



The realization of the individual fitness programs in the physical education of high schoolgirls

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Abstract

The realization of fitness is aimed at the forming of health preserving competence of high schoolgirls and is based on the indices of their physical condition, motivation to do exercises and level of their motor activity. The fitness-program is characterized by the set of specially selected physical exercises aimed at the complex or selective influence on the body systems or some parts of the body depending on the morpho-functional human capabilities. Fitness-programs are grouped according to the aim, types of motor activity and effect on human body. Some fitness-programs containing muscle-strengthening exercises were introduced to solve the problems of the correction of the body, increase or decrease of the circumference of the parts of the body. The muscle-strengthening exercises for increasing the body weight, circumference of the parts of the body (shoulders, chest, pelvis, thighs) and improving the rates of muscle tonus were recommended for the girls having asthenic body build. The senior pupils having hypersthenic body build did exercises to decrease the body weight and circumference of the parts of the body (shoulders, breast, pelvis, thighs), fatty component. The physical exercises for a normosthenic body build were aimed at amelioration of muscle tonus, decreasing the rate of the increase of body weight and circumference of pelvis.

Keywords: health preserving competence, fitness program, high schoolgirls, physical activity, health condition, correction of the body.

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INTRODUCTION

The improvement of schoolchildren's health is an important task of the modern education. Systematic physical exercises improve physical, mental and social health, increase life expectancy and cause active ageing [1-7]. School physical culture is an indispensable component of school education that enables the full development of the person and ensures healthy safe living [8].

Scientific studies show that modern programs for the development of physical education at schools are focused on the promotion of the pupils' motor activity in which primacy is given to the development of physical characteristics. The main purpose of the physical culture programs is just educational and health-care tasks are realized without their practical use [9,10]. The physical culture programs contain the unpopular kinds of motor activity. The physical activity during the physical culture lessons has "diffuse" nature and its "effect" disappears in 5-10 hours [11].

A considerable amount of studies devoted to the improvement of the content and methods of physical culture education of schoolchildren have been conducted for the last years [9,11,12]. The scientists state that the exercises that meet the individual demands of the human body have health-improving impact [13-17]. That's why new trends based on the morpho functional characteristics of youth should be used to increase the efficiency of physical exercises.

The results show that the pupils' health condition has worsened for the past ten years. So, the quantity of children in the special medical groups has increased from 5% to 34% and in the preparatory group from 8% to 39%. More than 70% of schoolchildren have serious health problems. Such a result can be explained by greater requirements of medical examination in the educational establishments. Pathology of locomotor system among schoolchildren takes the first place in the structure of general statistics of sickness (159.2%). Eyesight problems take the second place (138.8%) and pathology of endocrine system takes the third place (92.1%).

One of the newest trends in planning physical exercises is fitness. It has an effective impact on the body mass correction, develops the physical harmony and improves the functional condition of human organism. Mainly specialists in the USA, Great Britain and other European countries create fitness programs. Moreover, at the beginning of the 2000s the scientific works in fitness appeared in the post-Soviet countries.

The scientists stated that the use of fitness according to the personalized morpho functional human characteristics had the best health improving impact [15-19]. Regaining, maintaining and improving a functional capability may be effective when it is based on comprehensive activities of specialists from many areas oriented at an individual case of a specific person [20-21].

The problems of history, methods and planning of fitness were studied in top the Ukrainian [15,18] and foreign [2,16] scientific works in fitness. According to the conducted analysis the use of fitness in the educational establishments will increase the efficiency of physical education of schoolchildren. Despite the fitness popularity among girls, the educational process in the educational establishments lacks fitness programs.

MATERIALS AND METHODS

The research was conducted in 2015-2016. A randomly chosen group of 16-17-year-old girls who studied in the educational institutions number 10, 18, 25 in Lutsk took part in the experiment. The schools were chosen randomly, too. We didn't take into account any criteria. Participation in the experiment was voluntary and it didn't include any element of reward. The protocols of the research were approved by the Bioethics Committee of Lesya Ukrainka Eastern European National University (KE-0254/295/2015 meeting minutes no. 1 of 17.01.2018).

The health condition was defined according to the results of the analysis of the girls' medical records (568 girls) and statistical reports of the Directorate of Health of Volyn regional state administration. The level of the interest in physical culture and kinds of physical activity was defined by means of questionnaires.

The examination of the functional capabilities of the girls was conducted according to the measurements of the Stange-Hench test, the measurement of vital capacity of lungs. The Stange test is

a maximum delay of breath in the intake of air in the body. The patient sat and took a deep, deep breath in several successive turns and then after intake of air closed the mouth and nasal allars with a thumb and index finger. Using stopwatch time from the moment of breath stop up to the moment of starting breathing again was fixed. The Hensch-test is a delay of breath while exhaling. The patient exhaled deeply, closed the mouth and nose with fingers after several successive turns. The time of delay of breath was registered using stopwatch. The vital capacity was defined using spirometer Spirodok +SpO₂.

