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**ANALYSIS OF MOTOR SKILLS DEVELOPMENT IN UNIVERSITY  
FEMALE STUDENTS BY MEANS OF SPORTS GAMES IN THE  
PROCESS OF SECTION CLASSES**

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*The article analyzes the problem of preserving and strengthening the health of student youth, which is a topical issue in today's conditions. It is noted that conditions of study in the higher education institutions make excessive demands that cause deterioration in the health of female students. Recent scientific studies show that active exercise and sports play an active role in restoring and improving health.*

*It is determined that to stimulate female students' interest in various types of physical activity it is necessary to use modern methods and technologies that are aimed at generating interest in physical activity.*

*The article presents the results of a study of the motor skills development in female students of higher education institutions by means of sports games in the process of section classes. The results show the effectiveness of the program of motor skills development in female students of higher education institutions. After the pedagogical experiment, statistically significant changes were observed in the students of the experimental group compared with the control group.*

*Key words: physical education, sports games, motor activity, section classes, student youth.*

**Introduction.** Preserving nation health is an objective necessity of nowadays. It is determined mainly by the health of people of reproductive age, so the efforts of a young girl should be aimed at maintaining a healthy family, ensuring high social-creative and professional activity [5, 6].

An important activity of higher education institutions is search for new forms of strengthening female students' health in the process of their education and upbringing, introduction of health-preserving technologies in the educational process, coverage of female students with physical culture and sports, formation of health skills [3, 6].

In order to solve the above problems, we propose to use a personality-centered approach in the process of physical education, namely, to give female students the opportunity to choose the kind of sports or physical activity in which they would be engaged.

The advantage of the sectional form of organizing physical education is that in the process of classes students form knowledge, practical skills, abilities and needs to engage in physical exercises all their lives. All this in the further life will promote high and productive work, will give confidence and feeling of self-realization [2]. Therefore, the problem of improving physical education of students and finding ways to improve their health is relevant.

**Analysis of recent research and publications.** Analysis of scientific research in the field of physical culture and sports established the feasibility of using different types of motor exercises (V. Stula, Ye. Selivanov); innovative forms in the organization of classes (H. Bezverkhnia, M. Kliap); various methods of monitoring and control of the general physical condition of youth (M. Kuzminova, T. Hurtova).

**The purpose of the study:** substantiation, development and experimental verification of the program of motor skills development in female students of higher education institutions in the process of section classes.

At the first stage (September 2017 – January 2018) of the study the analysis of scientific-methodological literature was conducted. The peculiarities of organization of the process of physical education of female students were considered, the purpose and tasks of research were determined, the selection of research methods was carried out. Primary information about the level of functional state and development of physical qualities of female students for the formation of experimental groups was obtained. At this stage, a program aimed at the motor skills development in female students was created.

At the second stage (February 2018 – October 2019) of the study a basic pedagogical experiment was conducted to determine the impact and compare the developed curriculum with the traditional curriculum in physical education. At this stage, the analysis and generalization of the results of the study were carried out.

The study involved 150 students of Sumy National Agrarian University and Sumy State Pedagogical University named after A.S. Makarenko.

Testing of the level of physical health of female students was carried out according to the system of physical health assessment according to the method of H. L. Apanasenko [1].

All calculations were performed according to existing formulas, indicators were evaluated in points, according to five levels of their physical health: low, below average, average, above average, high.

The level of motor skills and physical qualities was determined by the following tests: running 100 m, shuttle running 10x5 m, flexion and

extension of the arms in a supine position, leaning forward from a sitting position, lifting the torso from a lying position, long jump from a place.

In choosing the type of tests, we were guided by the general provisions published in the works of leading experts [7].

**Results.** The specificity of the proposed program determines the feasibility of physical exercises based on sports (volleyball, basketball, table tennis), which affect the body for health and training purposes, and the health goal is realized by increasing the level of motor skills (both general and special), formation and improvement of professionally significant motor skills and abilities. Increasing the level of physical fitness has a significant effect in the recovery and physical strengthening of female students. The choice of these sports games is due to their diverse impact on the body of female students.

To experimentally test the developed program, two groups of students were formed: control (CG) and experimental (EG). The students of the control group were engaged in physical education in the curriculum of higher education institutions. In addition to traditional physical education classes, the students of the experimental group were invited to attend a sports games section. The work of the section was based on the use of game sports: volleyball, basketball, table tennis.

