

HYGIENIC CHARACTERISTICS OF SOME ASPECTS OF STUDENTS' PSYCHOLOGICAL HEALTH


Kopylov AS 

Burdenko Voronezh State Medical University, Voronezh, Russia

Recently, the problem of psychological status of students, including university students, and its influence on the health of the individual has become very relevant. The applicants entering higher education institutions of our county face an especially difficult period. They have to deal with a lot of exams affecting their future destiny, the complicated process of adaptation to the new training conditions existing in the educational institutions, as well as with the completely unfamiliar team of teachers and students. The study was aimed to perform comparative analysis of psychological health of the students attending the medical university and to determine the indicators most strongly affecting the students' quality of life and body's condition. A total of 1050 first-year, third-year, and sixth-year students of the medical university were enrolled. Each subject was offered to voluntarily pass three different tests to determine his/her psychological status. The scores of functional reserve of the CNS below 50% were reported for more than one third of students of the pediatric faculty (39%). In students of the faculty of pediatrics, the decreased performance was observed in 51% of cases, mostly in females. To summarize, it is worth noting, that medical students, especially first-year students, often have psychological health problems.

Keywords: psychological health, students, emotional stability, anxiety, functional reserves

Compliance with ethical standards: the study was approved by the Ethics Committee of the Burdenko Voronezh State Medical University (protocol № 7 dated 8 November 2021). Each subject mandatorily submitted the informed consent to study participation; confidentiality of the data collected was ensured.

 **Correspondence should be addressed:** Alexander S. Kopylov
Studencheskaya, 10, Voronezh, 394036, Russia; sania.kopylov@yandex.ru

Received: 18.12.2023 **Accepted:** 21.01.2023 **Published online:** 19.02.2024

DOI: 10.24075/rbh.2024.087

ГИГИЕНИЧЕСКАЯ ХАРАКТЕРИСТИКА НЕКОТОРЫХ АСПЕКТОВ ПСИХОЛОГИЧЕСКОГО ЗДОРОВЬЯ СТУДЕНТОВ


А. С. Копылов 

Воронежский государственный медицинский университет имени Н. Н. Бурденко, Воронеж, Россия

В последнее время очень актуальной стала проблема психологического состояния учащихся, в том числе студенческой молодежи, и его влияния на здоровье индивида. Особенно сложный период переживают абитуриенты, которые поступают в вузы нашей страны. Они сталкиваются с множеством экзаменов, от которых зависит их дальнейшая судьба, с непростым процессом адаптации к новым условиям обучения, существующим в учебных заведениях, а также с совершенно незнакомым коллективом преподавателей и студентов. Целью исследования было выполнить сравнительный анализ психологического здоровья студенческой молодежи, обучающейся в медицинском вузе, и определить показатели, которые наиболее сильно влияют на качество жизни и состояние организма учащихся. В исследовании приняли участие 1050 студентов медицинского вуза 1-го, 3-го и 6-го курсов обучения. Каждому из учащихся было предложено пройти три различных вида тестирования для определения психологического состояния. Более чем у трети студентов педиатрического факультета (39%) отмечен уровень функциональных резервов центральной нервной системы ниже 50%. У студентов педиатрического факультета в 51% случаев снижена работоспособность, преимущественно у лиц женского пола. Подводя итоги, стоит отметить, что у студентов-медиков, особенно первокурсников, часто имели место отклонения в психологическом здоровье.

Ключевые слова: психологическое здоровье, студенты, эмоциональная стабильность, тревожность, функциональные резервы

Соблюдение этических стандартов: исследование было одобрено этическим комитетом ВГМУ имени Н. Н. Бурденко (протокол № 7 от 8 ноября 2021 г.). Каждый участник в обязательном порядке подписывал добровольное информированное согласие на участие в исследовании, была гарантирована конфиденциальность полученных данных.

