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NAS RK is pleased to announce that Bulletin of NAS RK scientific journal has been accepted for indexing in the Emerging Sources Citation Index, a new edition of Web of Science. Content in this index is under consideration by Clarivate Analytics to be accepted in the Science Citation Index Expanded, the Social Sciences Citation Index, and the Arts & Humanities Citation Index. The quality and depth of content Web of Science offers to researchers, authors, publishers, and institutions sets it apart from other research databases. The inclusion of Bulletin of NAS RK in the Emerging Sources Citation Index demonstrates our dedication to providing the most relevant and influential multidiscipline content to our community.

Қазақстан Республикасы Ұлттық ғылым академиясы "ҚР ҰҒА Хабаршысы" ғылыми журналының Web of Science-тің жаңаланған нұсқасы Emerging Sources Citation Index-те индекстелуге қабылданғанын хабарлайды. Бұл индекстелу барысында Clarivate Analytics компаниясы журналды одан әрі the Science Citation Index Expanded, the Social Sciences Citation Index және the Arts & Humanities Citation Index-ке қабылдау мәселесін қарастыруда. Web of Science зерттеушілер, авторлар, баспашылар мен мекемелерге контент тереңдігі мен сапасын ұсынады. ҚР ҰҒА Хабаршысының Emerging Sources Citation Index-ке енуі біздің қоғамдастық үшін ең өзекті және беделді мультидисциплинарлы контентке адалдығымызды білдіреді.

НАН РК сообщает, что научный журнал «Вестник НАН РК» был принят для индексирования в Emerging Sources Citation Index, обновленной версии Web of Science. Содержание в этом индексировании находится в стадии рассмотрения компанией Clarivate Analytics для дальнейшего принятия журнала в the Science Citation Index Expanded, the Social Sciences Citation Index и the Arts & Humanities Citation Index. Web of Science предлагает качество и глубину контента для исследователей, авторов, издателей и учреждений. Включение Вестника НАН РК в Emerging Sources Citation Index демонстрирует нашу приверженность к наиболее актуальному и влиятельному мультидисциплинарному контенту для нашего сообщества.

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STUDY OF FUNCTIONAL STATE OF THE STUDENTS

Abstract. The aim of the work is to study and identify the features of the immune hormone status, functional and psychoemotional state of students and to search for possible ways of correcting the caused disorders. The article analyzes the tasks of the state in the sphere of education and physical education of students and students.

The solution of this problem is associated with the formation of a culture of health in all subjects of the educational process. Health is considered as a goal and condition of quality education – the basis of self-actualization, achievement of life success and as a criterion for the activity of an educational institution.

The result of the work was the identification of environmental and production factors that have a damaging effect on the body. Measures have been developed to eliminate adverse factors and their impact on students and ways to enhance the health of student youth.

Stress is a leading factor in the pathogenesis of most somato-visceral disorders, leading to the appearance of pathology of the endocrine system. In case of violations of the endocrine system, metabolism is disturbed and leads to a number of diseases, such as anemia, diabetes, etc. Anemia ranks first in the structure of morbidity in Kazakhstan. With anemia, there are violations of the antioxidant status, and oxidative stress develops, leading to the destruction of erythrocyte membranes, which causes a violation of the main function of erythrocytes - the delivery of oxygen to the tissues of the body.

Keywords: immune-hormonal status, functional and psycho-emotional state of students, the formation of a culture of health, stress, anemia.

Actuality. In the course of the research obtained new scientific information that will allow you to develop, test and implement the University's comprehensive assessment and monitoring of student's health. To increase the overall resistance of the organism conducted research to assess the level of health of students.

It is established that the students of the 1st course prone to maladjustment and socially affected by negative factors of social life, which affects the structural-functional state of erythrocyte membranes. The low stability of erythrocyte membranes and increase the membrane permeability of erythrocytes, increase of hemolysis and a low catalase activity in comparison with students of the 4th course.

The problem of health protection of student's youth is one of the most pressing challenges facing society and the state, because students are one of the representative groups of young people of the country. Students are the most dynamic social group in the period of formation of social and physiological maturity, which quickly adapts to the social and natural environment, and yet are at high risk of violations in health [1].

