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THE INFLUENCE OF 30-HOUR PHYSICAL EDUCATION CLASSES ON THE INDICATORS OF THE FUNCTIONAL STATUS OF STUDENTS — FUTURE TEACHERS AND THE REASONS FOR THEIR DECLINE BY THE END OF THE ACADEMIC YEAR AND FROM COURSE TO COURSE OF STUDY

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Abstract

The article examines the materials of the study of the impact of 30-hour physical education classes on the indicators of the functional status of students – future teachers – and the reasons for their decline by the end of the academic year and during the transition from one course to the next course of study.

Keywords: *students, pedagogical direction, intellectual activity, functional state, sports, physical education, indicators*

Introduction

The actual level of manifestation of the indicators of the functional systems of the human body in specific conditions as a result of natural or directed physical training not only determines the quantitative and qualitative characteristics of motor activity, but also is the basic basis of physical and mental performance (E. B. Olkhovskaya, 2015, from 113–118; T. A. Sapegina, E. B. Olkhovskaya, 2011, from 57–63; A. O. Egorychev, 2020, from 72–89; I. A. Kovacheva, 2002. from 166–175). According to the data of the listed authors, it is known that active systematic physical education or sports in the process of students' educational activities not only leads to the strengthening of their health and the development of physical qualities, but also improves the functional mechanisms of movement control, contributes to an increase in the level of intellectual and mental and professionally applied physical performance.

The purpose of this study is to study the impact of 30-hour physical education classes on the functional indicators of students – future teachers – with the subsequent determination of the reasons for their weakening by the end of the academic year.

Materials and methods

In the studies, methods were used to study: heart rate (HR) using a finger pulse

oximeter, respiratory rate (RR), duration of breath retention on inhalation (Barbell test) and exhalation (Genchi test), physical performance by determining the Harvard Step Test Index (HSTI). The study involved students of 1–4 courses studying in the pedagogical areas of education of Andijan State University.

The result and discussion

The results of the study showed that before the start of physical education classes conducted with 1st year students in the amount of 30 hours, the heart rate was 71.6 ± 3.45 beats/min., and at the end of the completion of these classes it decreased to 67.3 ± 2.38 beats/min (Table 1).

Table 1. *Dynamics of changes in the indicators of the functional state of 1st year students during 30-hour classes held for 1 semester. – $\overline{X} \pm \sigma$*

Functional tests	Till classes start		After classes		Difference of indicators	
	M n=36	Ph n =36	M n=36	Ph n=36	M	B
HR (beats./min)	71.6 ± 3.45	73.2 ± 3.87	67.3 ± 2.38	68.8 ± 2.77	4.3	4.4
RR (time/min.)	14.5 ± 2.04	15.7 ± 2.28	13.2 ± 1.57	13.8 ± 1.83	1.3	2.5
Barbell test (s.)	31.6 ± 5.13	29.4 ± 4.75	35.7 ± 4.26	33.6 ± 4.06	4.1	4.2
Genchi test(s.)	26.2 ± 3.17	23.5 ± 3.04	29.7 ± 2.15	27.5 ± 2.09	3.5	4.0
HSTI	53.6 ± 4.15	51.2 ± 3.86	57.3 ± 3.22	55.6 ± 3.11	3.7	4.4

Note: *M – Mathematics; Ph – Physics; HSTI – The Harvard Step Test Index*

The RR indicators were 14.5 ± 2.04 and 13.2 ± 1.57 times/min. accordingly.