 **Для корреспонденции:** Александр Сергеевич Копылов
ул. Студенческая, д. 10, г. Воронеж, 394036, Россия; sania.kopylov@yandex.ru

Статья получена: 18.12.2023 **Статья принята к печати:** 21.01.2023 **Опубликована онлайн:** 19.02.2024

DOI: 10.24075/rbh.2024.087

The university years represent the most difficult period of training characterized by significant academic workload of students. It is not always easy for the student's body to adapt when switching from school to the completely different level of complexity, which entails effects on the students' health and psychological status. The levels of stress are directly related to the individual's mental performance: stress contributes to cognitive decline in humans [1–4].

The process of adaptation of first-year students seriously hampers the radical change in the training conditions in the higher education institutions. A small school is replaced by multiple separate buildings of the university that are often located at a rather large distance from each other. The familiar schoolteachers are replaced by the university teachers, and the group consists of complete strangers. Unfortunately, not all first-year students adapt fairly quickly and successfully,

the adaptation process usually stretches to the next academic year and sometimes continues for longer [5–7].

The university applicants and the forward-thinking first-year students bear a huge responsibility for the selection of their future profession, with which they will spend the rest of their lives. It is essential that the student makes the choice on his/her own in accordance with his/her aspirations and abilities, without any pressure from parents or consideration of various benefits that could come from the further employment. Furthermore, students themselves note that difficulties they face on their way to higher education are complexity of mastering various academic disciplines and excessive academic workload they experience during the learning process [8–10].

The combined effects of various negative factors entail multiple negative consequences having an adverse effect on the health of immature students and increasing the risk

of different disorders. Since the regulatory framework essential to ensure the training conditions for students is incomplete, the institutional capacity of higher education institutions is reduced [11].

Psychological health is very important for students of all specialties, since the constantly high levels of stress and anxiety cause a negative response to training and further work in the profession, as well as professional burnout [12, 13].

This is especially important for medical students, who will become doctors in their nearest future and have to be strong, including psychologically strong, in order to work as hard as possible in the field of healthcare. The population of our country is interested in the qualified human resources capable of working most effectively when being in the state of psychological harmony [14].

High workload experienced by students when coming to universities after school also adversely affects the status of their nervous system and the quality of life. This is particularly true for first-year students, who cope with a large amount of information they have to master due to the lack of experience. In addition, year by year computer technologies are being introduced more and more intensively, and the reading rooms are gradually replaced by electronic libraries. This, in turn, results in the fact that it is necessary to spend much time on gadgets to go through the literature and successfully prepare for classes [15–18].

The study was aimed to perform comparative analysis of psychological health of the students attending the medical university and to determine the indicators most strongly affecting the students' quality of life and health.

METHODS

The randomized study was performed at the Center for Public Health and Preventive Healthcare of the Burdenko Voronezh State Medical University in 2022–2023. A total of 1050 students of the medical university were enrolled: first-year, third-year, and sixth-year students studying at the faculties of general medicine and pediatrics.

Each subject was offered to voluntarily pass different tests (sensorimotor test to determine the functional reserve of the central nervous system (CNS) and performance; color test to assess anxiety level and emotional stability; nonspecific adaptation test to calculate the resistance level) in the Origins of Health Valeometer program (Breath Technologies; Russia).

Statistical analysis of the results was performed using the MyOffice 2022 software package (New Cloud Technologies; Russia); the descriptive statistics, Student's *t*-test, and Spearman's rank correlation were used. The differences were considered significant at $p < 0.05$.

Table 1. Sensorimotor test scores

Indicators	Females (<i>n</i> = 810)	Males (<i>n</i> = 240)	Faculty of General Medicine (<i>n</i> = 660)	Pediatric faculty (<i>n</i> = 390)
Functional reserve of the CNS below 50%	36%	24%	30%	39%
Functional reserve of the CNS between 50 and 74%	43%	45%	45%	42%
Functional reserve of the CNS above 75%	21%	31%	25%	19%
Decreased performance	47%	35%	41%	51%

Note: the differences are statistically significant ($p < 0.01$).

RESULTS

After passing the sensorimotor test, the functional reserve of the CNS that showed the body's reserve capacity and determined its capacity to work was defined for each student as a percentage. Furthermore, software assessed performance of each respondent based on these data.

