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НАУЧНЫЙ МЕДИЦИНСКИЙ ЖУРНАЛ ВОРОНЕЖСКОГО ГОСУДАРСТВЕННОГО  
МЕДИЦИНСКОГО УНИВЕРСИТЕТА ИМ. Н. Н. БУРДЕНКО  
И РОССИЙСКОГО НАЦИОНАЛЬНОГО ИССЛЕДОВАТЕЛЬНОГО  
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## HYGIENE AS A SCIENCE IN MODERN CLINICAL THERAPEUTIC PRACTICE: FROM OBSERVATION TO DIGITALIZATION (PART TWO)

Kaminer DD<sup>1</sup>, Dubrovina EA<sup>1</sup>✉, Sheina NI<sup>1</sup>, Skoblina NA<sup>1</sup>, Sanakoeva EYu<sup>2</sup>, Vorona VP<sup>2</sup>

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Building on the global medical historiography, this review attempts to demonstrate the continued interest and involvement of doctors in investigation of the influence of environmental factors, their epidemiological and pathological aspects, on life expectancy and health of human beings, as well as to cover the most significant domestically developed prevention measures applicable in everyday life, during epidemics and against occupational hazards. We have also attempted to outline the history of interinfluence of the two medical specializations, including the new round of their transformation as they merge into the digital reality of today. The review shows that when medicine, as science and trade, in Russia was going through its establishing phases in Russia, the prominent Russian experts underscored the need for integrated application of therapeutic and hygienic approaches, development of the most effective combination thereof with the aim of qualitative improvement of public health care. The article considers the historical prerequisites for development of the system of preventive and anti-epidemic measures, which are the key safeguards against diseases, and development of the hygiene, including occupational hygiene, from the moment of inception to the age of digital medicine we live in currently.

**Keywords:** hygiene, therapy, history of medicine, prevention, digitalization of hygiene

**Author contribution:** Sheina NI, Skoblina NA, Dubrovina EA — research supervision, manuscript writing; Kaminer DD, Sanakoeva EYu, Vorona VP — data collection, literature review.

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## ГИГИЕНИЧЕСКАЯ НАУКА В СОВРЕМЕННОЙ КЛИНИЧЕСКОЙ ТЕРАПЕВТИЧЕСКОЙ ПРАКТИКЕ: ОТ НАБЛЮДЕНИЯ К ЦИФРОВИЗАЦИИ (ЧАСТЬ ВТОРАЯ)

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В обзоре предпринята попытка продемонстрировать неизменный интерес и вовлеченность врачей в изучение влияния факторов внешней среды с позиций эпидемиологии и патологии на продолжительность жизни и здоровье людей на основе общемировой медицинской историографии, коснуться наиболее значимых отечественных разработок в области профилактических мероприятий для использования в повседневной жизни, медицине труда и в периоды эпидемий, а также попытаться наметить контуры истории взаимного влияния двух медицинских специализаций, в том числе нового витка их трансформации в процессе погружения в сегодняшнюю цифровую реальность. Показано, что в ходе становления медицины в России выдающиеся отечественные специалисты акцентировали внимание на комплексном использовании терапевтических и гигиенических подходов, формировании наиболее эффективного сочетания этих направлений, чтобы качественно улучшить охрану здоровья населения. В статье рассмотрены исторические предпосылки развития системы профилактических и противоэпидемических мероприятий, являющихся главными средствами предупреждения заболеваний, с развитием гигиены (в том числе гигиены труда) с момента зарождения и до настоящего времени — эпохи цифровой медицины.

**Ключевые слова:** гигиена, терапия, история медицины, профилактика, цифровизация гигиены

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### Establishment of occupational hygiene as an independent discipline

The scientific approach to occupational health was formed during the second half of the 19<sup>th</sup> century and first quarter of the 20<sup>th</sup> century. According to F.F. Erisman (1842–1915), professor, teacher and one of the founders of hygiene as a science in Russia, public health as an independent field of research can yield long-term results [1]. Professor Erisman has also made a huge contribution to the development of preventive measures in epidemiology.

His legacy includes "School Hygiene", an extensive written work that was the first dedicated school hygiene guidebook

in Russia and basis for the prevention activities measures adopted throughout educational institutions [2].

The works of F.F. Erisman and M.D. Sokolov, his friend and associate, have basically laid the foundation for anti-epidemic measures that, as implemented by epidemiologists, are aimed directly at the source and the mechanism of transmission of infection, with prevention of infection of people inside the epidemic focus being another aspect based on the same foundation.

F.F. Erisman spearheaded the study of health of industrial workers. There were identified some labor-related factors that affected the subject negatively, and the gravest of those factors was overtime work. It was only later, already in the USSR, that

hygienists, therapists and occupational pathologists presented an integrated approach to creation of the optimal working conditions at plants and factories [3].

### The relevance of hygiene in the USSR

G.A. Lang (1875–1948), professor at the 1<sup>st</sup> Leningrad Medical Institute, was a scholar advancing cardiology and hematology. He developed the doctrine of hypertension (including a number of preventive aspects), founded a school of thought, was a member of the Academy of Medical Sciences and winner of the State Prize of the USSR [4].

N.D. Strazhesko (1876–1952) was a professor at the Kyiv University, academician with the USSR Academy of Sciences, Hero of Socialist Labor. He studied the pathologies of blood circulation, digestion, rheumatism, worked on the problems of septicemia, fatigue, longevity.

V.N. Vinogradov (1882–1964), professor at the 1<sup>st</sup> Moscow Medical Institute, attached great importance to patient care; he developed the routines of treatment of patients with myocardial infarction.

During the time of the Soviet Union, a number of scientists, including G.V. Khlopin, F.G. Krotkov, A.N. Sysin, A.A. Minkh, G.I. Sidorenko and many others, have contributed significantly to the development of everyday hygiene and recommendations for mitigation of the hygiene standards violations, be they related to daily life or work.

The list of the most important achievements of G.V. Khlopin (1863–1929) includes numerous manuals covering general hygiene and sanitary methods, as well as the works by his students. He initiated examination and analysis of the fabrics used to make protective and everyday uniforms, sanitary routines adopted by the Red Army and the Navy. His works on the hygiene of mental and physical labor, food hygiene for children or military personnel, remain relevant to this day. The algorithms of testing of food and beverages developed by G.V. Khlopin are still being actively used. He also investigated how bacteriological contamination of drinking water affects health and how it can be disinfected [5, 6].

F.G. Krotkov (1896–1983), chief hygienist of the Red Army, lead the team of authors that published over 50 hygiene and sanitation guidelines during the war. Inter alia, he wrote and compiled the "Beriberi Prevention Instructions for Doctors", "Frostbite Treatment Guidelines", various recommendations on creation of adequate sanitary and hygienic background for the troops in the Great Patriotic War of 1941–1945 [7]. In peacetime, professor F.G. Krotkov, Academician of the Academy of Medical Sciences of the USSR, Major General of the Medical Service, Hero of Socialist Labor and winner of the State Prize of the USSR, managed the Advanced Medical Training Department he established at the Central Institute until his dying day; one of the main subjects of research at the department was radiation hygiene.

A.N. Sysin (1879–1956), a hygiene scholar, is one of the founders of practical and theoretical epidemiology, general and community hygiene, disinfection and occupational medicine. He authored over 250 research papers, described the problems of epidemics and occupational toxicology, aspects of occupational health, adoption of protective equipment at production facilities and other measures of sanitary and recreational nature [8, 9].

Professor A.A. Minkh (1904–1984), corresponding member of the USSR Academy of Medical Sciences, published numerous works, but the particularly valuable among the best

known of them are the monographs "Methods of Hygienic Research" and "Air Ionization and its Hygienic Significance". He has also authored "General Hygiene", the first textbook for dental students covering the subject, and a number of other textbooks [10–12].