Specific conditions learning activities, everyday life and lifestyles students distinguish them from other categories of the population and makes this group vulnerable socially, affected by negative factors (high information load, emotional stress in the process of educational activity, lack of exercise, feeding disorders, etc.). These factors contribute to the development of disadaptation, exacerbation of latent pathological processes that adversely affected the health of students. In order to determine the individual mechanisms of adaptation to educational process in the University requires regular comprehensive study of psychological, psycho-physiological health and functional status of students [2].

The problem of prevention of major socially significant diseases, formation of healthy lifestyle among the population is among priority tasks of society and state. The importance is given to health programmes related to the improvement of the external conditions of human life. We are talking about the totality of the factors forming the environment and development of the individual and society: natural, social, climatic, emotional, etc. Without solving the given issues is essential to the effective formation of healthy lifestyle of young generation [3].

Human health by 50% or more defined by the lifestyle that the man chooses in accordance with his individual psycho-physiological features, with their beliefs, habits. Health and behavioral habits that impact on it, are formed mainly in childhood and adolescence. In a situation when it is known that many factors affecting health that are managed by the individual, the role of the formation of students skills and habits of healthy lifestyle (HLS). Therefore, the success in ensuring the health, safety of life for all can only be achieved by creating a system of national, interagency prevention activities among the younger generation, primarily through a system of effective hygienic training and education of youth [4, 5].

One of the main tasks of the state in education is comprehensive health and physical education and development of students. The solution of this problem is due to the formation of culture of health of all subjects of the educational process. The health is treated as a target and a condition of quality teaching is the basis of self-actualization, to achieve success in life and as a criterion of activity of educational institution [6].

Analysis of the literature indicates the presence of a significant amount of research devoted mainly to the study of the health status of students and determination of its social factors, learning environment, medical care. Virtually no large-scale prospective studies on the organization and the creation of new structures in educational institutions of different levels on the formation and preservation of the health of students; not described social programs aimed at the preservation and formation of health of students at all levels of government, are not taken into account their effectiveness and the prospect [7, 8].

In the last decade, environmental and production factors and stress, often have a damaging effect on the body. Stress is a leading factor in the pathogenesis of the majority of SOMATO-visceral disorders, leading to the appearance of the pathology of the endocrine system. In disorders of the endocrine system, the metabolism and leads to a number of diseases, such as anemia, diabetes, etc. Anemia occupies the first place in structure of morbidity in Kazakhstan. With anemia, disturbances of antioxidant status and oxidative stress has developed and lead to the destruction of erythrocyte membranes, which breaks the main function of erythrocytes is to deliver oxygen to the tissues of the body. In this regard, it is relevant to study the peculiarities of immune and hormonal status, functional and emotional state of students and search possible ways of correction caused by violations [9,10].

The solution of these tasks is consistent with the priorities of the state program of development of health of Kazakhstan "Salamatty Kazakhstan" for 2011-2015, where one of the main tasks set preservation and strengthening of health of the younger generation.

Materials and methods studies. The object of research was the students of first and fourth year. The studies were conducted at the beginning and end of the semester. The state of psycho-emotional status of students. Conducted study of structural-functional state of erythrocyte membranes to increase the overall resistance of the organism of students.

Research methods. Within the framework of the project, certified computer programs of the psychological toolkit Imaton and tests for the adequacy of the behavior and mental state of the examinee were used to reveal the level of psycho-emotional state of students.

To reveal the level of psycho-emotional state, the widely known test of Lusher was used. This technique uses the phenomenon of color preferences for the diagnosis of neuropsychic states and the identification of intrapersonal conflicts. The principle of the Lusher test is based on the fact that the choice of color occurs on an unconscious level, and therefore it is good to display the true state of a person.

A study and assessment of the levels of general, personal and situational anxiety was carried out according to the Spielberger test. This technique allows you to differentially measure anxiety and as a personal property, and as a condition.

To determine the level of the psychophysiological state, express diagnostics of the functional state of the central nervous system (CNS) of a person and the prediction of its operability were used on the basis of chronoreflexometry indices – the dynamic characteristics of the time of a simple visual-motor reaction (PZMR).