Comparison of the first-year, third-year, and sixth-year students revealed no significant differences. The worst performers were third-year students of the medical university. Among them almost a half (48%) showed decreased body's performance. The lowest functional reserves of the CNS (below 50%) were also reported for the third-year students (38%).

Significant differences were revealed when comparing the scores of the test of visual-motor response in students of different genders and students studying at different faculties (Table 1). The levels of functional reserve of the CNS below 50% were more often found in girls, than in boys. Decreased performance also prevailed in females: the test results showed that almost every second girl demonstrated decreased performance. Both of these scores showed smaller deviation from the norm in boys.

Comparison of the scores of students studying at two different faculties of the Burdenko Voronezh State Medical University showed that the students of the faculty of general medicine with the score of functional reserve of the CNS exceeding 74% predominated over students of the other faculty, i.e. students of the faculty of pediatrics had lower functional reserve of the CNS. Moreover, it should be noted that every second student of pediatric faculty has decreased performance, which may subsequently have an impact on the state of his/her nervous system, result in impaired functional state of the body and eventually in disorders affecting various organs and systems.

The decrease in performance and functional reserve of the CNS puts a lot of strain on the entire nervous system of the body, thereby increasing the risk of various adverse psychological conditions capable of causing persistent mental disorders in the future.

The color test demonstrated the anxiety levels and emotional stability of medical students, as well as the advantageous method to overcome stressful situations. The data obtained show that on average about 30% of students have medium to high anxiety levels, which is indicative of increased anxiety during the training process. No fundamental differences between boys and girls or students of different faculties were revealed. Significant differences were reported only when comparing the first-year and sixth-year students (Table 2). Among first-year students, low anxiety levels were reported only

Table 2. Anxiety level scores by years of training

Anxiety level	1 st year (n = 390)		3 rd year (n = 345)		6 th year (n = 315)		p
	abs.	%	abs.	%	abs.	%	
Low	270	69	257	75	236	75	$p_{1,2} = 0.06$ $p_{1,2} = 0.57$ $p_{1,2} < 0.05$
Medium	87	22	63	18	60	19	
High	33	9	25	7	19	6	

Note: $p_{1,2}$ — significance of differences between first-year and third-year students; $p_{1,2}$ — significance of differences between third-year and sixth-year students; $p_{1,2}$ — significance of differences between first-year and sixth-year students.

for 69%, while the anxiety levels of sixth-year students were about 75%. Such results indicate the decreased adaptability of first-year students, as well as the increased levels of stress and anxiety during training. These score decreases considerably by the end of training.

When assessing emotional stability, all scores were divided into four groups: normal, moderate, increased, and high emotional stability. Based on the results, it is important to emphasize that 55% of boys and 52% of girls had the increased scores that were outside the normal range. This means that every second student, regardless of gender, was not emotionally stable. Table 3 reflects the dynamic changes in the emotional stability scores, from junior students to senior ones. If among first-year students the indicators exceeding the norm were noted in 58%, and among third-year students in 51%, then by the 6th year these dropped to 48%. Such results suggest better students' adaptation to training at senior courses. Unfortunately, the process of the first-year students' adaptation to the medical university is slow, which can adversely affect their psychological status.

The levels of body's resistance to environmental factors show the extent, to which the nervous system is resistant to various changing environmental conditions. Assessment of this parameter revealed statistically significant differences ($p < 0.005$) between boys and girls, who had decreased resistance in 31 and 38% of cases, respectively. Comparative analysis by courses of training showed that the resistance levels of first-year students were much better than that of third-year students, and the differences were significant (Table 4). Furthermore, the results of first-year students turned out to be more upbeat compared to graduate students. The sixth-year students had very low resistance levels 10% more often than first-year students. The scores of third-year and graduate students were almost the same and showed no significant differences.

DISCUSSION

In recent years, insufficient attention is paid to psychological status of students, however, a comprehensive approach to the issue is needed when assessing the students' bodies and morbidity. The decrease in performance and the increase in anxiety levels can result in depression and later transform into stress [19].