G.I. Sidorenko (1926–1999), a world-renowned scientist and hygienist and author of over 300 scientific papers, developed the new theoretical and practical concept that describes a unified approach to the content of chemical substances in various environments through the lens of hygiene and enables forecasting their toxicity. He laid the foundation of research uniting the concepts of ecology and hygiene. In the 1980s, as part of the international cooperation with the United States, G.I. Sidorenko dedicated his time not only to the problems of hygiene but also prevention and treatment of cardiovascular and oncological diseases [13].

All the above mentioned studies by Soviet scientists and their associates were designed to solve the main problem, that of organization and large scale implementation of preventive measures to lower the incidence and preserve health of people.

### The current stage of development of hygiene

The task of hygiene as a science is to mitigate the negative factors and increase the impact of positive factors through hygienic measures. For example, it has been established that fluorine in drinking water has a certain positive effect on the development and formation of teeth.

In the 20<sup>th</sup> century, the investments into health care were mainly used to solve the already actual problems and not to prevent such. Therapy, not prevention and health strengthening, was the common solution in case of any condition that caused deterioration of health. However, currently, prevention as an area of medicine receives much attention.

It is known that environmental factors affect the course of development of various pathologies, and disregarding such factors degrades the effectiveness of treatment. For example, it was established and proven that occupational risks influence development of diseases of the oral cavity. Exposure to certain chemicals can boost a pathological process there, like caries and other diseases. There is a significant number of diseases known to have associations with the factors of the environment. Living conditions, mineral composition of the commonly consumed water affect the course of a number of diseases. Occupational factors, like conditions a person works in, can contribute to the development of certain diseases, exacerbate cardiovascular or respiratory pathologies [14].

A doctor must know of the influence of certain factors, such as nutrition, natural conditions and quality and composition of water, on the body. Drug prescriptions should factor in dietary habits of the patients, since nutrition can weaken or enhance the effect of the drug, same as drinking water.

Currently, hygiene develops in two directions. On the one hand, it undergoes differentiation, with a number of branches stemming out of the common body of hygiene as a science, including social hygiene, public hygiene, food hygiene, labor protection, children's and adolescent hygiene, radiation hygiene, military hygiene, hygiene of polymeric materials and toxicology, hygiene of space flights and aviation hygiene. On the other hand, there is an integration process underway that merges hygiene with clinical areas of medicine, therapeutics, pediatrics, obstetrics and gynecology etc. [15].

This relationship is also seen in occupational health, which affects the performance of health care professionals. Different professions have different requirements for those practicing



them. For physicians with a therapeutic profile, patience and attentiveness are important. District doctors, or neighborhood physicians, work under a rather tangible physical load and in conditions constantly causing nervous and emotional stress associated with a lack of time needed to properly diagnose and prescribe treatment. The specifics of work or peculiarities of the patients may be the reasons behind trauma suffered by psychiatrists in hospitals and clinics, STD and skin doctors, paramedics involved in transportation.

Doctors have to work under a high neuropsychic load in outpatient clinics and inpatient hospitals, feel negative emotions associated with difficulties in treating and caring for patients, visiting them at home or contacting their relatives. Studies investigating nervous system functions in doctors and hospital therapists have revealed that some indicators of attention (in particular, stability of attention, speed of sensorimotor reactions to light and sound stimuli) progressively deteriorate by the end of a shift.

During the coronavirus pandemic, which gave rise to a new round of hygiene and prevention improvements throughout the world, many medical researchers took it as their professional duty to delve deeply into the theoretical and practical issues of mutual support between hygiene and prevention.

Tens of thousands of articles have been written; to a greater or lesser extent, they address the issues of health education, compliance with hygiene and sanitation standards, prevention of infectious diseases, innovative methods of treatment relying on telemedicine and remote monitoring of chronic patients, and AI-enabled diagnosing. All of these are breakthroughs in the field of occupational health, which can quickly improve the quality and efficiency of work of health care professionals while protecting their lives and health. The challenges of the pandemic have unexpectedly brought together doctors of two specialties, therapists and hygienists, who join forces in an integrated approach to pathology elimination.

More and more often, there appear articles, research and development efforts dedicated to the problems of improvement of epidemiologically safe scenarios of interaction between doctors and patients under the multifactorial impact of COVID-19 [16, 17].

It can be stated that, in actuality, the third period in the history of hygiene has begun. In addition to sanitary rules, pharmacological and therapeutic treatments, it sees hygiene and therapy discovering a previously unknown channel of interaction. The two specialties have connected on the basis of a fundamentally new format through digital technologies such as artificial intelligence, remote monitoring of and care for infected patients, including online consultations when the patients stay at home (telemedicine), as well as various smart medical devices for personal use and direct communication with attending physicians.

All these digital tools allow separating infected patients from healthy people and doctors as much as possible, building additional barriers before a spreading epidemic disease. Such capabilities gain additional relevance since pandemics have not left us for good. According to the official data, SARS-CoV-2 claimed 5 million lives, however, some experts estimate the true toll taken by the pandemic is about 17 million people [18]. Regardless of what number is closer to reality, COVID-19 ranks first on the list of the deadliest diseases in history.

In the last thirty years, until 2020, the development of hygiene was somewhat stalling: the investments made into health care were mainly used to solve the already actual problems, i.e., to provide treatment proper, but not to prevent such problems. The focus of attention was not on health promotion and

disease prevention but on therapeutic and other assistance rendered when the pathology has already developed. It is obvious that the link was broken by the degression of health education efforts aimed at the general public, shrinking of the hygiene curriculum and deterioration of its quality at medical universities, as well as general commercialization of medicine, when treating a disease is more profitable than preventing it.

The COVID-19 pandemic marked a turning point in the history of hygiene and therapy. We are seeing how the priorities are changing in real time. At the peak of the pandemic, all media explained to the general population the essence and importance of the standard hygiene recommendations by WHO, recommendations that, when followed, reduce the risk of contracting coronavirus.

Personal protective equipment (PPE) came into limelight. It became the backbone of one of the most effective safety strategies that kept both the patients and the doctors safe from transmissible pathogens.

This hygiene strategy was the top priority one when the effective treatment and prevention measures against the disease were yet to be developed.

At this stage, hygiene came to the foreground again. Modern PPE were being actively designed; their primary purpose was to protect medical workers from virulent pathogens by preventing contact with biological fluids and infection by airborne droplets. Rigid protocols were formulated, which required the use of appropriate PPE by all health care providers who contact patients with confirmed or suspected COVID-19.

The world saw improvement and large-scale production of protective suits, waterproof gowns, a variety of gloves, breathing masks, surgical masks, hair protection devices, goggles and face shields that, combined with consistent hand hygiene, could minimize exposure to airborne particles and their landing on mucous membranes. En masse, health care professionals were taught the updated hygiene rules that describe how to use the PPE properly, down to the sequence of donning and doffing them.

Largely, the convergence of hygiene and therapeutics during the 2020 crisis was enabled by the unprecedented explosive development of a range of digital technologies, including the Internet of Things (IoT) with next-generation 5G networks, artificial intelligence (AI) relying on deep learning, big data analytics, blockchain, robotic technologies and the widespread introduction of telemedicine [19].

The third stage of the hygiene evolution, the era of digital transformation of medicine, has begun during the COVID-19 pandemic. Its emergence has stimulated worldwide introduction of measures designed to curb the spread of the disease, such as social distancing, quarantine and cordon sanitaire, all of which were supported by the doctor-patient interaction opportunities opened by the digital technology.

## CONCLUSION

Hygiene is a medical prevention discipline that studies the patterns of environmental factors as they act on the body with the aim of preventing diseases and improving the environment itself. Hygiene, as opposed to other disciplines, allows applying the main breakthroughs and achievements at the stage of primary prevention of the diseases, which can significantly reduce the incidence of more severe forms of the pathologies.

Rethinking the history of hygiene and therapeutics yields interesting ideas supporting formulation of unexpected innovative variants of the socio-medical paradigm of the future. The attitudes and concepts of the past years, with their understandable and clear values, help to develop the new

rules of health preservation that, along with classical preventive measures, include innovative methods of protection of doctors and persons (on both occupational and individual levels) that have to constantly be among people during a pandemic.

