	>0,05
	EG	22,45±1,58	28,51±1,46	<0,01
	P	>0,05	<0,01	–
Negative emotions	CG	23,52±1,43	26,29±1,22	>0,05
	EG	24,91±1,33	28,57±1,26	>0,05
	P	>0,05	>0,05	–
Quality of Life Index	CG	23,97±1,28	28,03±1,39	>0,05
	EG	24,43±1,54	31,94±1,48	<0,05
	P	>0,05	<0,01	–

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fitness tools had on resting heart rate, beats · min^{-1}: from a rating of “fair” to “good”; recovery time after 20 squats in 30 s., from: ‘below average’ to ‘above average’.

Analysis of the physical fitness of young women showed that no significant changes were found between the control and experimental groups at the beginning of the pedagogical experiment ($p>0,05$).

In the tabl. 2 presents the changes in physical fitness of both groups. During the research, significant changes ($p<0,05$–$0,01$) of the following indicators occurred in the experimental group: “shuttle running 4x9 m”, s; "Long jump", cm; "Lifting the torso into the saddle" in one minute, the number of times; "Leaning forward from a sitting position", cm. Analysis of the results of the control group showed that they also improved but not enough ($p>0,05$). After summarizing, it is found that the largest changes occurred in the test of the strength of the abdominal muscles and flexibility, from the rating "unsatisfactory" to the "excellent".

An analysis of the indicators of the level of "Assessment of satisfaction with quality of life" revealed that no significant changes were found between the control and experimental groups at the beginning of the experiment ($p>0,05$).

In the table 3 presents changes in the level of "Assessment of satisfaction with quality of life" of women in the control and experimental groups. According to the table, during the pedagogical experiment there were positive changes in both groups. However, it should be noted that the control group experienced non-significant changes ($p>0,05$), with the exception of the Health and Optimistic scales ($p<0,05$). In the experimental group, all the indicators that were studied significantly changed ($p<0,05$–$0,01$), except for the indicator “Negative emotions” ($p>0,05$): improved attitude to their activity, self-control, self-esteem, perception of health, support from friends, optimism while reducing tension and the degree of negative emotions. As a result of the study, it was found that personal assessment of satisfaction with quality of life with EG girls was significantly ($p<0,05$) different from CG girls ($p>0,05$).

Therefore, the developed method of combining different types of fitness with taking into account the ovarian-menstrual cycle is an effective means of improving the indicators of physical performance, physical fitness and mental health of young women.

Conclusions / Discussion

The results of the research made it possible to confirm and supplement known scientific developments, as well as to obtain new data in the aspect of the problem under study. The research confirms scientific data [4; 12; 19; 20] that trainings enhances fitness and efficiency, supplemented and expanded data [10] on the individual and psychological capabilities of young women in health fitness trainings.

Summarizing the results of the research, we can state that the study has further developed scientific data on the need to take into account the biological cyclic functions of the female body when planning physical activities, selection of exercises of different orientation in the physical and health education [6; 16].

The use of the author’s method of combining different kinds of fitness trainings (basic aerobics, pilates and stretching), which is based on the selection of optimal parameters of physical activity in different phases of OMC, helps to improve the psychophysical condition of young women. The results of the research complement the theory and methods of physical education with new ideas about the possibility of modernization of physical and health education.

The prospects for further research are defined by indicators of the level of anxiety of young women engaged in health fitness in different phases of the ovarian-menstrual cycle.

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

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Received: 08.11.2019.
Published: 30.12.2019.

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