Table 3. Emotional stability scores by years of training

Emotional stability	1 st year (n = 390)		3 rd year (n = 345)		6 th year (n = 315)		p
	abs.	%	abs.	%	abs.	%	
Normal	43	11	38	11	38	12	$p_{1,2} < 0.05$ $p_{1,2} = 0.57$ $p_{1,2} < 0.05$
Moderate	119	31	131	38	126	40	
Increased	142	36	122	35	101	32	
High	86	22	54	16	50	16	

Note: $p_{1,2}$ — significance of differences between first-year and third-year students; $p_{1,2}$ — significance of differences between third-year and sixth-year students; $p_{1,2}$ — significance of differences between first-year and sixth-year students.

When comparing emotional stability of university students with the results of adolescents, it should be noted, that schoolchildren demonstrate better results compared to first-year students of the medical university, whose scores are almost 2-fold decreased (31% and 58%, respectively). Unfortunately, the emotional stability score significantly decreases by the time of entering the higher education institution; the influence of the higher education institution itself and the specifics of training on the former applicants also become evident. The decrease in emotional stability score associated with the effects of some stressful situation can result in the development of various psychological conditions adversely affecting the body's health and the quality of life [20].

The functional reserve of the CNS often represents the essential energy reserve that helps the body overcome various stressful situations, furthermore, it contributes to mobilization of all organs and systems, as well as to increased performance of the individual [21, 22]. On average, the drop of functional reserve of the CNS to the level below 50% is observed in 30% of students of the medical university, while the decreased performance is reported for a half of students studying at the faculty of pediatrics. These two scores are directly related to processing new information and the students' academic success.

When assessing anxiety in all students, medical students show not the worst results. In total, 7.3% have increased anxiety levels, and the highest anxiety scores are reported for first-year students (9%). The rate of high anxiety levels is higher in the students of humanitarian university, than in medical students, and constitute 10% [23]. We can say that students of different universities usually demonstrate standard anxiety levels, except for a small number of people. Medical students from Tajikistan showed high anxiety levels in 33% of cases, which 3-fold exceeded the anxiety levels observed in the Russian students. Such results suggest reduced adaptability, lower quality of life of the residents of Tajikistan, including students [24].

CONCLUSIONS

The first-year students of the medical university mostly have unstable psychological status, increased anxiety levels. They often demonstrate decreased performance, high emotional instability. All these characteristics can later transform into

Table 4. Scores of body's resistance to environmental factors

Resistance level	1 st year (n = 390)		3 rd year (n = 345)		6 th year (n = 315)		p
	abs.	%	abs.	%	abs.	%	
Very low	54	14	74	21	75	24	$p_{1,2} < 0.05$ $p_{1,2} = 0.99$ $p_{1,2} < 0.05$
Low	67	17	61	18	47	15	
Medium	118	30	94	27	85	27	
High	90	23	72	21	64	20	
Very high	61	16	44	13	44	14	

Note: $p_{1,2}$ — significance of differences between first-year and third-year students; $p_{1,2}$ — significance of differences between third-year and sixth-year students; $p_{1,2}$ — significance of differences between first-year and sixth-year students.

various depressive disorders, and, therefore, finally transform into stress. It is necessary to pay more attention to the students' adaptation and psychological status. This is particularly true for first-year students, who were recently applicants and came to universities to face a completely different from school

education system. It is reasonable to engage tutors from among senior students or teachers, who will gradually facilitate systematic immersion of former schoolchildren into the student environment, in order to improve adaptation of first-year students.