In general, the entire history of hygiene and therapeutics, from antiquity to the present day, can be said to be the history of their deepening mutual penetration, influence and support. Both disciplines transform in line with the evolutionary changes of human society and medical science, absorbing breakthroughs and adapting them to serve the ultimate goal, which is to ensure maximum reliability in preserving human health and prolonging an active and fulfilling life.

The COVID-19 pandemic has become a separate chapter and a new phase in the world history of hygiene and prevention: it taught the current civilization the lessons of extreme reformatting under the pressure of sudden qualitative changes

in the attitude towards sanitary standards during a pandemic, and initiated the development of preventive measures that utilize the new digital opportunities open to medicine.

At the stage of digitalization, hygiene and telemedicine were connected by another rigid bridge, "the use of communication and information technology to provide medical services regardless of the temporal and spatial barriers" [20].

Relying on the digital technology, epidemiologists and therapists can monitor infected patients and shield doctors from the danger of infection.

The classical algorithms of organization of health care and preventive hygiene should give way to advanced technologies. Doctors have entered the era of digital opportunities for implementation of sanitary rules known since ancient times; the new stage of digitalization of all traditional hygiene tools and the related therapies has begun.

## References

1. Briko NI, Lopuhov PD. Fedor Fedorovich Jerisman — vydajushhijja gigenist i jepidemiolog. K 180-letiju so dnja rozhdenija. Profilakticheskaja medicina. 2022; 25 (9): 85–9 (in Rus.).
2. Briko NI, Sokolova TV, Klushkina VV. Jepidemiologicheskij podhod v profilakticheskoy dejatel'nosti F. F. Jerismana. Jepidemiologija i infekcionnye bolezni. Aktual'nye voprosy. 2015; (5): 72–6 (in Rus.).
3. Tareev EM, Bezrodnyh AA. Professional'nye bolezni. M.: Medicina, 1976; 408 p. (in Rus.).
4. Borodulin VI, Banzeljuk EN. Jetapy istorii otechestvennoj kliniki vnutrennih zabolevanij: sovetskaja medicina. Problemy social'noj gigieny, zdravoohraneniya i istorii mediciny. 2019; (6): 1102–6 (in Rus.).
5. Subbotina TI, Krivcov AV, Andrianov AI, Sorokoletova EF, Smetanin AL, Ishhuk JuV. Grigorij Vitalevich Hlopin — gordost' otechestvennoj gigenicheskoy nauki. Vestnik Rossijskoj Voenno-meditsinskoj akademii. 2020; 4 (72): 236–42 (in Rus.).
6. Rokshin AA, Majdan VA, Raguzina OG. Dorevolucionnyj period uchebnoj i nauchnoj dejatel'nosti professora G.V. Hlopina. Detskaja medicina Severo-Zapada. 2018; 7 (1): 363–4 (in Rus.).
7. Beljaev EN, Krotkova IF, Podunova LG. K 120-letiju so dnja rozhdenija Fedora Grigor'evicha Krotkova. Bjulleten' Nacional'nogo nauchno-issledovatel'skogo instituta obshhestvennogo zdorov'ja imeni N. A. Semashko. 2016; (2): 54–7 (in Rus.).
8. Rusakov NV, Rusakova EV. Aleksej Nikolaevich Sysin — vydajushhijja otechestvennyj uchjonyj. Izvestija GGTU. Medicina, farmacija. 2021; (2): 105–12 (in Rus.).
9. Shigan EE. Voprosy mediciny truda v rabotah A.N. Sysina (navstrechu 85-letnemu jubileju FGBU «NII Jekologii cheloveka i gigieny okruzhajushhej sredy im. A.N. Sysina» Minzdrava Rossii). Gigiena i sanitarija. 2016; 95 (7): 685–8 (in Rus.).
10. Nushtaev IA. Aleksej Alekseevich Minh (K 100-letiju so dnja rozhdenija), Gigiena i sanitarija. 2005; (1): 78–80 (in Rus.).
11. Rudik MI, Kaprizova MV. Dinastija Minhov i ee vklad v razvitie mediciny. Bjulleten' medicinskih internet-konferencij. 2018; 8 (12): 617 (in Rus.).
12. Alekseeva NI, Sarieva ZR, Shadrina IN. Professor A.A. Minh — saratovskij uchenyj, osnovopolozhnik gigenicheskikh metodov issledovanij. Bjulleten' Nacional'nogo nauchno-issledovatel'skogo instituta obshhestvennogo zdorov'ja imeni N.A. Semashko. 2016; (2): 23–5 (in Rus.).
13. Pamjati G.I. Sidorenko. Gigiena i sanitarija. 2007; (6): 94–5 (in Rus.).
14. Shigan EE. Stanovlenie gigieny truda kak nauki v Rossii. Medicina truda i promyshlennaja jekologija. 2015; (9): 155–6 (in Rus.).
15. Hocjanov LK. Gigiena truda — puti razvitija i zadachi. Gigiena i sanitarija. 1967; (6): 58–64 (in Rus.).
16. Hanina EE. Lechenie i profilaktika novoj koronavirusnoj infekcii (COVID-19)? Evrazijskoe Nauchnoe Objedinienie. 2021; (6-3): 198–204 (in Rus.).
17. Semenova VN, Stepanova AJe, Nikiforova NG, Krashenina GI, Galuzo NA, Fedjanina NS, et al. Profilakticheskaja napravlenost' mediciny — dostizhenija i problemy. V sbornike: World Science: Problems and Innovations. Sbornik statej LXVI Mezhdunarodnoj nauchno-prakticheskoy konferencii. Penza, 2022; p. 117–21 (in Rus.).
18. The number of people who have died from COVID-19 is likely to be close to 17m. The official tally of 5m is a huge undercount. The Economist. Available from: <https://www.economist.com/graphic-detail/2021/11/02/the-number-of-people-who-have-died-from-covid-19-is-likely-to-be-close-to-17m>.
19. Tjazhelnikov AA. Nauchnoe obosnovanie mediko-social'nyh i organizacionnyh meroprijatij po sozdaniju modeli okazaniya medicinskoj pomoshhi bol'nym s COVID-19 s ispol'zovaniem telemedicinskih tehnologij v ambulatornyh uslovijah [dissertation]. M., 2022 (in Rus.).
20. Sheikh A, Anderson M, Albala S, Casadei B, Franklin BD, Richards M, et al. Health information technology and digital innovation for national learning health and care systems. Lancet Digit Health. 2021; 3 (6): e383–e396. DOI: 10.1016/S2589-7500(21)00005-4. PubMed PMID: 33967002.

## Литература

1. Брико Н. И., Лопухов П. Д. Федор Федорович Эрисман — выдающийся гигиенист и эпидемиолог. К 180-летию со дня рождения. Профилактическая медицина. 2022; 25 (9): 85–9.
2. Брико Н. И., Соколова Т. В., Клушкина В. В. Эпидемиологический подход в профилактической деятельности Ф. Ф. Эрисмана. Эпидемиология и инфекционные болезни. Актуальные вопросы. 2015; (5): 72–6.
3. Тареев Е. М., Безродных А. А. Профессиональные болезни. М.: Медицина, 1976; 408 с.
4. Бородулин В. И., Банзелюк Е. Н. Этапы истории отечественной клиники внутренних заболеваний: советская медицина. Проблемы социальной гигиены, здравоохранения и истории медицины. 2019; (6): 1102–6.
5. Субботина Т. И., Кривцов А. В., Андриянов А. И., Сороколетова Е. Ф., Сметанин А. Л., Ищук Ю. В. Григорий Витальевич Хлопин — гордость отечественной гигиенической науки. Вестник Российской Военно-медицинской академии. 2020; 4 (72): 236–42.
6. Рокшин А. А., Майдан В. А., Рагузина О. Г. Дореволюционный период учебной и научной деятельности профессора Г. В.

