

The Impact of Health-promoting Technologies on University Students' Physical Development

Wpływ technologii prozdrowotnych na rozwój fizyczny studentów szkół wyższych

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SUMMARY

Aim: To investigate the impact of training sessions on the ground of health-promoting technologies upon students' physical development in higher educational institutions.

Materials and Methods: A group of 50 female students aged 17 to 22 was under our observation for a year. All of them were divided into the experimental (E) and the control (C) groups. The E group female students (n=25) were regularly involved in training sessions using health-promoting technologies, the C group female students (n=25) did not take part in this type of activities.

Results: The positive impact of training sessions based on health-promoting technologies upon the physical development of the E group students was revealed. A significantly better level of strength and flexibility development was noted in the E group students, compared to the C one. A statistically significant difference was found after the experiment in the E group students' indicators of static balance, vestibular stability, accuracy of assessment of strength, time and spatial parameters of movements.

Conclusions: A rationally constructed system of training sessions based on health-promoting technologies stimulates biological processes, supports the functioning of both individual organs and the students' body as a whole. This will contribute to strengthening students' health, increasing their motor activities, improving the efficiency of both learning and future professional activities.

Key words: health-promoting technologies, physical development, motor qualities, health, students

Słowa kluczowe: technologie prozdrowotne, rozwój fizyczny, cechy motoryczne, zdrowie, studenci

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INTRODUCTION

The modern model of the educational process defines a socially significant life strategy for the consistent formation of the health culture of students of pedagogical institutions of higher education i.e. future teachers as a necessary condition for the development of positive motivation of high schoolers and students for a healthy lifestyle [1-3]. Regular motor loads have a positive effect upon the level of a person's functional capabilities, increase emotional stability, reduce morbidity, ensure the acceleration of the warming-up process, contribute to the long-term preservation of the optimal pace, speed and efficiency of work movements [4-6]. The organization of the educational process in institutions of higher education

involves a sufficiently broad study of the issue of preserving and promoting the health of young people, in particular, it involves the development and wide use of appropriate educational technologies aimed at positive self-perception, the value attitude of the individual both to his/her own health and to the health of other people, promotion of a healthy lifestyle and motivation for motor activities [7-9].

The current state of young people's health requires new approaches to the formation of principles of a healthy lifestyle, activation of the promotion of a healthy lifestyle [10-12]. The social significance of the identified problem and its insufficient study determined the choice of the research topic. The priority is the social mandate for an educationalist who possesses

health-promoting technologies of education and upbringing, who is able to organize the health-promoting educational process and develop the health-promoting competence of students [13, 14].

One of the priority directions of the socio-pedagogical activities of teachers (in particular, teachers of biology and the basics of health) is the establishment of cooperation and coordination of the efforts of all links of relevant influence upon the development of the individual with the aim of motivating him/her to a healthy lifestyle, promoting the formation of a young person's motivation for a healthy lifestyle and motor activities [15, 16].

The personal qualities of the teacher affect the results of the high schoolers' work. We believe that future teachers' regular attendance of training sessions with elements of health-promoting technologies will have a motivating effect and contribute to their physical development and improvement of motor quality indicators.

AIM

The aim is to investigate the impact of training sessions on the ground of health-promoting technologies upon students' physical development in higher educational institutions.

MATERIALS AND METHODS

The following research methods were used to achieve the aim: informational, which involved studying the current state of the problem on the use of health-promoting technologies in the educational process of students with the aim of improving their physical development; analytical, which involved the analysis of scientific and methodological literature; monitoring of Internet information resources, analysis of theoretical and methodological works; observation method; assessment of physical development of students using motor tests. The research was conducted in several stages. The first stage involved carrying out the analysis and generalization of data from scientific and methodical sources reflecting the state of the problem, development of research organization schemes and selection of the appropriate contingent. The second stage involved scientific substantiation of the use of health-promoting technologies, in particular, the fitness training system for the development of motor skills of students. The third stage consisted in the experimental verification of the effectiveness of the use of health-promoting technologies in the educational process of future teachers.

T.H. Shevchenko National University "Chernihiv Colehium" was chosen as the research base. A group of 50 female students aged 17 to 22 was under our observation for a year. All of them were divided into the experimental (E) and the control (C) groups. The E group female students (n=25) were involved in training sessions using health-promoting technologies, the C group female students (n=25) did not take part in this type of activities.

