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Comparative analysis of the health status of students of II and IV courses during their studies at universities

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Purpose: *to study the health status of students during their studies at universities.*

Material & Methods: *141 students of the Faculty of Economics (age 18–23 years) of a technical university took part in the study. The survey was carried out on each year of study from 1 to 5 courses using methods: study management problems; traditional methods; a complex of pedagogical, sociological, psychological, psychophysiological and medical-functional methods; methods of mathematical statistics.*

Results*: research materials revealed factors negatively affecting the health status of students. A comparative analysis of the results of the study of students of II and IV courses revealed a deterioration in the health status of students in 4 year.*

Conclusions: *the abolition of physical education classes for fourth-year students, a high level of neuro-emotional tension during the session, a significant decrease in physical activity and other stress factors negatively affect the health status of students and require the restoration of physical education classes in senior courses.*

Keywords: *state of health, physical education, training, fatigue, working capacity.*

Introduction

According to WHO experts, in Ukraine, mortality due to cardiovascular diseases of individuals is about 420–430 thousand people per year [4]. As the leading cardiac surgeon of Ukraine, director of the National Institute of Cardiovascular Surgery named after N. M. Amosov, academician of the NAMSU Professor Vasily Lazorishinets, a similar situation was in the USA in 1980. Thanks to the developed program, over 20 years, mortality due to cardiovascular diseases decreased from 44% to 29%. Such indicators are today civilized countries of the world. In Ukraine, every year there is an increase in the number of people with these diseases [11]. But most often they die due to coronary heart disease. In different countries, despite the development of civilization, this reason is observed in 50% of cases [5].

Cardiovascular mortality rates in Ukraine are among the highest in the world. For two years, the country loses the population equal to the population of such cities as Lviv or Dnipro. Most often, young people of working age die. Under such conditions, the problem of prevention of cardiovascular diseases becomes relevant. The factors of the development of cardiovascular diseases are, first of all, the state of ecology, lifestyle, unhealthy diet, sedentary lifestyle, bad habits.

Particular attention must be paid to students. The development of our country and the future of our society depend on the level of his health, intellectual abilities and professional skills.

However, in recent years there has been an increase in the number of students with a disease of the cardiovascular system (CVS) [1–3; 10]. Therefore, one of the most important components of the quality of life in a technogenic environment is the optimization of tools that improve mental activity and preserve the health of the student. It is necessary to introduce new health-saving technologies in the process of their study and rest in order to continue creative longevity and the prevention of diseases, especially blood circulation organs.

In such conditions, the use of sports and recreational activities positively affects the working capacity and human health [9]. But their use without individual and reasonable data may not give the planned result. Therefore, the urgent problem is the study of changes that occur in the state of health and activity of the circulatory system, central nervous system (CNS) and higher mental functions during the educational process (examination session). You should also determine the attitude of students to the use of innovative technologies associated with means of physical culture, recreation and health-improving education. This will help to develop and effectively implement physical culture, recreational and other health-saving technologies in the life of students.

Purpose of the study: to study the health status of students of II and IV courses during the period of study at the university.

Objectives of the study:

1. To identify factors affecting the health status of students of II and IV courses and their attitude to physical-recreational and health-improving measures during the period of study at the university.

2. Conduct a comparative analysis of the health of students of II and IV courses and establish how their state of health changes in the process of studying at a university.

Material and Methods of the research

Over the course of 5 years, 141 students of the Faculty of

Economics (aged 18–23 years) of a technical university became under supervision. After each year of study, from 1 to 5 courses, they were examined using: methods for studying the management problem (general scientific methods of cognition, methods of working hypotheses and expert assessments); traditional methods (theoretical analysis and synthesis of literary evidence, registration of diseases and state of health, medical examination and analysis of diseases); a complex of pedagogical, psychological, psychophysiological, sociological and medical methods; methods of mathematical statistics.

In 10918 students aged 18 to 23 years, a disease analysis was carried out. Also, for two years, students in the main medical group II (25 people) and IV (23 people) of the courses of the Faculty of Economics measured in the process and in the near recovery period after the exam (30–50 min) indicators that characterize the activity of the central nervous system (CNS)), circulatory organs and higher mental functions. At the same time, according to a specially developed questionnaire, a survey was conducted, stress factors affecting the students' body turned out to be studied, working capacity and subjective assessment of the condition, their attitude to the use of physical-recreational and recreational and preventive measures during the period of study at the university were studied.

