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**IMPROVING THE PERFORMANCE OF FLEXIBILITY AND
COORDINATION ABILITIES UNIVERSITY GIRLS-STUDENTS IN THE
PROCESS OF HATHA-YOGA CLASSES DURING THE UNIVERSITY
YEAR**

Abstract. Purpose: *to determine the results of changes in terms of flexibility and coordination abilities of university students in the process of hatha-yoga developed by the program during the year. Material and methods:* *a pedagogical experiment was attended by 60 students of the university at the age of 17–20 years. Conducted pedagogical experiment and educational testing, the results were processed by methods of mathematical statistics. Results:* *the control group students only attended university studies in physical education, experimental – three times a week, hour and a half fitness classes on hatha-yoga. Conclusions:* *in the pedagogical experiment proved the effectiveness of the developed program on hatha-yoga in extracurricular work of students of the university; the average results recorded characteristics of flexibility and coordination abilities of university students and calculated at the end of the university year, the percentage improvement in these indicators.*

Keywords: *hatha-yoga, students, university classes, flexibility, coordination.*

Introduction. The analysis of a state of health and a level of physical fitness of student's youth considerable gives concern among teachers, physiologists, physicians and specialists of other branches [1; 6; 7]. Independent preventive actions and program classes in physical training in higher educational institutions only slightly improve the available situation. However according to normative documents it is possible to supplement the training university program with the organization of an out-of-class work of a sports- improving and well-mannered orientation [1; 8] which will promote the solution of a complex of derivative tasks. The positive effect is provided to be received at the creation of student's groups in which to apply modern fitness of technology and well-known improving systems systematically. Yoga is one of the popular improving systems in the world that extends among the domestic population. In turn, the systematic use of this improving system on the out-of-class classes needs carrying out a scientific argumentation concerning its influence on a student's organism and granting methodical recommendations concerning features of a physiologic development and a physical condition of the contingent of those who makes the created group. The relevance to the research is added by the positive complex influence of the improving system of yoga on a female organism and

therefore there is a need to determine the level of shifts in indicators of separate physical qualities of students within an academic year.

In modern publications the considerable effect from practice of yoga classes is noted [4;15], and in particular for women that is confirmed [2; 5; 9; 13] where the application of exercises on yoga for the correction of a bearing and the increase of a level of their health is carried out. We developed the program of Hatha yoga classes (a type of yoga is accented on the performance of physical exercises – "asanas") for students of an initial level of preparedness that recommended for the realization in an out-of-class work of higher educational institutions [11;12]. In this work indicators of characteristics of flexibility and coordination abilities of students of universities are lighted that as a result of Hatha yoga classes within an academic year receive significant improvements.

The objective of the research: to determine results of shifts in indicators of flexibility and coordination abilities of students of universities in the course of Hatha yoga classes by the developed program within the academic year.

The task of the research:

1. To make a pedagogical experiment concerning the application of the developed program on Hatha yoga on the out-of-class work of students of a higher educational institution.

2. To record average results of characteristics of flexibility and coordination abilities of students of universities at the beginning, in the middle and at the end of the academic year who regularly visit the out-of-class Hatha yoga classes.

3. To carry out a percentage comparison of shift of indicators of the separate characteristic of flexibility and coordination abilities of students of universities during the experimental period of classes by yoga.

Material and methods of the research: analysis of data of special scientifically methodical literature and Internet, pedagogical tests, pedagogical experiment, methods of mathematical statistics.

The forming experiment within the academic year was made for the verification of the offered improving program on Hatha yoga which was applied in the conditions of the out-of-class work of students of a higher educational institution. The general totality of the experiment was made by 60 students of a higher educational institution of the first and second years. The control and the experimental groups of students by the age of 17-20 years old on 30 persons everyone are created which weren't engaged in any sports and improving systems or sport, that is had the initial level of preparedness. The test fixed at the beginning of the experiment that the average indicators of students of both groups had no essential differences ($p>0,05$) at issuant characteristics of physical qualities.

The student of the control group attended only classes on physical training for the achievement of the purpose of the experiment which are provided by the training program for a higher educational institution. The students of the experimental group, except planned studies on physical training, in addition in the conditions of the out-of-class work three times for a week attended improving classes on Hatha yoga one and a half hour where carried out the training program which is lighted in a source [12].