References

- Fomina EV, Olenko ES, Kodochigova AI, Filippov DJu. Vliyanie stressa na kognitivnye sposobnosti zdorovogo cheloveka: nejrofiziologicheskie aspekty. Psihosomaticheskie i integrativnye issledovaniya. 2019; (5): 0402 (in Rus.).
- Grosheva ES, Sokolova NV, Gubina OI. Izuchenie vlijaniya jezkamenacionnogo stressa na pokazateli umstvennoj rabotosposobnosti studentov vuza. Gigiena i sanitarija. 2019; 98 (5): 527–33 (in Rus.).
- Luckij IS, Luckij EI. Vlijanie hronicheskogo psihojemocional'nogo naprjazhenija na kognitivnye funkcionii. Kazanskij medicinskij zhurnal. 2015; 96 (4): 523–31 (in Rus.).
- Kuznecov VV, Kosilov KV. Sravnitel'nyj analiz vlijaniya psihologicheskikh harakteristik kachestva zhizni i social'no-jekonomicheskogo statusa na uspevaemost' u rossijskikh i kitajskikh studentov medicinskih special'nostej sopredel'nyh territorij Dal'nego Vostoka. Rossijskij medicinskij zhurnal. 2019; 25 (5-6): 287–92 (in Rus.).
- Nicina OA, Bonko TI, Suhinina KV, Brel PJu, Cherkashina EV, Chmarkova EG. Analiz izmenenij lichnostnyh harakteristik u studentov na pervom i vtorom kursah obuchenija v vuze. Pedagogicheskoe obrazovanie v Rossii. 2023; (1): 39–45 (in Rus.).
- Koroleva AA, Yanushanets OI, Petrova NA, Bezzubenkova EF. Influence of the degree of adaptability and lifestyle on the quality of life of medical university students. Russian Bulletin of Hygiene. 2021; (2): 26–30.
- Tarasov AV, Rakhmanov RS, Bogomolova ES, Skoblina NA, levleva OV. Modern factors determining the status of students' health. Russian Bulletin of Hygiene. 2022; (1): 4–8.
- Popov VI, Sudakov DV, Sudakov OV. Ocenka psihologicheskogo zdorov'ja studentov medicinskogo vuza. V knige: Gerasimenko N. F. i dr., redaktory. Zdorov'e molodezhi: novye vyzovy i perspektivy. Tom 5. M.: Nauchnaja kniga, 2019. P. 110–26 (in Rus.).
- Ushakov IB, Melihova EP, Libina II, Gubina OI. Gigienicheskie i psihofiziologicheskie osobennosti formirovaniya zdorov'ja studentov medicinskogo vuza. Gigiena i sanitarija. 2018; 97 (8): 756–61 (in Rus.).
- Setko NP, Bulycheva EV, Zhdanova OM. Funkcional'noe sostojanie osnovnyh sistem organizma uchashhihsja, zdejstvovannyh v uchebno-metodicheskom processe, v uslovijah sovremennogo medicinskogo obespechenija. Gigiena i sanitarija. 2020; 99 (7): 738–44 (in Rus.).
- Popov VI. Gigienicheskaja harakteristika podhodov, harakterizujushhih vozrastnye osobennosti i pokazateli zdorov'ja detej, podrostkov i molodjzhi. Zdravoohranenie Rossijskoj Federacii. 2019; 63 (4): 199–204 (in Rus.).