A comparative analysis of the state of health and indicators characterizing the functional state and factors affecting the body of students was carried out according to the results of surveys of students of II and IV courses.

Results of the research

The analysis of certificates on the condition of the subjects revealed the largest number of students with respiratory diseases, students of II and IV courses also indicated (75 and 88%, respectively). Further, taking into account the number of students and nosological units, there were diseases of the gastrointestinal tract, circulatory organs, vision, and the genitourinary system.

Analysis of the medical examination of students of the II and IV courses determined that in the IV year the number of persons assigned to the main medical group decreased 1,47 times, and in the preparatory course it increased 1,75 times compared with the results of their medical examination conducted in II course (Table 1).

The decrease in the number of students in a special medical group and exempted from classes due to health reasons is explained by the fact that students with certain deviations in health status are enrolled in the specified faculty. Some of them were exempted from classes due to health reasons, while others, taking into account their state of health, switched to extramural studies, provided academic and maternity leave, and were expelled from the university.

Table 1

Results of a medical examination of students of the Faculty of Economics, %

Course	Groups			Released from lesson for health reasons
	Basic	Preparatory	Special	
II	19,51	31,71	47,16	1,63
IV	14,29	55,36	30,36	0

A previous analysis of the diseases of 10918 students found that ten years ago the students' health was much better and there were significantly fewer students with circulatory diseases (previously it was in the sixth, now in fourth place in the overall structure of the diseases). In recent years, their number in the main medical group decreased by 33%, in the preparatory and special - increased by 37% and 50%, respectively [10].

Under such conditions, there is a need to establish what health-saving technologies students use to restore their condition. Numerous studies have proved the feasibility of using various types of physical exercises during and after mental exertion. But in the second year, 19% of them are independently engaged in physical education and sports in their free time, and 50% preferred taking vitamins. In the fourth year, 25% and 50% of students, respectively. Most students do not know what health-saving technologies are, therefore, the need to train students in these technologies in physical education classes is being updated.

At the same time, physical education classes were held twice a week with second-year students, and fourth-year students did not have such classes, and this was during that period of life when the health status of students was being intensively formed. Significantly reduced the amount of physical activity is an important factor in the deterioration of physical qualities and health. Most likely, this is one of the main factors in reducing their numbers in the main medical group, as evidenced by the data of self-medication (Table 2).

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A significant negative impact of stress factors, which acts on the central nervous system and the circulatory system of students, has a high level of mental stress during the session (Table 2). They exceed the capabilities of the body, noted the majority of respondents II and IV courses (82 and 69%). In such conditions, it becomes necessary to study the functional state of the nervous system and the higher mental functions of students.

One of the indicators that characterizes the activity of the central nervous system is the auditory-motor reaction. The measurement during the session showed that after passing the exam the time of a simple auditory-motor reaction decreases in students of the II and IV courses by 21,9% ($p<0,01$) and 22,8% ($p<0.01$), respectively. To some extent, this may indicate a high level of excitement, which worsens well-being from 5,6±0,26 to 4,6±0,41 points (17,9%; $p<0,05$) and from 5,2±0,38 to 4,1±0,29 points (21,2%; $p<0,05$) and increases the level of fatigue, noted students of II and IV courses (81 and 93%, respectively). This situation significantly increases the

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Table 2
Factors affecting student health, %

Courses	Health care	Rest: active / passive	Doing exercise and sports / taking vitamins	Self-medication	Mental stress during the session
II	69	13/50	19/50	38	82
IV	94	6/38	25/50	79	69

number of errors when performing the Malkov test by 35,7% ($p<0,005$) and 37,9% ($p<0,01$), and in the majority of the subjects (60% and 65%) it worsens concentration and switching of attention.