- Хлопина. Детская медицина Северо-Запада. 2018; 7 (1): 363–4.
7. Беляев Е. Н., Кроткова И. Ф., Подунова Л. Г. К 120-летию со дня рождения Федора Григорьевича Кроткова. Бюллетень Национального научно-исследовательского института общественного здоровья имени Н. А. Семашко. 2016; (2): 54–7.
  8. Русаков Н. В., Русакова Е. В. Алексей Николаевич Сысин — выдающийся отечественный ученый. Известия ГТТУ. Медицина, фармация. 2021; (2): 105–12.
  9. Шиган Е. Е. Вопросы медицины труда в работах А. Н. Сысина (навстречу 85-летию юбилею ФГБУ «НИИ Экологии человека и гигиены окружающей среды им. А. Н. Сысина» Минздрава России). Гигиена и санитария. 2016; 95 (7): 685–8.
  10. Нуштаев И. А. Алексей Алексеевич Минх (К 100-летию со дня рождения). Гигиена и санитария. 2005; (1): 78–80.
  11. Рудик М. И., Капризова М. В. Династия Минхов и ее вклад в развитие медицины. Бюллетень медицинских интернет-конференций. 2018; 8 (12): 617.
  12. Алексеева Н. И., Сариева З. Р., Шадрин И. Н. Профессор А. А. Минх — саратовский ученый, основоположник гигиенических методов исследований. Бюллетень Национального научно-исследовательского института общественного здоровья имени Н. А. Семашко. 2016; (2): 23–5.
  13. Памяти Г. И. Сидоренко. Гигиена и санитария. 2007; (6): 94–5.
  14. Шиган Е. Е. Становление гигиены труда как науки в России. Медицина труда и промышленная экология. 2015; (9): 155–6.
  15. Хозянов Л. К. Гигиена труда — пути развития и задачи. Гигиена и санитария. 1967; (6): 58–64.
  16. Ханина Е. Е. Лечение и профилактика новой коронавирусной инфекции (COVID-19). Евразийское Научное Объединение. 2021; (6-3): 198–204.
  17. Семенова В. Н., Степанова А. Э., Никифорова Н. Г., Крашенинина Г. И., Галузо Н. А., Федянина Н. С. и др. Профилактическая направленность медицины — достижения и проблемы. В сборнике: World Science: Problems and Innovations. Сборник статей LXVI Международной научно-практической конференции. Пенза, 2022; с. 117–21.
  18. The number of people who have died from COVID-19 is likely to be close to 17m. The official tally of 5m is a huge undercount. The Economist. Available from: <https://www.economist.com/graphic-detail/2021/11/02/the-number-of-people-who-have-died-from-covid-19-is-likely-to-be-close-to-17m>.
  19. Тяжелников А. А. Научное обоснование медико-социальных и организационных мероприятий по созданию модели оказания медицинской помощи больным с COVID-19 с использованием телемедицинских технологий в амбулаторных условиях [диссертация]. М., 2022.
  20. Sheikh A, Anderson M, Albala S, Casadei B, Franklin BD, Richards M, et al. Health information technology and digital innovation for national learning health and care systems. Lancet Digit Health. 2021; 3 (6): e383–e396. DOI: 10.1016/S2589-7500(21)00005-4. PubMed PMID: 33967002.



## HYGIENIC PROFILE OF HIGH SCHOOL SENIORS, THEIR PARENTS AND TEACHERS

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Shaping healthy lifestyle in high school seniors is one of the main challenges of society. The high school seniors' lifestyle is formed under the influence of their parents and teachers. The study was aimed to form a picture of the hygienic profile of high school seniors, their parents and teachers. An online questionnaire survey of 158 high school students aged 15–18, 113 parents, 202 teachers was carried out. It has been found that 88.6% of high school seniors spend much time on electronic gadgets, 37.2% spend more than three hours on homework, 39.9% sleep less than six hours per day, 35.3% drink alcohol, 12.7% have tried smoking, 4.0% smoke, 17.3% spend less than 60 min per day outdoors, 54.3% have insufficient physical activity, 25% do not follow principles of healthy eating, 25.1% eat cooked meals less than two times a day, 11.0% have a late supper. Among parents, spending much time on electronic gadgets is reported in 30.1%, furthermore, 46.9% of them do nothing to improve their health, 55.7% sleep less than six hours per day, 25.6% drink alcohol, 11.5% smoke, 49.6% have insufficient physical activity, 20.4% do not follow principles of healthy eating, 15.0% have a late supper. As for teachers, spending much time on electronic gadgets is reported in 37.8%, 41.7% of teachers do nothing to improve their health, 59.2% sleep less than six hours per day, 9.5% drink alcohol, 9.5% smoke, 42.8% have insufficient physical activity, 38.3% do not follow principles of healthy eating, 26.0% have a late supper. The hygienic profile of high school seniors, their parents and teachers demonstrates unhealthy lifestyle choices that pose a challenge for their lifestyle and health.

**Keywords:** healthy lifestyle, hygienic profile, continuity, high school seniors, parents, teachers

**Author contribution:** Solovyova YuV — data acquisition and statistical processing, literature review, manuscript writing.

**Compliance with ethical standards:** all subjects (high school seniors, their parents and teachers) submitted the informed consent to study participation.

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## ГИГИЕНИЧЕСКИЙ ПРОФИЛЬ ШКОЛЬНИКОВ СТАРШИХ КЛАССОВ, ИХ РОДИТЕЛЕЙ И ПЕДАГОГОВ

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Формирование здорового образа жизни у старшеклассников является одной из главных задач общества. Образ жизни старшеклассников формируется под влиянием родителей и педагогов. Целью настоящего исследования было сформировать представление о гигиеническом профиле учащихся старших классов, их родителей и педагогов. Проведено онлайн-анкетирование 158 старшеклассников в возрасте 15–18 лет, 113 родителей, 202 педагогов. Установлено, что длительно используют электронные устройства 88,6% старшеклассников, 37,2% тратят более трех часов на выполнение домашнего задания, 39,9% спят менее шести часов в сутки, 35,3% употребляют алкогольные напитки, 12,7% пробовали курить, 4,0% курят, 17,3% ежедневно проводят на свежем воздухе менее 60 мин, 54,3% имеют дефицит двигательной активности, 25% демонстрируют нарушения принципов здорового питания, 25,1% употребляют горячую пищу менее двух раз в день, 11,0% поздно ужинают. Среди родителей длительное использование электронных устройств имеет место у 30,1%, при этом 46,9% ничего не предпринимают для укрепления своего здоровья, 55,7% спят менее шести часов в сутки, 25,6% употребляют алкогольные напитки, 11,5% курят, 49,6% имеют дефицит двигательной активности, 20,4% демонстрируют нарушения принципов здорового питания, 15,0% практикуют поздние ужины. Среди педагогов длительное использование электронных устройств выявлено у 37,8%, 41,7% ничего не предпринимают для укрепления своего здоровья, 59,2% спят менее шести часов в сутки, 9,5% употребляют алкогольные напитки, 9,5% курят, 42,8% имеют дефицит двигательной активности, 38,3% демонстрируют нарушения принципов здорового питания, 26,0% поздно ужинают. Гигиенический профиль старшеклассников, их родителей и педагогов демонстрирует нарушения здорового образа жизни, что представляет собой проблему для их образа жизни и здоровья.

**Ключевые слова:** здоровый образ жизни, гигиенический профиль, преемственность, старшеклассники, родители, педагоги

**Вклад авторов:** Ю. В. Соловьева — сбор и статистическая обработка данных, анализ литературных данных, написание статьи.

**Соблюдение этических стандартов:** все участники (старшеклассники, их родители и педагоги) подписали добровольное информированное согласие на участие в исследовании.

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The today's high school seniors are adolescents who demonstrate certain behaviors, habits and certainly character and behavioral patterns. Furthermore, they are often guided by their environment (age-mates, parents, teachers) [1].