The technique is implemented in the form of a computer program and requires no more than 5 minutes for conducting and can be performed repeatedly, since it does not cause the effect of training.

Osmotic resistance of erythrocytes was determined by the degree of hemolysis in solutions of various NaCl concentrations (0.35 to 0.9 g/100ml) under the regime of incubation of 20 min at 37°C. The level of hemolysis of cells was calculated in percentage relative to 100% hemolysis caused by the 0.1 g/100ml solution of Na₂CO₃.

The permeability of erythrocyte membranes (PEM) for anions was determined by the method (Kolmakov, V. N., Radchenko V. G.) the value of the permeability of erythrocyte membranes (PEM) in the diagnosis of chronic liver diseases.

The catalase activity of erythrocyte membranes was determined by the method (Korolyuk M. A., Ivanova L. I., Mayorova I. G., Tokarev V. E.).

In the process of implementation of the Project adhered to the principles of humanity set out in European community directives (86-609-EEC) and the Helsinki Declaration, in accordance with the "Rules of the work on the people." Adherence to the principles of research ethics provided by the scientific head of the Project on the basis of statements prohibiting the fabrication of scientific data, falsification, plagiarism, false joint authorship.

Research results and discussion. We studied the psycho-emotional and functional state (biochemistry of the blood) of 40 students of both sexes (average age 18.5 years) of the 1st and 4th courses of the natural-technical faculty, specializing in natural disciplines of the Zhetysu State University. I. Zhansugurova.

Analysis of the statistical characteristics of the time series variational series allowed to calculate the criteria that assess the different aspects of the functional state of the central nervous system of students on average.

The results of the study showed that the average group indices of a simple visual-motor reaction of the subjects showed a level characterizing "slightly reduced" performance.

The students were also divided into 2 groups depending on the course of study. 1 group – 4 year students (20 people). In the 2nd group (20 people), the students of the initial course were allocated.

With an individual analysis of the results, a comparison of the obtained data made it possible to distinguish 3 types of state, each of which corresponds to its level of operability.

100% of the students of group 1 (4th year students) had a normal level of working capacity (normal level of working capacity), in this state the norm is characterized by the equilibrium of the nervous processes of the central nervous system and corresponds to a good state of health, mood. The efficiency in this state is optimal (figure 1).

When differentiating anxiety (highlighting the level of personal and situational anxiety) revealed the following features of the structure of anxiety of students. In general, for students of the 4th course (graduate course), a lower level of situational anxiety was characteristic (high level – in 20%, moderate – in 35%, low – in 45%). Also, on average, 25% of the students surveyed had a high level of personal anxiety, 35% of students had an average with a tendency to a high level, 40% of the students showed results corresponding to a low level of anxiety.

The tendency to a high level of personal anxiety can be explained by the constant neuropsychic overstrain of students. Probably, a high level of personal anxiety in 20% of students was probably associated with the upcoming state certification exams.

It is known that anxiety is both a personality trait and a condition. To assess the level of anxiety of 1st year students, a comparative analysis was carried out and the average group index of the level of situational and personal anxiety was calculated. When analyzing the results of the level of anxiety, the total score for each of the subscales was in the range of 35 to 75 points.

The diagnostics performed by us when studying the level of general anxiety of students showed the following results. On the average, 62% of the first year students have a high level in the group, 23% of the students have an average level of general anxiety, 15% of the students showed results corresponding to a low level of anxiety. Practice shows that high-anxiety students, who aspired to achieve a high result (high need for achievement), activities were usually violated, and they showed worse results due to additional and debilitating stress in the learning process.