Given the increase in recent years in the number of students with diseases of the circulatory system and the fact that these diseases are most often found in people with mental labor, we studied the performance indicators of students' CVS. The results obtained made it possible to determine the level of neuro-emotional tension (NET), fatigue and performance during the semester and session. It should be noted that in the near recovery period after the exam, an increase in heart rate (HR) in respondents of the II and IV courses from 76,0±1,8 to 95,0±2,1 beats per minutes (25,0%; $p<0,001$) and 78,0±2,1 to 93,0±2,5 beats in minutes (19,2%; $p<0,01$), respectively. There was also an increase in diastolic blood pressure (DBP) from 68,2±2,5 to 74,3±1,9 (8,8%; $p<0.05$) and 67,5±2,7 to 77,3±1,8 (13,2%; $p<0.05$) mmHg. At the same time, systolic blood pressure was increased respectively in 50% and 53% of students of II and IV courses. It is necessary to indicate a significant increase in both systolic and diastolic blood pressure before exams. In some students, systolic blood pressure increased to 170–180 mmHg, and HR – to 120–150 beats per minutes [2; 10].

The above may indicate that some students begin to develop a disease associated with a violation of the autonomic regulation of CVS. This requires planning in the educational process, training and the use of new physical education, recreational and health-improving technologies in physical education classes.

An increase in heart rate, blood pressure and a change in reaction time indicates an increased level of the excitation process, to a certain extent, indicates an increase in nervous tension and the degree of fatigue. This negatively affects performance. This situation, formed during the session, is not restored during the semester and is felt even after classes by respondents 19 and 50% of the courses indicated (Table 3). As can be seen, a significant increase in the number of students with an increased level of fatigue, lethargy and drowsiness during the session and reduced working capacity on weekdays was revealed in the fourth year. This negatively affects the body and, possibly, is one of the factors of the disease.

It should be noted that students of II and IV courses, respectively 56 and 25%, seeking to better prepare for exams and tests, sleep during the session from 3 to 5:00 a day. Therefore, 44% of them experience lethargy and drowsiness during the semester (Table 3). In some students, nervous tension affects the effectiveness of sleep and manifests itself in its disorder. For excellent health and effective transfer of information from operational to long-term memory, you need to sleep 8:00 a day.

It is necessary to indicate one of the main stress factors that affects the health status of students – a balanced diet. Along with unbalanced, inadequate, poor-quality nutrition, they eat 1–2 times a day, morning and evening (Table 3).

As can be seen from the table. 3, in the fourth year, the largest number of students are worried about health, are independently engaged in physical education and sports, eat rationally, spend more time for sleep and feel much less mental stress during the session, but reluctance to engage in physical education and negative stress factors on I, II and III courses significantly affect the body and lead to poor health, and students (63% and 83%) noted in their profiles (Table 3).

Currently, in some universities, I–IV courses plan and conduct physical education classes at 2:00 a week. Both domestic and foreign scientists have proved that the best healing effect is achieved during classes at least three times a week [6–8]. Such classes will positively affect the body if students will independently engage in physical exercises twice a week. As mentioned above, only 19% and 25% of students independently engage in physical education and sports in II and IV courses. The use of various types of physical exercises in the classroom once a week does not give a healing effect [7–9].

Conclusions / Discussion

The abolition of physical education classes for fourth-year students, the high level of nervous and emotional tension during the session, the non-use of physical culture and recreational activities negatively affect the health status of students and needs to be restored to physical education classes for senior students.

A high level of neuro-emotional stress during the examination leads to a significant acceleration of the pulse rate and an in-

Table 3
Factors affecting student health, %

Courses	SH deterioration	Meals 1–2 times (session – weekdays – weekends)	Meals 1–2 times (session-weekdays-weekends)	Lethargy and drowsiness (weekdays / session)	Fatigue and performance
II	63	82 – 75 – 44	56	44 / 0	19
IV	83	32 – 32 – 13	25	44 / 19	50

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crease in blood pressure, negatively affects the activity of the circulatory system.

The study provides an opportunity to recommend such measures:

• to educate students the desire to consciously maintain their health and, above all, to plan and independently engage in physical education;

• schedule more time for physical education classes;

• plan in the educational process and train students in physical education classes in various physical-recreational and health-improving technologies for their independent use.

Prospects for further research will be based on the study of the impact of various types of physical exercises on the body and the health status of students in the process of self-study.

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