The today's high school seniors are characterized by accelerated development compared to their age-mates of the early 2000s. At the same time, their infantilism compared to high school seniors of the previous decades has been noted. The today's high school students fall into the category of so-called "visual learners". This poses a rather serious challenge not only for themselves but also for their parents and teachers [2]. The

today's high school seniors are usually rather emancipated. They often value money instead of relationship. Furthermore, they often have harmful habits, and in some cases, all kinds of dependencies (vaping, alcohol consumption, or even use of hard drugs). It is often high school seniors living in megacities who do not clearly understand their own importance and have trouble when trying to define their place in life [3–5].

Both high school seniors and their parents, and sometimes teachers, adopt behavioral patterns and lifestyle, including physical activity, eating behavior, etc., being guided not by official guidelines approved by professional society, but by the

online resources unacknowledged by professional sources, bloggers, and popular channels (Youtube and other) [6]. Adolescents who have no experience can make rash decisions about their health, relying on the opinion of famous bloggers. Girls usually start using makeup earlier, boys, driven by the desire to build muscle mass, start consuming protein cocktails and sometimes even hormonal drugs. Bloggers are people who sometimes do not have even elementary knowledge of the issues related to healthy lifestyle, take the liberty of providing advice on sticking to this or that diet, lifestyle. This can not only improve health, but in some cases promotes deterioration of health and the quality of life. Furthermore, this can contribute to risky behaviour and in some cases lead to disability and death. The today's parents usually do not care about the sources of information, the teenagers use when they have questions about their lifestyle, nutrition, and health [7–11].

The so-called “spontaneous preferences” related to nutrition and physical activity, and sometimes deviant behavior, are often formed in high school seniors due to the data obtained from disreputable sources under the influence of appropriate bloggers.

Poor eating habits and unhealthy lifestyle often result in health (both physical and mental) problems [12]. The today's young adults become more and more obsessed with material items, such as making money online, on TikTok or Youtube, sometimes through live demonstration of obscene behavior, humiliation or aggression against each other, animals, etc. [13]. That is why it is vital for modern family to know what exactly is their teenager interested in on the Internet, what online channels he/she visits. To realize his/her full value, it is important for the teenager to go out, play sports, have meals with family.

Russia is a multinational country, that is why it is necessary to familiarize adolescents and other family members with family traditions, culture of communication and nutrition [14]. All the teenager's family is recommended to attend events aimed at promoting family cohesion more often in order to create a favorable psychological climate [15].

It is important for the adolescent to be able to control the time spent on the computer, tablet, phone, and to have a healthy lifestyle, stick to the principles of healthy adequate nutrition, spend more time outdoors, exercise regularly, have a healthy environment of like-minded people and adherents of a healthy lifestyle, abandon bad habits, and have great reproductive health [6, 16].

The study was aimed to form a picture of the hygienic profile of high school seniors, their parents and teachers.

## METHODS

The study was performed from February to March 2023 in the Comprehensive Secondary School № 2065 (Moscow) by conducting an online survey involving the use of the online questionnaire with 10 questions on healthy lifestyle for high school seniors, eight questions for parents, and eight questions for teachers [17]. A valid questionnaire suitable for such studies was used. The method of independent samples was used to survey 158 students aged 15–18 (grades 9–11) attending school № 2065, 113 parents of high school seniors, and 202 teachers. In additions, standard questionnaires on the lifestyle of children, adolescents, and youth was used during the study [18].

The inclusion criteria were as follows: availability of the properly filled questionnaires; availability of the filled informed

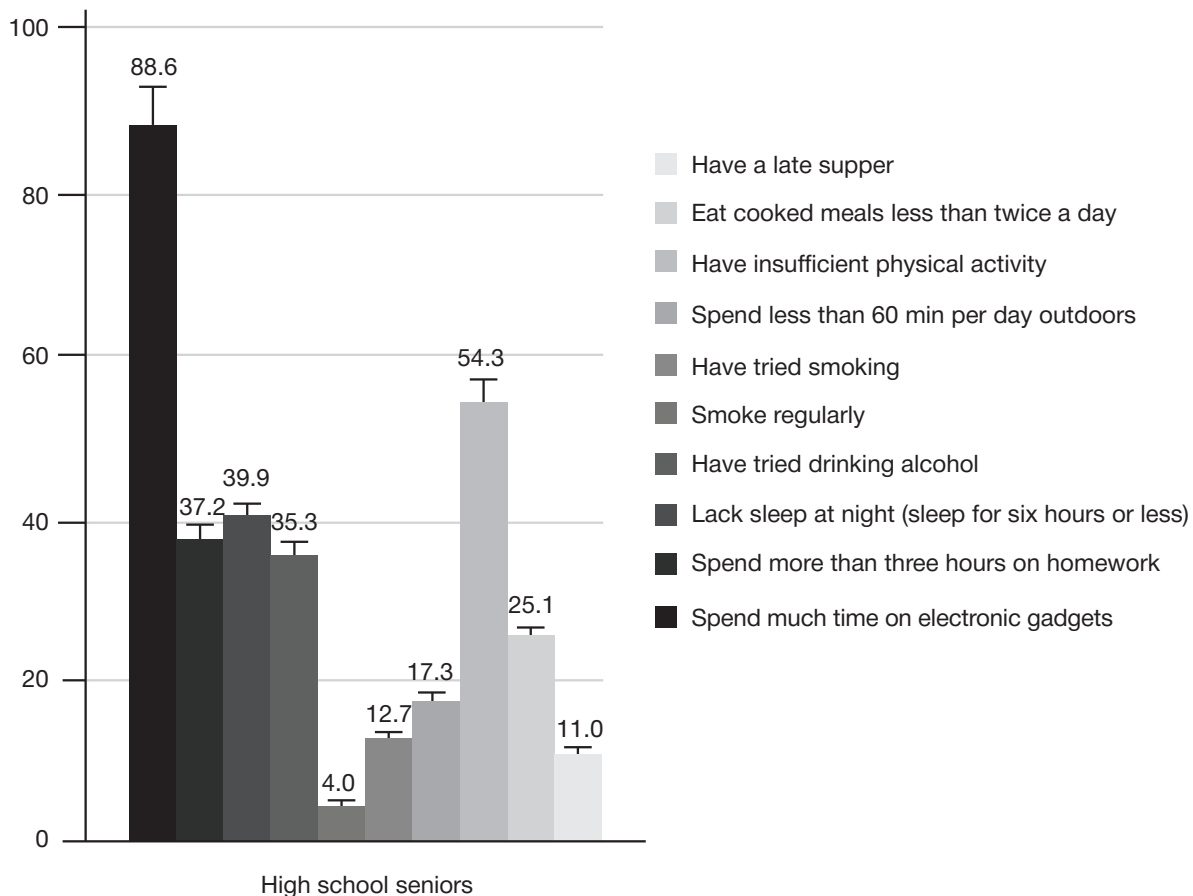


Fig. 1. Hygienic profile of today's high school seniors (%)