The duration of breath retention during inhalation (according to the Barbell test) before the start of classes was 31.6 ± 5.13 seconds, and after that it increased to 35.7 ± ± 4.26 seconds. The time of holding the breath on exhalation (according to the Genchi sample) was 26.2 ± 3.17 and 29.7± 2.15 seconds, respectively. Physical performance according to HSTI data before the start of the course of physical education classes was 53.6 ± 4.15, and subsequently it increased to 57.3 ± 3.22 conventional units. From the data presented, it can be seen that despite the small amount of hours allocated for physical education classes, the indicators of the cardiorespiratory sphere, including the hypoxic ability of the examined students (the body's resistance to O_2 deficiency), by the end of these classes were characterized by a certain improvement in the background activity of the corresponding functional systems, were characterized by a tendency of pronounced deterioration of their level not only by the end of the academic year, but also as you move from one course to another course of study. In particular, the heart rate of 1st-year students before the start of the academic year and scheduled 30-hour physical education classes was 65.5± ± 2.34 beats/min. and by the end of the school year, it had increased 67.2 ± 2.49 beats/min.

Table 2. *Dynamics of changes in functional indicators for students of 1–4 courses during the academic year. – $\overline{X} \pm \sigma$*

Functional tests	1 c n=32	2 c n=29	3 c n=30	4 c n=26	$\overline{X}$
HR (beats./min)	65.5 ± 2.34	66.3 ± 2.07	68.7 ± 1.86	69.2 ± 1.95	67.4
	67.2 ± 2.49	68.8 ± 2.15	69.6 ± 2.21	71.5 ± 2.37	69.3
RR (time/min.)	13.6 ± 1.53	13.9 ± 1.67	14.7 ± 1.72	15.6 ± 1.83	14.4
	13.8 ± 1.55	14.4 ± 1.72	14.9 ± 1.77	16.2 ± 2.06	14.9

Functional tests	1 c n=32	2 c n=29	3 c n=30	4 c n=26	$\overline{X}$
Barbell test (s.)	33.5 ± 4.73	32.9 ± 4.51	30.6 ± 3.85	29.2 ± 3.56	31.5
	31.2 ± 4.47	30.5 ± 4.16	29.3 ± 3.72	27.7 ± 3.22	29.8
Genchi test(s.)	27.7 ± 2.86	26.5 ± 2.79	25.8 ± 2.63	24.2 ± 2.55	26.1
	26.2 ± 2.59	25.3 ± 2.65	23.6 ± 2.27	23.2 ± 2.13	14.7
HSTI	57.6 ± 3.27	55.3 ± 3.07	54.7 ± 2.78	52.6 ± 2.35	55.0
	56.2 ± 3.03	53.8 ± 2.71	52.5 ± 2.47	5.17 ± 2.36	53.5

For 2nd year students, the heart rate before the start of the academic year was equal to 66.3 ± 2.07 beats/min., at the end of the year it increased to 68.8±2.15 beats/min. In the 3rd year, these indicators were 68.7±1.86 and 69.6 ± 2.21 beats/min, respectively. In the 4th year – 69.2 ± 1.95–71.5 ± 2.37 beats/min. The average heart rate for all courses before the start of the academic year was 67.4 beats per minute, and by the end of the academic year it had increased to 69.3 beats per minute. It becomes obvious that the heart rate indicators of the surveyed students increase not only at the end of the academic year, but also during the transition from one course to another course of study. Apparently, this result was obtained due to a consistent increase in the volume of intellectual activities and the restriction or termination of physical culture and sports exercises, resulting in a certain tension in the functional activity of the myocardium. This assumption is confirmed by other indicators of the functional state of the examined students. For example, the RR of 1st year students at the beginning of the academic year was 13.6 ± 1.55 times/min., at the end – 13.8 ± 1.55 times/min. In the 2nd year – respectively 13.9 ± 1.67–14.4 ± 1.72; in the 3rd year – 14.7 ± 1.72–14.9 ± 1.77; 4 the rate is 15.6 ± 1.83–16.2 ± 2.06 times/min.

The duration of breath retention on inspiration according to the data of the Barbell test in the 1st year at the beginning of the academic year was: 33.5 ± 4.73 sec., at the end – 31.2 ± ± 4.47 sec., in the 2nd year – 32.9 ± 4.51–30.5 ± ± 4.16; in the 3rd year – 30.6 ± 3.85–29.3 ± ± 3.72; in the 4th year – 29.2 ± 3.56–27.7 ± ± 3.22 sec.