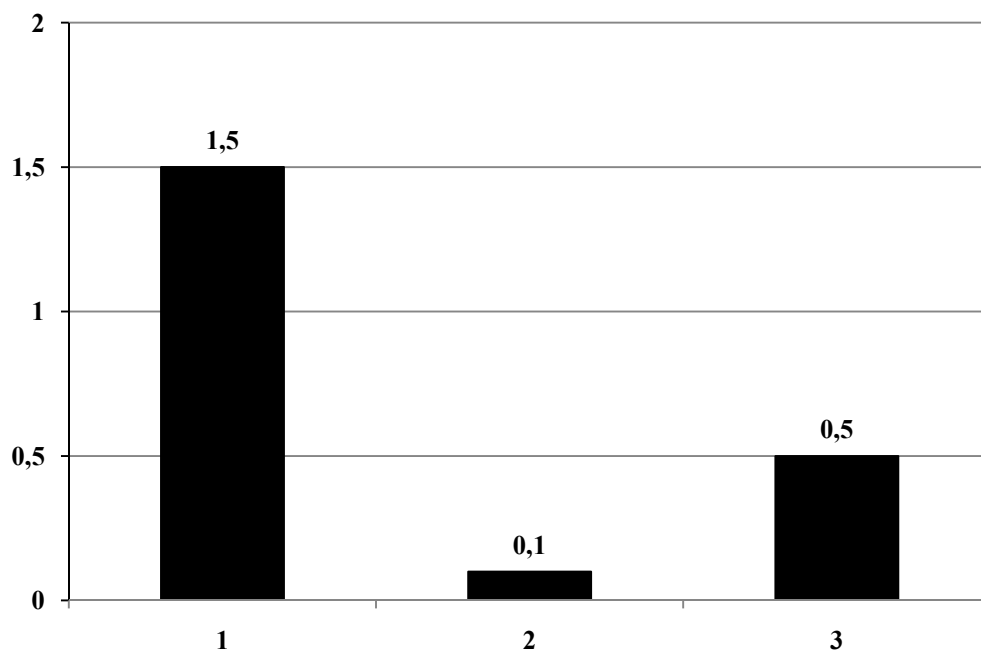


Figure 1 – The level of efficiency of students 1 and 4 courses:
1 – normal level of health; 2 – reduced level of efficiency; 3 – slightly reduced level of efficiency

Next, we evaluated the indices of students' neuropsychic activity. Changes in the indicators of the actual psychophysiological state of the students were recorded with the help of the Luscher test. To assess the current psychophysiological state of the athletes, the total deviation (CO) and the vegetative coefficient (VC) were analyzed. On average, the group had insignificant differences in the severity of the neuropsychic stress among students. According to the results of the study, it was noted that the index of the total deviation from the autologous norm (CO), reflecting the level of unproductive neuropsychic tension in group 1 (4 courses) corresponded to the average level.

It is characteristic of the surveyed group to cope with their duties within the average established requirements. In the usual situation, they can move from the training load to rest and back, from one activity to another without significant difficulties. If necessary, they can overcome fatigue by strong-willed effort, but after that, in his state of health, a long "train" of reduced efficiency is visible.

In group 2 (1 course of students), the level of tension corresponded to an insignificant level of unproductive neuropsychic tension. The survey was dominated by the installation for active activity. Energy resources are sufficient for more or less regular outbursts of overactivity and strain that are inaccessible to most other people. In conditions of motivated (interesting) activity, they do not experience difficulties with prompt and long-term memorization and reproduction of information. To the thrill, in general, do not seek. From stressful situations come with dignity.

Investigated osmotic resistance of biological membranes students of group 1 (4th year). Hemolysis of erythrocytes is enhanced by decreasing the osmolarity of the incubation medium, reaching a maximum value of 0.35 g/100 ml NaCl – 78,6%. Indicators of osmotic resistance in the group of students of 1 course revealed a slight decrease in osmotic resistance of erythrocytes to hemolysis. So, in the incubation medium 0.35 and 0.45 g/100 ml NaCl the magnitude of the output of hemoglobin increased by 3.8 % and 7.2 %, respectively, compared to the performance of students of 4th course. A significant reduction in the osmotic resistance was observed in 0.4 g/100 ml NaCl, where hemolysis was increased by 14.3% in the group of students of 1 course relative to the students of 4th course.

Next, we investigated the permeability of erythrocyte membranes of the students of the 4th course. It is revealed that membrane permeability is enhanced by placing the cells in solutions of urea and saline with the ratio of 60/40 and 65/35, reaching its maximum value: 75,8% and 86,4 %, respectively.

The permeability of erythrocyte membranes students of the 1st course has been significantly improved in almost all the concentrations of the incubation media (figure 2).