The E group female students regularly attended "Dilemma" dance and fitness studio for a year, training sessions lasted for one hour three times a week. Programming and organization

of women's training was based on the following provisions: directing health training to the development of general endurance (due to aerobic processes of energy production); limitation of the speed and strength exercises in the health-improving fitness training, which is stipulated by a smaller capacity of anaerobic mechanisms of energy production; the inclusion of strength exercises provided that the state of the pelvic floor is taken into account (the possibility of lowering the pelvic organs with the increase in the internal abdominal pressure). The main objective of the training sessions was to enhance the physical development of female students, promote the health of various systems of the body and improve their emotional state. The tasks of the training sessions included: promotion of health, improvement of vitality, enhancement of general and special working capacity, development of physical abilities, formation of the body posture and correction of body build abnormalities, prevention of pathological conditions and professional illnesses. The following recommendations were taken into account while determining the intensity of the physical load according to the indicators of the maximal oxygen consumption (MOC): the training load was within the boundaries of 65-75% of the MOC for female students with a high level of physical well-being, 50-65% of the MOC for students with an average level of physical well-being, 40-50% of the MOC for female students with a low and below average levels of physical well-being. At that time, the C group female students performed exercises that ensured their motor activities at their own discretion.

The determination of the indicators of physical development of female students was carried out according to the following indicators: the indicator of the development of strength qualities (push-ups, times), the indicator of the development of speed and strength qualities (standing long jump, cm), the indicator of the development of agility (4×9 m shuttle run, s), the indicator of flexibility development (torso tilt forward from a sitting position, cm), the indicator of static balance (one leg balance, s), the indicator of vestibular stability (Romberg coordination test, s), the indicators of kinesthetic sensation (hand dynamometry method, %), the indicators of time orientation (determination of an individual minute, s), the indicator of spatial orientation (basketball dribbling with one hand when changing the direction of movement, s), speed of a simple reaction ("Catch the ruler" method, cm), speed of attention ("Collect puzzles" method, min).

During the exams, the reliability of the difference between the students' indicators at the beginning and at the end of the research was determined using the Student's t-test. Significance for all statistical tests was set at $p < 0.05$. The difference was also presented as a percentage.

RESULTS

The indicators that were taken before the start of the experiment were compared in order to determine the homogeneity of the groups. With the help of the comparative analysis of the indicators of female students' motor readiness, it was concluded that the most of the E and the C groups

Table 1. Dynamics of the indicators of motor readiness of female students ($M \pm m$, $n=50$)

Tests	Groups	Beginning of the experiment	End of the experiment	Rate of growth
Push-ups, times	E	11.2±1.0	13.1±1.0*	16.9%
	C	11.1±0.6	11.3±0.6	1.8%
Standing long jump, cm	E	212.5±4.5	212.5±4.6	0.00%
	C	212.6±3.7	213.7±3.4	0.5%
4×9 m shuttle run, s	E	10.1±0.2	9.9±0.2	2.00%
	C	10.3±0.1	10.3±0.1	0.00%
Torso tilt forward from a sitting position, cm	E	12.0±1.0	13.5±1.0*	12.5%
	C	11.5±0.4	12.6±0.4	9.5%

Note: M – the arithmetic mean, m – the error of the mean-square deviation, * – the reliability of the difference between the indicators of female students at the beginning and at the end of the research at the level of $p \leq 0.05$

indicators were not significantly different from each other at the beginning of the experiment ($p > 0.05$) (Table 1).

At the end of the experiment, the E group students' indicators increased in almost all motor tests, the biggest changes were registered when determining the development of arm strength and quantitative indicators in torso tilt forward from a sitting position: an increase of 16.9% and 12.5%, respectively. Positive dynamics were also noted in the time of shuttle running by 2%. Positive dynamics were also noted in the C group students when studying the specified indicators of motor readiness, but to a much lesser extent.

Checking the level of physical development of female students of both groups revealed the presence of reliable changes in the indicators of the representatives of the experimental group after the year of the experiment (Table 2).

As it can be seen from the data presented in Table 2, the increase in the indicator of static balance in the E group students was 18.6%, which is significantly more than in the C group students. According to the obtained results, the indicators of vestibular stability, kinesthetic sensation, time and spatial orientation also reliably ($p \leq 0.05$) improved in the E group female students. The studied indicators also improved in the C group female students, however,

the difference between the data at the beginning and at the end of the experiment is unreliable ($p > 0.05$). The rate of growth in the indicators of speed of a simple reaction (improvement is 1.5%), speed of attention (improvement is 3.1%) is insignificant and statistically unreliable ($p > 0.05$) in the E group female students.