- Shhegolev VA, Lipovka AJu. Osnovnye negativnye faktory, vlijajushhie na zdorov'e i zdorovyj obraz zhizni studentov. Zdorov'e — osnova chelovecheskogo potenciala: problemy i puti ih reshenija. 2016; (1): 448–52 (in Rus.).
- Eliseeva YV, Ratushnaya NS, Dubrovina EA. Effect of psychological climate on risks of burnout syndrome in a team of healthcare professionals. Russian Bulletin of Hygiene. 2022; (1): 25–8.
- Makarov SV, Gajdarov GM, Alekseeva NJu, Maevskaja IV. Priverzhennost' k professii budushhih vrachej i molodyh specialistov kak faktor razvitija kadrovogo potenciala sistemy zdravoohranenija. Sibirskij medicinskij zhurnal (Irkutsk). 2019; 157 (2): 5–12 (in Rus.).
- Skoblina NA, Popov VI, Eremin AL, Markelova SV, Milushkina OJu, Obrubov SA, et al. Riski razvitija boleznej glaza i ego pridatochnogo apparata u obuchajushhihsja v uslovijah narushenija gigienicheskikh pravil ispol'zovanija jelektronnyh ustrojstv. Gigiena i sanitarija. 2021; 100 (3): 279–84 (in Rus.).
- Goncharova GA. New digital opportunities in diagnosis and prevention of students' mental health. Russian Bulletin of Hygiene. 2021; (4): 40–4.
- Markelova SV, Mettini E, Tatarinchik AA, levleva OV. Regime of using mobile electronic devices by students as a risk factor of vision impairment. Russian Bulletin of Hygiene. 2022; (2): 27–32.
- Ushakov IB, Popov VI, Skoblina NA, Markelova SV. Dlitel'nost' ispol'zovanija mobil'nyh jelektronnyh ustrojstv kak sovremennyj faktor riska zdorov'ju detej, podrostkov i molodezhi. Jekologija cheloveka. 2021; 28 (7): 43–50 (in Rus.).
- Pershina KV. Nejrofiziologicheskie mehanizmy stressa i depressivnyh sostojanij i metody bor'by s nimi. European Science. 2019; 1 (43): 78–83 (in Rus.).
- Kudashkina OV, Fadeeva OV, Tarasova SV. Razvitie jemocional'noj ustojchivosti podrostkov sredstvami psihologicheskogo treninga. Kazanskij pedagogicheskij zhurnal. 2022; 5 (154): 178–84 (in Rus.).
- Krivoshhekov SG. Stress, funkcional'nye rezervy i zdorov'e. Sibirskij pedagogicheskij zhurnal. 2012; (9): 104–9 (in Rus.).
- Setko NP, Bulycheva EV, Bejlina EB. Gigienicheskaja ocenka funkcional'nyh rezervov i adaptacionnyh vozmozhnostej studentov. Gigiena i sanitarija. 2017; 96 (2): 166–70 (in Rus.).
- Ershova AS. Issledovanie urovnja trevozhnosti na jetape adaptacii k uchebnoj dejatel'nosti vuza. Studencheskij nauchnyj forum: materialy VI Mezhdunarodnoj. studencheskoj nauchnoj konferencii, 15 fevralja – 31 marta 2014 goda. (In Rus.). Available from: <https://scienceforum.ru/2014/article/2014001502>.
- Shukurov FA, Halimova FT, Arabzoda SN. Stepen' trevozhnosti i jemocional'noj labil'nosti u studentov v processe ih obuchenija. Biologija i integrativnaja medicina. 2020; 3 (43): 202–11 (in Rus.).