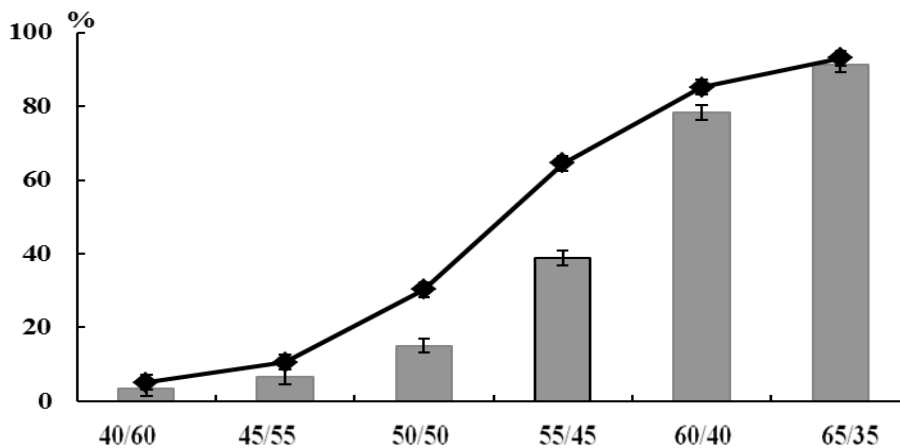


Figure 2 – Changes in the permeability of erythrocyte membranes students:
y-axis – magnitude of hemolysis, %; x-axis – the ratio of urea/saline, %

Incubation of cells in media with the ratio of urea and NaCl 45/55 and 50/50, the release of hemoglobin from erythrocytes increased by 3.4 % and 15.2 %, reaching the maximum increase in solution concentration of urea and 55 % (ratio of urea and NaCl 55/45) 25.6% relative to the values of the hemolysis of the students of 4th course. Further increase of urea (ratio urea and NaCl 60/40 and 65/35) leads to some increase in PAM, but the hemolysis of erythrocytes is 6.9% and 2 % lower than that in the group of students of 4th course.

Catalase activity was estimated by the number of destroyed hydrogen peroxide in the solution and expressed in percent.

The activity of the enzyme catalase in erythrocyte membranes of students of 1 course is lowered by 8.6 % in comparison with students of the 4th course (figure 3).

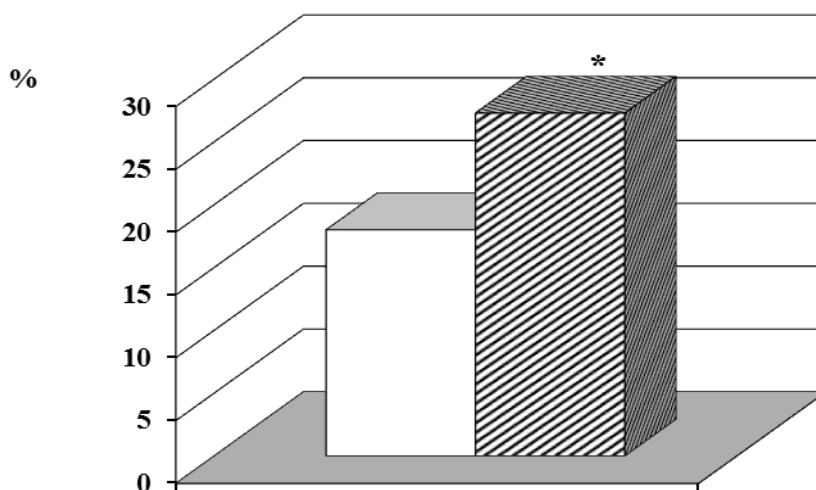


Figure 3 – The catalase activity of students of 1,4-courses:
y-axis – amount of catalase activity, %; x-axis – groups of students* p<0.05

Thus, the students of 1 course there is a low stability of erythrocyte membranes and increase the membrane permeability of erythrocytes, increase of hemolysis and a low catalase activity in comparison with students of the 4th course.

On the basis of conducted research we can draw the following conclusions: students of the 1st course prone to maladjustment and socially affected by negative factors of social life, which affects the structural-

functional state of erythrocyte membranes. The low stability of erythrocyte membranes and increase the membrane permeability of erythrocytes, increase of hemolysis and a low catalase activity in comparison with students of the 4th course.