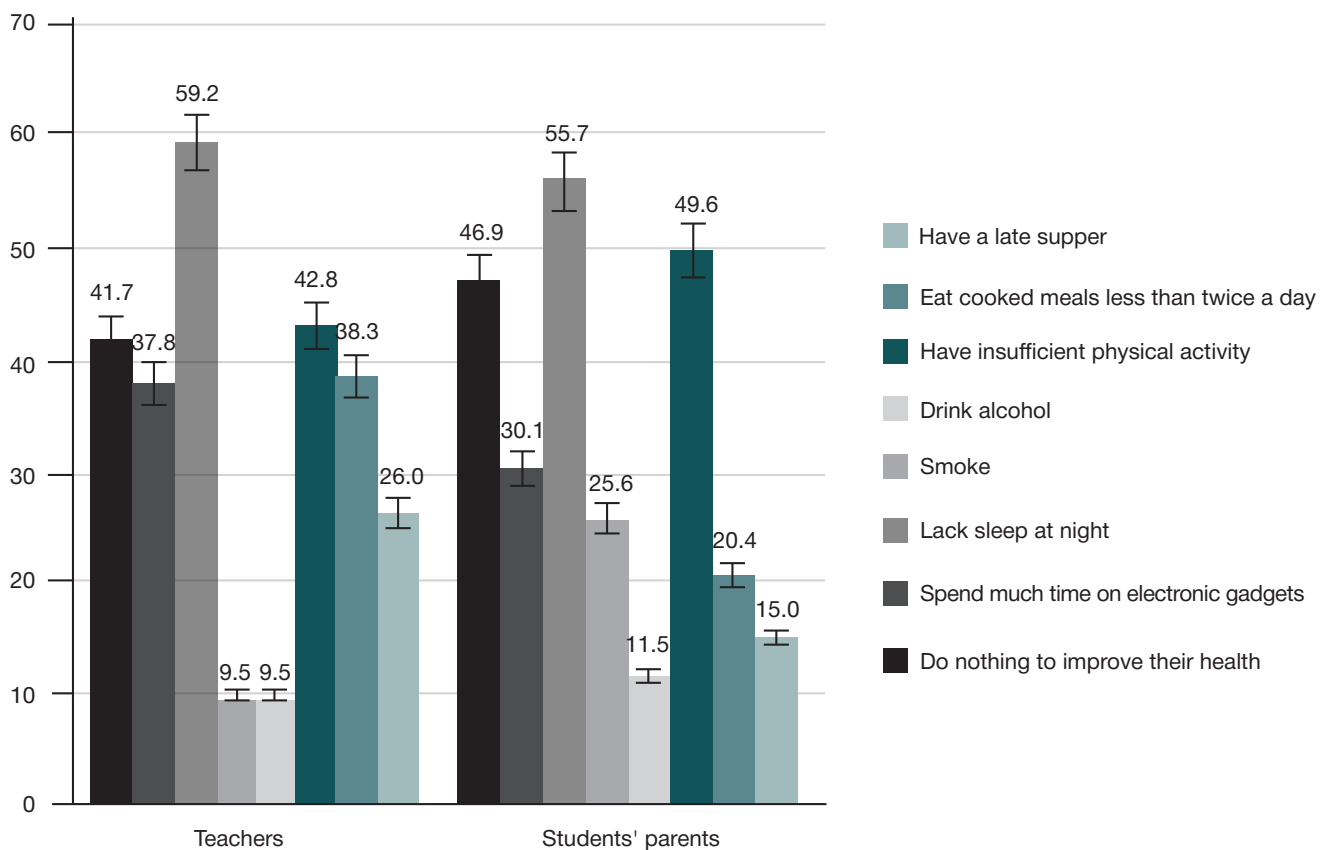


Fig. 2. Hygienic profile of today's high school seniors' parent and teachers (%)

consent being one of the questionnaire items; belonging to the group of high school seniors, parents or teachers.

The questionnaire consisted of several items that included questions about the time spent on electronic gadgets, homework, night sleep, physical activity, healthy eating, existence or lack of harmful habits, such as drinking alcohol and smoking, as well as about the time spent outdoors [19]. The so-called hygienic profile of high school seniors, their parents and teachers was created based on the survey results. Hygienic profile is a complex concept that includes comprehensive hygienic characteristics of the lifestyle of high school seniors, parents and teachers in general together with the estimated time spent on electronic gadgets, time spent on homework, sleep, existence or lack of harmful habits (drinking alcohol and smoking), and the time spent outdoors. Furthermore, physical activity and compliance with the principles of healthy eating (the facts of having cooked meals, having meals at least twice a day, having late suppers) were assessed.

Statistical processing of the results was performed using the Excel 2016 spreadsheet (Microsoft; USA) and the Statistica 10 software package (Statsoft; USA). When performing data processing, the results obtained were previously tested for normality. Descriptive statistics, i.e. the mean (M) and standard deviation (σ), were used.

## RESULTS

Among high school seniors, 88.6% spend much time on electronic gadgets. It should be noted that 37.2% of them spend more than three hours on homework, though 39.9% demonstrate a constant lack of night sleep, i.e. sleep less than six hours per day (Fig. 1).

Furthermore, it should be noted that high school seniors often have unhealthy lifestyle. Thus, drinking alcohol is reported

in 35.3%, 4.0% smoke, and 12.7% note that they have tried smoking. The today's high school seniors go out rarely and spend a little time outdoors: 17.3% of adolescents spend less than 60 min per day outdoors. Modern high school seniors have insufficient physical activity in 54.3% of cases.

One third of today's high school seniors do not stick to the principles of healthy eating: 25.1% eat cooked meals less than twice a day. Late suppers taken less than two hours before sleep (violation of the recommended interval) are reported in 11.0% of high school seniors.

Among the high school seniors' parents, 30.1% spend much time on electronic gadgets. It should be noted, that 46.9% of parents do nothing to improve their health, and more than a half (55.7%) demonstrate a constant lack of night sleep, i.e. sleep less than six hours per day (Fig. 2).

The high school seniors' parents often demonstrate such unhealthy lifestyle choices, as drinking alcohol (25.6% of cases), smoking (11.5% of cases). Modern parents of high school seniors have insufficient physical activity in 49.6% of cases. Furthermore, sometimes they do not stick to the principles of healthy eating. For example, 20.4% of parents eat cooked meals less than twice a day. Late suppers taken less than two hours before sleep (violation of the recommended interval) are reported in 15.0% of parents.

Among the high school seniors' teachers, 37.8% spend much time on electronic gadgets. It should be noted, that 41.7% of teachers do nothing to improve their health, and more than a half (59.2%) demonstrate a constant lack of night sleep, i.e. sleep less than six hours per day (Fig. 2). The teachers of high school seniors often demonstrate such unhealthy lifestyle choices, as drinking alcohol (9.5% of cases), smoking (9.5% of cases). Modern high school seniors' teachers have insufficient physical activity in 42.8% of cases. Furthermore, the today's teachers sometimes do not stick to the principles of healthy eating. Furthermore,

38.3% of teachers eat cooked meals less than twice a day. Late suppers taken less than two hours before sleep (violation of the recommended interval) are reported in 26.0 % of teachers.

## DISCUSSION

The study has made it possible to form a picture of the hygienic profile of high school seniors, their parents and teachers, as well as to reveal various unhealthy lifestyle choices. According to the results, today's high school seniors, their parents and even teachers demonstrate unhealthy lifestyle choices that pose a challenge related to both lifestyle and general health.

The questionnaire survey carried out as part of the scientific research has revealed insufficient awareness and compliance with healthy lifestyle in high school seniors, their parents and teachers. This is a deeper problem of public health, since high school seniors are often guided by knowledge provided by teachers, parents and medical professionals both at school and in their extracurricular activities. For this reason, research shows that it is necessary to involve experts in healthy lifestyle (pediatricians, family and school physicians, nutritionists, and other competent specialists in this field) to acquire knowledge and develop skills. High school seniors, their parents and teachers should be provided up-to-date information about the basics of healthy lifestyle and the effects of non-compliance with such lifestyle. Furthermore, high school seniors should be provided an opportunity to make brief presentations on the issue in their biology and PE classes, as well as to take part in

various Olympiads on healthy lifestyle. Currently, decreasing overall morbidity of the population is a priority at the national level. This will make it possible to improve the quality of life of the whole population, reduce the risk of disorders, and in some cases prevent the disease development.

Joint efforts of the healthcare system, researchers and teachers will not only help to shape an ideal profile of high school seniors, their parents and teachers in terms of health, but also enable creating healthy society. The literature reports data on the effective application of preventive measures aimed to preserve and improve health of high school seniors, their parents and teachers [18, 20–24].