The positive influence of the offered program was estimated behind changes of the received results of the control tests in the middle and at the end of the experimental period that by data [3; 10] gives an opportunity to define informative characteristics of the available condition of the tested quickly and objectively. The comparative method was applied to the analysis of the recorded average indicators of students of the control and the experimental groups. The analysis was carried out in each group separately, namely: results of the control test of students at the beginning of the experiment were compared to indicators in the middle and at the end of the academic year behind Styudent's technique and the percentage changes between average results of characteristics of flexibility and coordination abilities were calculated at the beginning and at the end of the experimental academic year.

The research of characteristics of flexibility of students in the forming experiment was carried out by means of the battery of the following pedagogical tests: forward and cross splits, a shoulder joint, lateroflection of a spine pillar, bending of a spine pillar at an inclination forward from a position standing on a gymnastic lava, extension of a spine pillar in the test "bridge". Tests for the determination of coordination abilities were such: shuttle run of 4x9 m, static balance with opened and closed eyes.

Results of the research and their discussion. Carrying out the analysis of the studied flexibility indicators, it is visible from the table that the absent reliability of divergences ($p > 0,05$) between the majority of the recorded results for a year in the control group of students and, on the contrary, statistically significant ($p < 0,05$ and $p < 0,01$) results between all marks of tests for identification of dynamics of flexibility were observed during the experimental period in the experimental group of students. So, the level of forward split and cross split made 159,67 gr., 149,83 gr. in the control group of students at the beginning of the experiment and in the middle of the experiment – 162,03 gr. and 151,93 gr., at the end on 3% and 4% was better, than at the beginning – 165,07 gr. and 155,93 gr. respectively. In the experimental group similar results of students increased from 160,27 gr. within the academic year and 148,87 gr. at the beginning of the academic year till 167,23 gr. and 156,73 gr. after the second pedagogical testing and till 171,20 gr. and 162,17 gr. at the end of the experiment that made the general improvement on 7% and 9%. The percentage improvement of an indicator of mobility of a shoulder joint at students of control group during the forming experiment made 8% (69,07; 71,13; 74,63 gr.). In the experimental group of students the improvement took place at the level of 15% and according to the results of three intentions within the academic year: 69,73; 75,83; 80,13 gr. At the beginning of the experiment lateroflection of a spine pillar found indicators of the control group of students with a mark 14,27 gr., in the middle of the experiment – 15,23 gr., and at the end it was on 11% better, than at the beginning – 15,87 gr. In the experimental group similar results are found out in the students that within the academic year increased from 14,37 gr. till 16,73 gr. after the second testing and till 19,33 gr. at the end of the experiment that made the general improvement at 35%.

The percentage comparison of indicators of manifestation of flexibility and coordination abilities of students of the control group (n=30) and the experimental group (n=30) during the experimental period of Hatha yoga classes

Control test	Unit of measure	Groups	Indicators at the beginning of the experiment		$\bar{X}_1 \leftrightarrow \bar{X}_2$	Indicators in the middle of the experiment		$\bar{X}_2 \leftrightarrow \bar{X}_3$	Indicators at the end of the experiment			$\bar{X}_1 \leftrightarrow \bar{X}_3$
			\bar{X}_1	m	p	\bar{X}_2	m	p	\bar{X}_3	m	CG↔EG, p	%
1	gr.	CG	159,67	1,56	>0,05	162,03	1,25	>0,05	165,07	1,38	<0,01	3
		EG	160,27	1,65	<0,01	167,23	1,16	<0,05	171,20	1,03		7
2	gr.	CG	149,83	1,78	>0,05	151,93	1,83	>0,05	155,93	2,01	<0,05	4
		EG	148,87	1,25	<0,01	156,73	1,38	<0,01	162,17	1,38		9
3	gr.	CG	69,07	1,52	>0,05	71,13	1,52	>0,05	74,63	1,43	<0,01	8
		EG	69,73	1,47	<0,01	75,83	1,56	<0,05	80,13	1,12		15
4	gr.	CG	14,27	0,62	>0,05	15,23	0,54	>0,05	15,87	0,45	<0,01	11
		EG	14,37	0,67	<0,01	16,73	0,45	<0,01	19,33	0,45		35
5	sm	CG	8,13	0,67	>0,05	9,07	0,49	<0,05	11,13	0,62	<0,01	37
		EG	7,93	0,67	<0,01	10,47	0,45	<0,01	15,57	0,62		96
6	sm	CG	53,47	0,89	>0,05	53,03	0,71	>0,05	51,53	0,45	<0,01	4
		EG	53,53	1,12	<0,05	50,47	0,89	<0,05	47,73	0,85		11
7	s	CG	10,98	0,07	>0,05	10,83	0,06	<0,01	10,47	0,04	<0,05	5
		EG	11,03	0,04	<0,01	10,64	0,07	<0,01	10,34	0,04		6
8	s	CG	84,97	15,08	>0,05	93,10	15,26	>0,05	103,40	15,39	<0,01	22
		EG	89,43	6,16	<0,01	129,63	8,25	<0,01	178,27	8,66		99
9	s	CG	16,57	1,56	>0,05	18,67	1,61	>0,05	20,77	1,65	<0,01	25
		EG	16,03	1,74	<0,01	23,87	1,87	<0,05	28,87	1,38		80