The level of the girls' physical activity was defined according to International Physical Activity Questionnaire (IPAQ). The medium time of filling in the questionnaire was 45 minutes. The aim of the research and the procedure were explained to the respondents. According to the result of the analysis of the questionnaires, 34 weren't done in a proper way (unfinished, unreal data). They were withdrawn. That's why the sample of physical activity included 450 students of high school. All the questions were about last seven days. The results were shown as the evaluation of the energy outlay in the metabolic equivalent per week. The statistical report of the data was done using software STATISTICA, the 10th version.

RESULTS

Our research results show that the schoolchildren have cardiovascular problems. The average indices of the Stange test are 32-35 seconds. Measuring the duration of the delay in the intake of air in the body showed the decrease of the results to 42-47% in the Stange test. According to the average rates, the girls' vital capacity corresponds to the age-specific standards. Though it is 0.5–0.6 l lower than standard. 43% of pupils have low or lower than the average vital capacity.

The results show that only 2.59% respondents have a high level of motor activity. The majority of the girls have a medium (57.76%) or low (39.66%) levels of motor activity (Fig. 1).

According to the results, the level of physical activity of the girls is insufficient and the organism can't function as it is necessary and can't develop its physical qualities.

According to the results of the experiment we defined that the level of high schoolgirls' interest in physical education isn't high (table 2). Only 44 – 48% of respondents have a medium and higher than medium interests in physical education. 8 – 12% of girls have negative attitude toward physical exercises or have no interest in them. At the same time, the motivation to do exercises is as follows: to have a nice body – 43%, to be healthy – 28%, to achieve good sport results – 8%, the need to move – 10%.

The pedagogical experiment showed the high efficiency of the offered fitness program (table 1). The girls in the experimental group have a high (57.3%) or medium (42.7%) levels of motor activity. 12.5% respondents have a high level of motor activity in the control group.

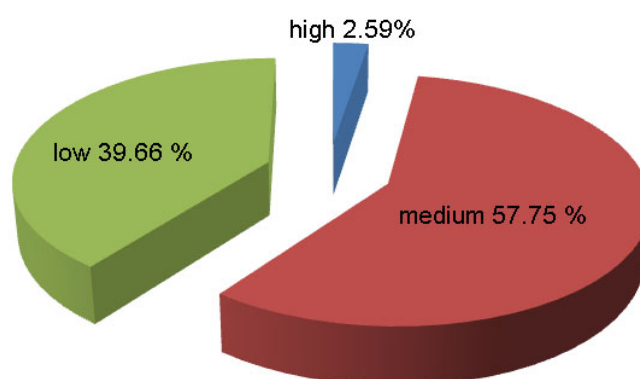


Figure 1. The level of physical activity of high school girls.

Table 1. The level of motor activity of the girls in the experimental and control groups after the pedagogical experiment.

The level of motor activity	The group of pupils	
	Experimental [%]	Control [%]
High	57.3	12.5
Medium	42.7	49.2
Low	–	38.3

Table 2. The level of high schoolgirls' interest in physical education and sport.

The level of interest [%]	Age	
	16 [years]	17 [years]
High	12.5	11.9
Higher than medium	15.3	11.6
Medium	28.7	29.8
Lower than medium	27.2	24.2
Low	8.3	10.5
Lack of interest	5.2	9.5
Negative attitude	2.8	2.5

Table 3. The kinds of motor activity during the practice of physical education of high schoolgirls.

The kind of motor activity [grade place]	Age	
	16 [years]	17 [years]
Cyclic exercises	5	6
Games	3	2
Power exercises and single combat	4	4
Gymnastics	2	3
Fitness	1	1
Nontraditional health improving systems	6	5

Table 4. Dosage loads for girls of different body structure.

Physique	The dimension of the burden (maximum repetitions) [times]	Number of approaches [times]	The duration of rest between series [min]	Temp of acting
Asthenic	8–12	5–6	1.5–3.0	slow, medium
Hypersthenic	15–25	3–4	0.63–1.0	fast
Normostenic	8–12	4–5	1.0–2.0	average

Table 5. The skinfold of the girls in the experimental and control groups after the pedagogical experiment.