## CONCLUSIONS

Analysis of the hygienic profile of high school seniors, their parents and teachers has revealed poor adherence to the principles of healthy lifestyle not only in high school students, but also in their parents and teachers. This is important, since there is continuity of adherence to certain lifestyle and eating patterns between parents and children, teachers and children. However, the findings show that parents and teachers often breach or fail to comply with the principles of healthy lifestyle and eating, which is probably due to their professional activity and lack of time. Despite this, one should not forget that habits that comply with the principles of healthy lifestyle and nutrition are formed mostly at school and at home, and the environment (parents and teachers) is that very source, the high school seniors are guided by and sometimes imitate.

## References

1. Bramantoro T, Santoso CMA, Hariyani N, Setyowati D, Zulfiana AA, Nor NAM, et al. Effectiveness of the school-based oral health promotion programmes from preschool to high school: a systematic review. *PLoS One*. 2021; 16 (8): e0256007. DOI: 10.1371/journal.pone.0256007. PubMed PMID: 34379685; PMCID: PMC8357156.
2. Markelova SV, Sapunova NO, Dobruk IV, Ceplyaeva KV. Dynamics of teachers' awareness on the issues of protecting the health of schoolchildren during the ongoing sanitary and educational work during 2000–2021. *Russian Bulletin of Hygiene*. 2022; (3): 9–13. DOI: 10.24075/rbh.2022.049.
3. Setko AG, Zhdanova OM, Tyurin AV. Scientific justification of the innovative approach to health control in students from general educational institutions of various types. *Russian Bulletin of Hygiene*. 2021; (3): 13–17. DOI: 10.24075/rbh.2021.024.
4. Julia Tong T, Mohammadnezhad M, Salem Alqahtani N, Salusalu M. Perception of students on factors contributing to overweight and obesity among high school students in Kiribati: a qualitative study. *PLoS One*. 2022; 17 (1): e0260900. DOI: 10.1371/journal.pone.0260900. PubMed PMID: 35051216; PMCID: PMC8775294.
5. Iskandarsyah A, Shabrina A, Siswadi AGP. Usability and acceptability of JAGA SEHAT: mobile application to improve knowledge about healthy lifestyle. *J Multidiscip Healthc*. 2022; (15): 115–24. DOI: 10.2147/JMDH.S342913. PubMed PMID: 35082497; PMCID: PMC8785129.
6. Skoblina NA, Milushkina OYu, Tatarinchik AA, Fedotov. DM. Mesto gadzhetov v obraze zhizni sovremennykh shkol'nikov i studentov. *ZNISO*. 2017; 7 (292): 41–3 (in Rus.). DOI: 10.35627/2219-5237/2017-292-7-41-43.
7. Hu D, Zhou S, Crowley-McHattan ZJ, Liu Z. Factors that influence participation in physical activity in school-aged children and adolescents: a systematic review from the social ecological model perspective. *Int J Environ Res Public Health*. 2021; 18 (6): 3147. DOI: 10.3390/ijerph18063147. PubMed PMID: 33803733; PMCID: PMC8003258.
8. Masluk B, Gascón-Santos S, Oliván-Blázquez B, Bartolomé-Moreno C, Albasa A, Alda M, et al. The role of aggression and maladjustment in the teacher-student relationship on burnout in secondary school teachers. *Front Psychol*. 2022; (13): 1059899. DOI: 10.3389/fpsyg.2022.1059899. PubMed PMID: 36533004; PMCID: PMC9756840.
9. Thumronglaohapun S, Maneeton B, Maneeton N, Limpiti S, Manojai N, Chaijaruwanich J, et al. Awareness, perception and perpetration of cyberbullying by high school students and undergraduates in Thailand. *PLoS One*. 2022; 17 (4): e0267702. DOI: 10.1371/journal.pone.0267702. PubMed PMID: 35486631; PMCID: PMC9053786.
10. Sadjadi M, Blanchard L, Brülle R, Bonell C. Barriers and facilitators to the implementation of Health-Promoting School programmes targeting bullying and violence: a systematic review. *Health Educ Res*. 2022; 36 (5): 581–99. DOI: 10.1093/her/cyab029. PMID: 34312670.
11. Zhu Z, Tang Y, Zhuang J, Liu Y, Wu X, Cai Y, et al. Physical activity, screen viewing time, and overweight/obesity among Chinese children and adolescents: an update from the 2017 physical activity and fitness in China — the youth study. *BMC Public Health*. 2019; 19 (1): 197. DOI: 10.1186/s12889-019-6515-9. PubMed PMID: 30767780; PMCID: PMC6376726.
12. Devrishov RD. Review of factors determining living conditions of modern schoolchildren. *Russian Bulletin of Hygiene*. 2022; (3): 29–34. DOI: 10.24075/rbh.2022.054.
13. Waasdorp TE, Fu R, Clary LK, Bradshaw CP. School climate and bullying bystander responses in middle and high school. *J Appl Dev*



- Psychol. 2022; (80): 101412. DOI: 10.1016/j.appdev.2022.101412. PubMed PMID: 35444357; PMCID: PMC9015685.
14. Kuchma VR, Gorelova ZhYu, Ivanenko AV, et al. Nauchnoe obosnovanie i razrabotka sovremennykh racionov pitaniya shkol'nikov. *Pediatrics. Zhurnal imeni G. N. Speranskogo*. 2019; 98 (3): 124–34 (in Rus.). DOI 10.24110/0031-403X-2019-98-3-124-134.
  15. Cefai C, Camilleri L, Bartolo P, Grazzani I, Cavioni V, Conte E, et al. The effectiveness of a school-based, universal mental health programme in six European countries. *Front Psychol*. 2022; (13): 925614. DOI: 10.3389/fpsyg.2022.925614. PubMed PMID: 36003110; PMCID: PMC9393716.
  16. Scull TM, Dodson CV, Geller JG, Reeder LC, Stump KN. A media literacy education approach to high school sexual health education: immediate effects of media aware on adolescents' media, sexual health, and communication outcomes. *J Youth Adolesc*. 2022; 51(4): 708–23. DOI: 10.1007/s10964-021-01567-0. PubMed PMID: 35113295; PMCID: PMC8811737.
  17. Milushkina OYu, Skobolina NA, Markelova SV. Gigienicheskie aspekty obraza zhizni detej, podrostkov i molodyozhi v giperinformacionnom obshchestve (ankety dlya issledovaniy): uchebno-metodicheskoe posobie. M.: Rossijskij nacional'nyj issledovatel'skij medicinskij universitet imeni N.I. Pirogova, 2021; 88 p. (In Rus.).
  18. Pivovarov YuP, Skobolina NA, Milushkina OYu, et al. Ispol'zovanie internet-oprosov v ocenke osvedomlennosti ob osnovah zdorovogo obraza zhizni. *Sovremennye problemy zdorovoohraneniya i medicinskoj statistiki*. 2020; (2): 398–413 (in Rus.). DOI 10.24411/2312-2935-2020-00055.
  19. Milushkina OYu, Skobolina NA, Markelova SV, Tatarinchik AA, Bokareva NA, Fedotov DM. Ocenka riskov zdorov'yu shkol'nikov i studentov pri vozdejstvii obuchayushchih i dosugovykh informacionno-kommunikacionnykh tekhnologij. *Analiz riska zdorov'yu*. 2019; (3): 135–43 (in Rus.). DOI: 10.21668/health.risk/2019.3.16.
  20. Kuchma VR, Milushkina OYu, Bokareva NA, Skobolina NA. *Sovremennye napravleniya profilakticheskoy raboty v obrazovatel'nykh organizatsiyah*. Gigena i sanitariya. 2014; 93 (6): 107–11 (in Rus.).
  21. Tsubono K, Ogawa M. The analysis of main stressors among high-stress primary school teachers by job positions: a nationwide survey in Japan. *Front Public Health*. 2022; (10): 990141. DOI: 10.3389/fpubh.2022.990141. PubMed PMID: 36620252; PMCID: PMC9815557.
  22. Maida CA, Marcus M, Xiong D, Ortega-Verdugo P, Agredano E, Huang Y, et al. Investigating perceptions of teachers and school nurses on child and adolescent oral health in Los Angeles County. *Int J Environ Res Public Health*. 2022; 19 (8): 4722. DOI: 10.3390/ijerph19084722. PubMed PMID: 35457591; PMCID: PMC9032022.
  23. Naing KM, Htun YM, Tun KM, Win TT, Lin H, Sein TT. Involvement of high school teachers in Health Promoting School program in selected township, Yangon Region, Myanmar: a cross-sectional mixed methods study. *PLoS One*. 2022; 17 (6): e0270125. DOI: 10.1371/journal.pone.0270125. PubMed PMID: 35709210; PMCID: PMC9202905.
  24. Wanga V, Danielson ML, Bitsko RH, Holbrook JR, Lipton C, Claussen AH, et al. Stability of mental disorder prevalence estimates among school-aged children and adolescents: findings from the community-based project to learn about youth-mental health (PLAY-MH) and replication-PLAY-MH (Re-PLAY-MH), 2014–2017. *Ann Epidemiol*. 2022; 72: 82–90. DOI: 10.1016/j.annepidem.2022.05.007. PubMed PMID: 35661706.