Note. 1 – forward split; 2 – cross split; 3 – shoulder joint; 4 – lateroflection of a spine pillar; 5 – bending of a spine pillar at an inclination forward from a position standing on a gymnastic lava; 6 – extension of a spine pillar in the test "bridge"; 7 – shuttle run of 4x9 m; 8 – static balance with open eyes; and 9 – static balance with closed eyes.

An assessment of mobility of a spine pillar at an inclination forward from a position standing on a gymnastic lava found marks 8,13 sm, after the second intention – 9,07 sm at students of the control group at the beginning of experiment of, and at the end of the academic year the general improvement took place on 37% and made 11,13 sm. Similar results equaled 7,93 sm in the experimental group of students at the beginning of the forming experiment, in the middle – 10,47 sm, and the improvement on 96% with a mark 15,57 sm is fixed after the third intention. The results of the extension of a spine pillar in the test "bridge" at students of the control group at the beginning of the experiment made 53,47 sm, after the second intention made 53,03 sm, and at the end of the academic year improved till 51,53 sm that displayed the general improvement on 4%. In the experimental group the following indicators are found within the academic year, namely: at the beginning – 53,53 sm, in the middle – 50,47 sm, and after the third intention – 47,73 sm with the general improvement on 11%.

Characteristics of coordination abilities of students during the experiment were fixed by means of shuttle run of 4x9 m, static balance with the opened and closed eyes. Statistically significant ($p < 0,01$) divergences are found only between indicators of the second and third testing in the control group of students for a year, statistically significant ($p < 0,01$) results between all marks of pedagogical tests for the detection of coordination characteristics were observed during the experimental period in the experimental group of students. So, the percentage improvement of results of the students of the control group in shuttle run of 4x9 m made 5% with the recorded mark: 10,98; 10,83; 10,47 s. The similar improvement equaled 6% between output and final results within the academic year in the experimental group of students: 11,03; 10,64; 10,34 s.

The results of static balance with the opened and closed eyes at students of the control group had a mark 84,97 s and 16,57 s at the beginning of the experiment, in the middle of experiment – 53,03 s and 15,23 s, and at the end – 51,53 s and 15,87 s that on 4% and 11% was better, than at the beginning. In the experimental group similar indicators of students within the academic year increased from 89,43 s and 16,03 s at the beginning of the academic year till 129,63 s and 23,87 s after the second testing and till 178,27 s and 28,87 s at the end of the experiment that made the general improvement on 99% and 80% respectively.

The statistically significant differences at $p < 0,05$ and $p < 0,01$ are fixed when comparing indicators of the manifestation of flexibility and coordination abilities of students of the control group ($n=30$) and the experimental group ($n=30$) at the end of the forming experiment (table) that testifies to the significant improvement of these characteristics and leads up the efficiency of the developed program on Hatha yoga for classes with students in the out-of-class work of the higher educational institution.

Conclusions:

1. The pedagogical experiment is carried out and the efficiency of the application of the developed program on Hatha yoga is proved in the out-of-class work of the students of the higher educational institution.

2. The average results of characteristics of flexibility and coordination abilities of the students of universities are fixed in the control and the experimental groups.

3. The percentage improvement of indicators of flexibility and coordination abilities of the students of universities is calculated at the end of the academic year

and the advantage of results of the experimental group is determined which was engaged according to the developed program on Hatha yoga.

Prospects of the subsequent researches. Carrying out the analysis is planned concerning the definition of the influence of an experimental technique on Hatha yoga for high-speed and power characteristics of students of universities within the academic year.

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