The decrease in the level of resistance of the organism should be considered as a factor contributing to the development of hypokinesias States. The students in the context of modern technologies, it is necessary to carry out activities non-pharmacological nature, contributing to the restoration and normalization of the adaptive capacity of the organism.

The obtained results can be used in the field of psychophysiology, valeology teachers Colleges and Universities, school psychologists and medical workers of educational institutions.

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СТУДЕНТТЕРДІҢ ФУНКЦИОНАЛДЫҚ ЖАҒДАЙЫН ЗЕРТТЕУ

Аннотация. Жұмыстың мақсаты – студенттердің иммундық гормондық статусын, функционалды және психоэмоциялық жағдайының ерекшеліктерін зерттеу, анықтау және туындаған бұзылуларды түзетудің ықтимал жолдарын іздестіру. Мақалада студенттердің дене тәрбиесі мен білім беру саласындағы мемлекеттің міндеттері талданады.

Бұл мәселені шешу білім беру процесінің барлық субъектілерінде денсаулық мәдениетін қалыптастырумен байланысты. Денсаулық сақтау сапалы білімнің мақсаты мен шарты болып табылады – өзін-өзі жетілдірудің негізі, өмірлік табысқа қол жеткізу және білім беру мекемесінің қызметіне критерий ретінде.

Жұмыстың нәтижесі денеге зиянды әсер ететін экологиялық және өндірістік факторларды анықтау болады. Жағымсыз факторларды және олардың оқушыларға әсері мен студенттік жастардың денсаулығын жақсарту жолдарын жою бойынша шаралар әзірленді.

Стресс – эндокриндік жүйенің патологиясының пайда болуына әкелетін көптеген сомато-висцеральды бұзылулардың патогенезінде жетекші фактор. Эндокриндік жүйені бұзған кезде метаболизм бұзылып, анемия, қант диабеті сияқты көптеген ауруларға алып келеді. Қазақстандағы аурудың құрылымында анемия бірінші орын алады. Анемиямен антиоксидант жағдайының бұзылуы байқалады, эритроциттердің негізгі функциясын бұзу – органның ұлпаларына оттегін жеткізу – эритроциттердің қабынуын жоюға әкелетін тотығу стрессі дамиды.

Түйін сөздер: иммундық-гормондық мәртебесі, студенттердің функционалды және психо-эмоционалды жағдайы, денсаулық мәдениетін қалыптастыру, стресстер, анемия.

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ИССЛЕДОВАНИЕ ФУНКЦИОНАЛЬНОГО СОСТОЯНИЯ СТУДЕНТОВ

Аннотация. Цель работы – изучение и выявление особенностей иммунно-гормонального статуса, функционального и психоэмоционального состояния студентов и поиск возможных путей коррекции вызванных нарушений. В статье проанализированы задачи государства в сфере образования и физическом воспитании учащихся и студентов.

Решение этой задачи связано с формированием культуры здоровья у всех субъектов образовательного процесса. Здоровье при этом рассматривается как цель и условие качественного обучения – основа самоактуализации, достижения жизненного успеха и как критерий деятельности образовательного учреждения.

Результатом работы стало определение экологических и производственных факторов оказывающих повреждающее действие на организм. Разработаны мероприятия по устранению неблагоприятных факторов и их влияние на учащихся и пути укрепления здоровья студенческой молодежи.

Стресс является ведущим фактором патогенеза большинства сомато-висцеральных расстройств, приводящих к появлению патологии эндокринной системы. При нарушениях эндокринной системы нарушается обмен веществ и приводит к ряду заболеваний, таких как анемия, диабет и др. Анемия занимает первое место в структуре заболеваемости в Казахстане. При анемии возникают нарушения антиоксидантного статуса, и развивается окислительный стресс, приводящий к деструкции мембран эритроцитов, что вызывает нарушение основной функции эритроцитов – доставки кислорода к тканям организма.

Ключевые слова: иммунно-гормональный статус, функциональное и психоэмоциональное состояние студентов, формирование культуры здоровья, стресс, анемия.

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