DISCUSSION

According to many scientists [17, 18], the implementation of health-promoting technologies should be aimed at indicators of health, physical development and physical fitness of students. A number of scientific works by specialists in many countries of the world are devoted to the issue of implementing modern methods for strengthening and preserving the health of student youth [19-22]. The scientists have proven the positive impact upon the body of students of such modern technologies as Kangoo Jumps, Pilates, aqua aerobics, swimming, stretching, various types of dance and fitness, and many others [5, 8, 12, 15, 23, 24]. At the same time, the study of the issue of improving the specific motor abilities of female students in the process of training sessions on the ground of health-promoting technologies remained without due attention of specialists.

Table 2. Dynamics of the indicators of physical development of female students ($M \pm m$, $n=50$)

Tests	Groups	Beginning of the experiment	End of the experiment	Rate of growth
Static balance, s	E	14.0±0.5	16.6±1.0*	18.6%
	C	14.0±0.6	14.3±0.6	2.1%
Vestibular stability, s	E	28.0±0.5	31.0±0.6*	10.7%
	C	27.0±1.7	28.0±1.4	3.7%
Kinesthetic sensation, %	E	13.0±0.2	11.5±0.2*	11.6%
	C	14.0±0.1	13.5±0.1	3.6%
Indicator of time orientation, s	E	52.0±1.5	58.5±1.0*	12.5%
	C	45.5±4.4	46.6±3.4	2.4%
Indicator of spatial orientation, min	E	1.0±0.0	0.9±0.0*	10%
	C	1.0±0.2	1.2±0.4	20%
Speed of a simple reaction, cm	E	0.217±0.002	0.212±0.004	1.5%
	C	0.242±0.003	0.240±0.003	0.9%
Speed of attention, min	E	14.4±1.5	13.6±1.2	3.1%
	C	16.1±1.5	15.4±1.0	3.1%

Note: M – the arithmetic mean, m – the error of the mean-square deviation, * – the reliability of the difference between the indicators of female students at the beginning and at the end of the research at the level of $p \leq 0.05$

Specific motor abilities that characterize the physical development of a person are quite diverse. Among them, we can distinguish the ability for differentiation, orientation, sense of balance, speed of reaction and attention [5, 25]. They are the most significant, because they are manifested in working practice, sports activities, and everyday life. In particular, the speed of motor reactions is determined by the mobility of nervous processes, and the frequency of movements depends on the mobility of the neuromuscular apparatus: the frequency of neuromuscular impulses, the speed of muscle transition from the tension phase to the relaxation phase, the rate of alternation of these phases, the degree of inclusion of “fast” muscle fibres in the process of movement and their synchronous work, they are characterized by hereditary features and are best developed in sensitive periods. In addition, motor skills are the basis of physical development of students, as well as a prerequisite for effective training in physical exercises, as they ensure the coordination and arrangement of various motor actions into a single whole in accordance with the set goal [26–28].

A statistically significant difference after the experiment was shown by the results of the indicators of static balance (18.6%), vestibular stability (10.7%), accuracy of assessment of force, time and spatial parameters of movements (11.6%, 12.5% and 10%, respectively). The rate of growth in the indicators of speed of motor reactions (1.5%) and speed of attention (3.1%) is insignificant and statistically unreliable. The analysis of the obtained results showed that the systematic attendance of dance and fitness training sessions, which are based on the application of health-promoting technologies, contributed to the increase in the motor activities of female students, and this, in turn, led to an improvement in their physical development.

CONCLUSIONS

The positive influence of training sessions on the ground of health-promoting technologies upon the physical development of female students was revealed. The female students of the experimental and control groups showed positive dynamics of physical development indicators, in particular, the female students of the experimental group increased the indicators in almost all motor tests, the biggest changes were registered when studying the indicators of the development of arm strength and torso flexibility: the indicators of push-ups improved by 16.9%, the indicators of torso tilt forward from a sitting position – by 12.5%. Positive shifts in agility indicators were also noted i.e. the shuttle running time improved by 2%. A significant improvement in the indicators of the physical development of female students of the experimental group, compared to the representatives of the control group, was also established, according to the indicators of static balance (by 18.6%), vestibular stability (by 10.7%), kinesthetic sensation (by 11.6%), time orientation (by 12.5%) and spatial orientation (by 10%).

The obtained results allow us to state that a rationally constructed system of training sessions on the ground of health-promoting technologies contributes to improving

the physical development of students, strengthening their health, and increasing their motor activities, which, in general, will ensure the effectiveness of both educational and future professional activities.

Prospects for further research are aimed at studying the state of formation of health-saving competence among students in the process of their preparation for professional activities.

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