The indicators of the duration of breath retention on exhalation according to the Gencha sample were, respectively: in the 1st year – 2.77 ± 2.86–26.2 ± 2.59; in the 2nd year – 26.5 ± 2.79–25.3 ± 2.65; in the 3rd year – 25.8±2.63–23.6±2.27; in the 4th year – 24.2 ± 2.55–23.2 ± 2.13 sec.

HSTI, according to which physical performance was assessed, for 1st year students at the beginning of the academic year was 57.6 ± ± 3.27, and at the end – 55.3 ± 3.03, in the 2nd year – respectively –55.3 ± 3.07–53.8 ± 2.71, in the 3rd year – 54.7 ± 2.78–52.52.47, in the 4th year – 52.6 ± 2.35–51.7 ± 2.36. The average value of HSTI at the beginning of the academic year was 55.0, and at the end it decreased to 53.5 conventional units, which means a decrease in physical performance among the surveyed students to a level below the "unsatisfactory" standard. It can be seen that HSTI not only increases by the end of the academic year, but also decreases from course to course of study.

The dynamics of the manifestation of the studied functional data in future teachers – teachers presented above suggests that the reasons for their pronounced deterioration by the end of the academic year and from course to course of study are, on the one hand, an increase in the volume of intellectual and creative loads, and on the other hand, restriction or termination of physical exercises or sports.

To determine the validity of this version, we conducted studies aimed at studying the relevant parameters of the functional state of the body on the example of students engaged in certain sports (Table 3).

The table shows that the heart rate of students – future teachers engaged in volleyball is 62.4 ± 2.12 beats/min. For "football players" students –63.5 ± 2.17 beats/min., and for students involved in mini-football – 64.4 ± 2.25 beats/min., while for students not involved in sports, it was equal to

68.4 beats/min. RR respectively amounted to: 12.4 ± 1.06; 11.7 ± 1.13; 10.9 ± 1.05 times/min, where their average value was 11.6 times/min. At the same time, students who are not involved in sports had a BH of 14.6 times/min.

The duration of breath retention during inhalation according to the Barbell test for "volleyball players" was 49.5 ± 4.15 seconds, for "football players" – 51.7 ± 4.19 seconds, for "mini-football players" it was 53.3 ± 4.24 seconds, the average value was 51.3 seconds. And for students not involved in sports, it was 30.6 seconds. The duration of breath retention on exhalation according to the Gencha sample was respectively: 34.3 ± ± 3.0; 36.7 ± 3.16; 38.5 ± 3.21 sec. and for students not involved in sports, this value was 25.4 seconds.

Indicators of physical performance according to IGST data were: for "volleyball players" – 67.5 ± 3.63, for "football players" – 69.7 ± 3.72, for "mini-football players" – 72.3 ± 3.81, where the average value for students involved in sports was 69.8, and for non-athletes – 54.2.

These data allow us to state the fact that students who do not engage in sports, all the studied indicators of the functional state of the body lag significantly behind similar indicators recorded in students engaged in sports.

Conclusions

Based on the analysis of the results of this study, it can be summarized that the students – future teachers who are not engaged in physical exercises or sports, the studied indicators of functional state were extremely low and improved to a certain extent under the influence of 30-hour planned physical education classes conducted with 1st year students in the first semester. At the same time, subsequent studies have shown that almost all functional indicators were characterized by a further decrease in their level by the end of the academic year and during the transition from one course to the next course of study. And for students who systematically engage in sports, the same indicators turned out to be relatively higher and were almost close to the values characteristic of athletes of mass categories. It should also be emphasized that it is important to continue research to study the degree of assimilation of knowledge in all academic disciplines provided for in the curriculum for training courses.

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