The program used kinds of sports in accordance with the sports preferences of female students. Implementation of the authors' program was carried out in three stages (Table 1).

At the first stage in the second term more attention was focused on the formation of motor potential of female students, which contributed to the effective mastering and improvement of technical elements of a particular sport – volleyball and table tennis. Both at the beginning of this stage and at the end, the main place was occupied by general and auxiliary training with

the use of exercises in selected sports; means of increasing the functional potential of an organism in insignificant volumes were applied.

Table 1

**Stages of implementation of the program of motor skills development in female students of higher education institutions**

Stages	Term of study	Kind of sports	GPT (%)	SPT (%)
I year of study				
First	II term	volleyball, table tennis	80	20
II year of study				
Second	III term	basketball, table tennis	70	30
Third	IV term	volleyball, table tennis, basketball	65	35

Note: GPT – general physical training; SPT – special physical training

The load in the section “Special physical training” was characterized by an increase in the number of special training and competitive exercises and the amount of load, while slightly increasing the intensity of exercise and training in general. This stage was characterized by variable, repeated and interval methods.

At the second stage the classes were aimed at improving physical qualities, they had a relatively large amount of work and a significant load. At this stage, the main tasks of integrated training were solved; special physical training was based mainly on various sports elements. A peculiarity of this stage was the growing share of competitive methods.

The third stage of the methodology was aimed at improving and diversifying the arsenal of motor actions and skills, which took place on the basis of a high level of general physical fitness achieved at the previous stages. At this stage, interval and competitive methods were used.

To determine the effectiveness of the program of motor skills development of female students of higher education institutions in the process of section classes at the beginning and at the end of the

experiment, we determined the indicators of physical health [1] and the level of development of female students' motor skills [7].

The analysis of vital index (VI) at the beginning of the experiment in students of the experimental group was  $1.47 \pm 0.28$  points, and at the end of the experiment was  $2.05 \pm 0.3$  points, i.e. increased by 28.29 % (Table 2).

Table 2

**Comparative characteristics of the indicators of the level of somatic health of female students in the course of pedagogical research**

Group	Time	Mass index	Vital index	Power index	Robinson Index	Rufier Index	ISH	Level of SH
CG (n=23)	Before	$-0,65 \pm 0,18$	$1,55 \pm 0,18$	$2,05 \pm 0,38$	$1,3 \pm 0,13$	$-0,2 \pm 0,34$	$4,05 \pm 0,18$	below average
	After	$-0,55 \pm 0,17$	$1,7 \pm 0,22$	$2,1 \pm 0,38$	$1,3 \pm 0,13$	$-0,2 \pm 0,34$	$4,35 \pm 0,27$	below average
	tcrit	1,000	1,143	1,000	0,00	0,00	1,552	<i>temp(a=0,05) =2,09</i>
	Changes in %	18,18%	8,82%	2,38%	0,00%	0,00%	7,41%	
EG (n=23)	Before	$-0,68 \pm 0,17$	$1,47 \pm 0,28$	$0,68 \pm 0,4$	$1,37 \pm 0,11$	$1,05 \pm 0,4$	$3,89 \pm 0,2$	below average
	After	$-0,21 \pm 0,18$	$2,05 \pm 0,3$	$1,89 \pm 0,33$	$1,37 \pm 0,11$	$1,05 \pm 0,4$	$6,16 \pm 0,37$	average
	tcrit	3,375	4,158	4,463	0,00	0,00	5,245	<i>temp(a=0,05) =2,1</i>
	Changes in %	30,88%	28,29%	64,02%	0,00%	0,00%	36,85%	

Note CG – control group; EG – experimental group

Analysis of the data obtained by the Rufier index revealed more positive changes in the students of the experimental group ( $p < 0.05$ ). Whereas in the control group we did not observe significant changes ( $p > 0.05$ ).

As can be seen from table 2 before the experiment, the average mass index in the experimental group improved by 30.88 %. The mass index of female students in the control group at the end of our study also had positive changes (18.18 %), but compared to female students in the experimental group, they were insignificant

( $p > 0.05$ ).

The results of the power index revealed statistically significant changes in the female students of the experimental group ( $p < 0.001$ ). This figure increased by 64.02 %. The control group of female students, in percentage terms, showed a less significant improvement of 2.38 % ( $p > 0.05$ ).