Skinfold	Group of schoolchildren		p
	Experimental $\bar{x} \pm SD$ [mm]	Control $\bar{x} \pm SD$ [mm]	
Biceps	9.7 \pm 0.51	10.1 \pm 0.43	0.5996
Triceps	13.4 \pm 0.91	13.7 \pm 1.22	0.2266
Subscapular	9.2 \pm 0.94	9.5 \pm 0.86	0.2554
Suprailiac	13.5 \pm 0.83	14.7 \pm 1.12	0.9621
Calf muscle	13.1 \pm 1.06	13.3 \pm 0.85	0.1632

SD – standard deviation, p – statistical significance

The girls prefer fitness (the first-grade place) to other kinds of motor activity (table 3). The respondents mention gymnastics, too. Recurrent kinds of sport and non-traditional recreational systems don't play a great role in the pupils' motivation.

Group or personalized fitness programs are created considering motivation and health condition, functional capacity of high schoolgirls and the requirements of the program of physical education in the 10–11s forms. They are health-oriented on the decrease of diseases, achievement and keeping proper physical condition and improvement of psycho emotional condition of the schoolchildren.

Despite the peculiarities of the physical condition of girls belonging to different groups, we accordingly developed a dosing of strength loads (table 4). During the pedagogical experiment we measured the skinfold thickness of the girls' body (table 5).

According to the results of our research we can state that biceps, triceps, subscapular, sprailiac and calf muscle skinfolds of the girls in the experimental and control groups don't differ. At the same time the tendency of decrease of the indicated indices of the schoolchildren in the experimental groups is revealed. Namely, biceps skinfold of the girls in the experimental group is less by 4.12%, triceps skinfold is less by 2.24%, subscapular skinfold is less by 3.26%, suprailiac skinfold is less by 8.88% and calf skinfold is less by 1.53%.

DISCUSSION

Our research results show that the schoolchildren have cardiovascular problems. The average indices of the Stange test are 32–35 seconds. Measuring the duration of the delay in the intake of air in the body (Hench test) showed the decrease of the results to 42–47% in the Stange test. According to the average rates, the girls' vital capacity corresponds to the age-specific standards. Though it is 0.5–0.6 l lower than standard. 43% of pupils have low or lower than the average vital capacity.

The results of the study showed that fitness program is the basis for this physical activity. It is characterized by the specially chosen exercises that have a complex or selective impact on the whole organism or just on some organs depending on the morpho functional human capacity.

The scientific studies [7,8,13] established that the training effect has not only high level of motor activity including organized physical exercises and intense sport games. So high motivation to have a nice body and the girls' interest in fitness are the objective premises for creating and efficient realization of fitness-programs in the educational process of physical training of high schoolgirls.

The scientific research [8,11] proved that one of the most distinctive characteristics of the human physical development is body build. According to the results of the research it was discovered that 22% of senior pupils have asthenic body build, 19% – hypersthenic and 59% – normosthenic. The deviation of the parameters of the body build from the optimal one has a negative effect on both physical and mental condition of youth. That's why programming fitness-programs the body build type (asthenic, hypersthenic, normosthenic) is taken into consideration.

The girls having asthenic body build are lean, above average stature, have narrow shoulders, thin limbs, underweight body. They were recommended strength exercises to increase body weight, circumference of the parts of the body (shoulders, chest, pelvis, thighs) and to improve muscular tonus. Senior pupils having hypersthenic body build are heavysset and overweight, have average stature, bulky shoulders, short limbs. That's why their exercises were aimed at the decrease of body weight, circumference of the parts of the body (shoulders, breast, abdomen, pelvis, thighs), of fat component.

The offered general structure of fitness-program can be corrected depending on the aim of the exercises, health and senior pupils' motivational interest.

During the pedagogical experiment the quantity of the respondents with a high level of physical activity increased by 54.7%. After the experiment there were no girls having a low level of physical activity, at the beginning of the experiment there were 69.2% such girls.

According to the results of the pedagogical experiment the level of physical preparation of the schoolchildren ($p < 0.001$) namely their endurance, strength, flexibility, agility increased. The level of their endurance and strength increased most of all. Apparently, the systematic strengthening classes influence on the high schoolgirls in a comprehensive manner. The high schoolgirls had also significant

positive changes in the level of their motivation to do exercises. After the pedagogical experiment the girls had mainly high or higher than medium interest in physical education (at the beginning of the experiment the level was medium or lower than medium).

The indices of the heart rate, systolic and diastolic blood pressure didn't change significantly ($p>0.05$) during the pedagogical experiment. It is explained by their instability and changeability. At the same time according to the Stange-Hench test the girls' vital capacity improved significantly ($p<0.001$) after the pedagogical experiment.

CONCLUSION

The results of the research show that one of the most perspective types of physical activity is fitness (a complex of health improving programs which combines various physical exercises in aerobics, shaping, stretching, dancing, gymnastics, yoga, combat, training on simulators). The realization of doing fitness is aimed at the forming of health preserving competence of high schoolgirls and is based on the indices of their physical condition, motivation to do exercises and the level of their motor activity.

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