Литература

1. Фомина Е. В., Оленко Е. С., Кодочигова А. И., Филиппов Д. Ю. Влияние стресса на когнитивные способности здорового человека: нейрофизиологические аспекты. Психосоматические и интегративные исследования. 2019; (5): 0402.
2. Грошева Е. С., Соколова Н. В., Губина О. И. Изучение влияния экзаменационного стресса на показатели умственной работоспособности студентов вуза. Гигиена и санитария. 2019; 98 (5): 527–33.
3. Луцкий И. С., Луцкий Е. И. Влияние хронического психоэмоционального напряжения на когнитивные функции. Казанский медицинский журнал. 2015; 96 (4): 523–31.
4. Кузнецов В. В., Косилос К. В. Сравнительный анализ влияния психологических характеристик качества жизни и социально-экономического статуса на успеваемость у российских и китайских студентов медицинских специальностей сопредельных территорий Дальнего Востока. Российский медицинский журнал. 2019; 25 (5-6): 287–92.
5. Ницина О. А., Бонько Т. И., Сухина К. В., Брель П. Ю., Черкашина Е. В., Чмаркова Е. Г. Анализ изменений личностных характеристик у студентов на первом и втором курсах обучения в вузе. Педагогическое образование в России. 2023; (1): 39–45.
6. Королева А. А., Янушанец О. И., Петрова Н. А., Беззубенкова Е. Ф. Влияние степени адаптированности и образа жизни на качество жизни студентов медицинского университета. Российский вестник гигиены. 2021; (2): 29–34.
7. Тарасов А. В., Рахманов Р. С., Богомолова Е. С., Скоблина Н. А., Иевлева О. В. Современные факторы, определяющие состояние здоровья студенческой молодежи. Российский вестник гигиены. 2022; (1): 4–9.
8. Попов В. И., Судаков Д. В., Судаков О. В. Оценка психологического здоровья студентов медицинского вуза. В книге: Герасименко Н. Ф. и др., редакторы. Здоровье молодежи: новые вызовы и перспективы. Том 5. М.: Научная книга, 2019. С. 110–26.
9. Ушаков И. Б., Мелихова Е. П., Либина И. И., Губина О. И. Гигиенические и психофизиологические особенности формирования здоровья студентов медицинского вуза. Гигиена и санитария. 2018; 97 (8): 756–61.
10. Сетко Н. П., Бульчева Е. В., Жданова О. М. Функциональное состояние основных систем организма учащихся, задействованных в учебном процессе, в условиях современного медицинского обеспечения. Гигиена и санитария. 2020; 99 (7): 738–44.
11. Попов В. И. Гигиеническая характеристика подходов, характеризующих возрастные особенности и показатели здоровья детей, подростков и молодежи. Здравоохранение Российской Федерации. 2019; 63 (4): 199–204.
12. Щеголев В. А., Липовка А. Ю. Основные негативные факторы, влияющие на здоровье и здоровый образ жизни студентов. Здоровье — основа человеческого потенциала: проблемы и пути их решения. 2016; (1): 448–52.
13. Елисеева Ю. В., Ратушная Н. Ш., Дубровина Е. А. Влияние психологической обстановки на риск развития эмоционального выгорания в коллективе медицинских работников. Российский вестник гигиены. 2022; (1): 28–32.
14. Макаров С. В., Гайдаров Г. М., Алексеева Н. Ю., Маевская И. В. Приверженность к профессии будущих врачей и молодых специалистов как фактор развития кадрового потенциала системы здравоохранения. Сибирский медицинский журнал (Иркутск). 2019; 157 (2): 5–12.
15. Скоблина Н. А., Попов В. И., Еремин А. Л., Маркелова С. В., Милушкина О. Ю., Обрубов С. А. и др. Риски развития болезней глаза и его придаточного аппарата у обучающихся в условиях нарушения гигиенических правил использования электронных устройств. Гигиена и санитария. 2021; 100 (3): 279–84.
16. Гончарова Г. А. Новые возможности цифровых технологий в диагностике и профилактике психического здоровья обучающихся. Российский вестник гигиены. 2021; (4): 42–6.
17. Маркелова С. В., Метгини Э., Татаринчик А. А., Иевлева О. В. Режим использования мобильных электронных устройств обучающимися как фактор риска развития отклонений со стороны органа зрения. Российский вестник гигиены. 2022; (2): 30–6.
18. Ушаков И. Б., Попов В. И., Скоблина Н. А., Маркелова С. В. Длительность использования мобильных электронных устройств как современный фактор риска развития отклонений у детей, подростков и молодежи. Экология человека. 2021; 28 (7): 43–50.
19. Першина К. В. Нейрофизиологические механизмы стресса и депрессивных состояний и методы борьбы с ними. European Science. 2019; 1 (43): 78–83.
20. Кудашкина О. В., Фадеева О. В., Тарасова С. В. Развитие эмоциональной устойчивости подростков средствами психологического тренинга. Казанский педагогический журнал. 2022; 5 (154): 178–84.
21. Кривошеков С. Г. Стресс, функциональные резервы и здоровье. Сибирский педагогический журнал. 2012; (9): 104–9.
22. Сетко Н. П., Бульчева Е. В., Бейлина Е. Б. Гигиеническая оценка функциональных резервов и адаптационных возможностей студентов. Гигиена и санитария. 2017; 96 (2): 166–70.
23. Ершова А. С. Исследование уровня тревожности на этапе адаптации к учебной деятельности вуза. Студенческий научный форум: материалы VI Международной студенческой научной конференции, 15 февраля – 31 марта 2014 года. URL: <https://scienceforum.ru/2014/article/2014001502>.
24. Шукуров Ф. А., Халимова Ф. Т., Арабзода С. Н. Степень тревожности и эмоциональной лабильности у студентов в процессе их обучения. Биология и интегративная медицина. 2020; 3 (43): 202–11.