We analyzed the indicators of the Robinson index in female students of the experimental and control groups at the beginning of the study and found that this indicator did not have a significant difference between female students in both groups. At the end of the pedagogical experiment, this indicator increased in the experimental group of female students by 9.7 % and amounted to  $1.37 \pm 0.11$  points ( $p < 0.05$ ). Indicators in students of the control group remained with minor changes ( $p > 0.05$ ).

Analyzing the results of indicators of the level of formation of female students' motor skills, we found that according to their assessment, the indicators of both groups before the beginning of the pedagogical experiment corresponded to a low level. Control and experimental groups of female students were formed in such a way that by the level of physical fitness they did not have a significant difference (Table 3).

Table 3

**The results of testing of the level of female students' motor skills development**

Tests	Group	N	Before the experiment	V (%)	After the experiment	V (%)	Increase (%)	P
Running 100 m	K	23	$16,25 \pm 1,52$	9,34	$15,6 \pm 1,43$	9,16	4,17	$> 0,05$
	E	23	$17,32 \pm 1,42$	8,18	$15,47 \pm 1,35$	8,72	11,9	$< 0,001$
Tilt the torso forward, <i>sm</i>	K	23	$13,92 \pm 1,13$	8,13	$15,01 \pm 1,15$	7,66	7,83	$< 0,001$
	E	23	$14,42 \pm 1,54$	10,68	$16,15 \pm 1,9$	11,77	12,01	$< 0,001$
Long jump from a	K	23	$168,76 \pm 16,35$	9,69	$169,57 \pm 16,21$	9,56	0,48	$<$

place, <i>sm</i>								0,001
	E	23	171,23± 16,51	9,64	173,98± 16,89	9,71	1,61	< 0,001
Flexion and extension of the arms in a supine position, <i>times</i>	K	23	19,35 ± 1,79	9,23	19,85 ± 1,87	9,43	2,58	< 0,001
	E	23	18,79 ± 1,23	6,54	20,58 ± 1,54	7,48	9,52	< 0,001
Lifting the torso from a supine position, <i>times</i>	K	23	16,15 ± 1,95	12,1	16,55 ± 2,37	14,3 4	2,48	< 0,05
	E	23	16,42 ± 1,74	10,61	18,26 ± 1,59	8,72	11,2 2	< 0,001
Shuttle running 10x5 m, <i>sec</i>	K	23	19,33 ± 1,28	6,6	19,18 ± 1,42	7,38	0,81	> 0,05
	E	23	19,32 ± 1,06	5,49	18,64 ± 1,13	6,07	3,64	< 0,001

The results of testing of the level of development of female students' motor skills show that when performing the test "Running 100m", at the stage of initial testing, the indicators of female students performing the test at a high level were 9.34 % in the control group and 8.18 % in the experimental group. After introduction of the program there has been a positive dynamic in the female students of the experimental group.

Analysis of the results of the test "Tilt the torso forward" showed that the increase in performance in the control group was 7.83 %, in the experimental group – 12.01 %.

According to the results of the test "Flexion and extension of the arms", we found that none of the students in the experimental and control groups remained at a low level but improved their results.

The results of re-testing "Explosive Force" revealed a decrease in the number of female students in the experimental group with an average level by 10.6 %, due to these changes increased the number of female students with above average level (10.5 %), female students in the control group also had positive changes, but only by 5 %.

After the implementation of the developed experimental measures, we recorded a statistically significant improvement in the performance of the

test “Shuttle running 5x10 m” and “Lifting the torso from a supine position” in female students of the experimental group.

The final assessment of the results of the study of physical fitness of female students allows us to conclude about the effectiveness of the program for the development of motor skills in the process of section classes for female students.

**Conclusions.** The analysis of the modern scientific literature has revealed that the existing system of physical education in higher education institutions does not provide conscious active motor activity of female students, purposeful and corresponding to their individual characteristics.

We found that the program of classes with the use of sports games had the greatest impact on the indicators of the functional state of the spine and respiratory system of female students.

Analysis of the results of the study of the motor skills development in female students allows us to conclude about the effectiveness of the program of classes using sports games in the extracurricular process of higher education institutions. After the introduction of the pedagogical experiment, we noted statistically significant changes in the students of the experimental group by 11.22 % ( $p < 0.01$ ), compared with the control group, where the increase was 2.48 % ( $p < 0.05$ ).

The obtained results require further theoretical and experimental research on this issue.

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