## Литература

1. Bramantoro T, Santoso CMA, Hariyani N, Setyowati D, Zulfiana AA, Nor NAM, et al. Effectiveness of the school-based oral health promotion programmes from preschool to high school: a systematic review. *PLoS One*. 2021; 16 (8): e0256007. DOI: 10.1371/journal.pone.0256007. PubMed PMID: 34379685; PMCID: PMC8357156.
2. Маркелова С. В., Сапунова Н. О., Добрук И. В., Цепляева К. В. Динамика информированности учителей по вопросам охраны здоровья школьников в ходе проводимой санитарно-просветительской работы на протяжении 2000–2021 гг. *Российский вестник гигиены*. 2022; (3): 9–13. DOI: 10.24075/rbh.2022.049.
3. Сетко А. Г., Жданова О. М., Тюрин А. В. Научное обоснование инновационного подхода к управлению здоровьем обучающихся общеобразовательных организаций различного типа. *Российский вестник гигиены*. 2021; (3): 13–17. DOI: 10.24075/rbh.2021.024.
4. Julia Tong T, Mohammadhezahad M, Salem Alqahtani N, Salusalu M. Perception of students on factors contributing to overweight and obesity among high school students in Kiribati: a qualitative study. *PLoS One*. 2022; 17 (1): e0260900. DOI: 10.1371/journal.pone.0260900. PubMed PMID: 35051216; PMCID: PMC8775294.
5. Iskandarsyah A, Shabrina A, Siswadi AGP. Usability and acceptability of JAGA SEHAT: mobile application to improve knowledge about healthy lifestyle. *J Multidiscip Healthc*. 2022; (15): 115–24. DOI: 10.2147/JMDH.S342913. PubMed PMID: 35082497; PMCID: PMC8785129.
6. Скоблина Н. А., Милушкина О. Ю., Татаринчик А. А., Федотов Д. М. Место гаджетов в образе жизни современных школьников и студентов. *ЗНиСО*. 2017; 7 (292): 41–3. DOI: 10.35627/2219-5237/2017-292-7-41-43.
7. Hu D, Zhou S, Crowley-McHattan ZJ, Liu Z. Factors that influence participation in physical activity in school-aged children and adolescents: a systematic review from the social ecological model perspective. *Int J Environ Res Public Health*. 2021; 18 (6): 3147. DOI: 10.3390/ijerph18063147. PubMed PMID: 33803733; PMCID: PMC8003258.
8. Masluk B, Gascón-Santos S, Oliván-Blázquez B, Bartolomé-Moreno C, Albesa A, Alda M, et al. The role of aggression and maladjustment in the teacher-student relationship on burnout in secondary school teachers. *Front Psychol*. 2022; (13): 1059899. DOI: 10.3389/fpsyg.2022.1059899. PubMed PMID: 36533004; PMCID: PMC9756840.
9. Thumronglaohapun S, Maneeton B, Maneeton N, Limpiti S, Manojai N, Chaijaruwanich J, et al. Awareness, perception and perpetration of cyberbullying by high school students and undergraduates in Thailand. *PLoS One*. 2022; 17 (4): e0267702. DOI: 10.1371/journal.pone.0267702. PubMed PMID: 35486631; PMCID: PMC9053786.
10. Sadjadi M, Blanchard L, Brülle R, Bonell C. Barriers and facilitators to the implementation of Health-Promoting School programmes targeting bullying and violence: a systematic review. *Health Educ Res*. 2022; 36 (5): 581–99. DOI: 10.1093/her/cyab029. PMID: 34312670.
11. Zhu Z, Tang Y, Zhuang J, Liu Y, Wu X, Cai Y, et al. Physical activity, screen viewing time, and overweight/obesity among Chinese children and adolescents: an update from the 2017 physical activity and fitness in China – the youth study. *BMC Public Health*. 2019; 19 (1): 197. DOI: 10.1186/s12889-019-6515-9. PubMed PMID: 30767780; PMCID: PMC6376726.
12. Девришов Р. Д. Обзор факторов, определяющих условия жизнедеятельности современных обучающихся. *Российский вестник гигиены*. 2022; (3): 29–34. DOI: 10.24075/rbh.2022.054.
13. Waasdorp TE, Fu R, Clary LK, Bradshaw CP. School climate and bullying bystander responses in middle and high school. *J Appl Dev Psychol*. 2022; (80): 101412. DOI: 10.1016/j.appdev.2022.101412. PubMed PMID: 35444357; PMCID: PMC9015685.
14. Кучма В. Р., Горелова Ж. Ю., Иваненко А. В. и др. Научное обоснование и разработка современных рационов питания школьников. *Педиатрия. Журнал имени Г. Н. Сперанского*. 2019; 98 (3): 124–34. DOI 10.24110/0031-403X-2019-98-3-124-134.



15. Cefai C, Camilleri L, Bartolo P, Grazzani I, Cavioni V, Conte E, et al. The effectiveness of a school-based, universal mental health programme in six European countries. *Front Psychol.* 2022; (13): 925614. DOI: 10.3389/fpsyg.2022.925614. PubMed PMID: 36003110; PMCID: PMC9393716.
16. Scull TM, Dodson CV, Geller JG, Reeder LC, Stump KN. A media literacy education approach to high school sexual health education: immediate effects of media aware on adolescents' media, sexual health, and communication outcomes. *J Youth Adolesc.* 2022; 51(4): 708–23. DOI: 10.1007/s10964-021-01567-0. PubMed PMID: 35113295; PMCID: PMC8811737.
17. Милушкина О. Ю., Скоблина Н. А., Маркелова С. В. Гигиенические аспекты образа жизни детей, подростков и молодежи в гиперинформационном обществе (анкеты для исследований): учебно-методическое пособие. М.: Российский национальный исследовательский медицинский университет имени Н. И. Пирогова, 2021; 88 с.
18. Пивоваров Ю. П., Скоблина Н. А., Милушкина О. Ю. и др. Использование интернет-опросов в оценке осведомленности об основах здорового образа жизни. Современные проблемы здравоохранения и медицинской статистики. 2020; (2): 398–413. DOI 10.24411/2312-2935-2020-00055.
19. Милушкина О. Ю., Скоблина Н. А., Маркелова С. В., Татаринчик А. А., Бокарева Н. А., Федотов Д. М. Оценка рисков здоровью школьников и студентов при воздействии обучающих и досуговых информационно-коммуникационных технологий. Анализ риска здоровью. 2019; (3): 135–43. DOI: 10.21668/health.risk/2019.3.16.
20. Кучма В. Р., Милушкина О. Ю., Бокарева Н. А., Скоблина Н. А. Современные направления профилактической работы в образовательных организациях. Гигиена и санитария. 2014; 93 (6): 107–11.
21. Tsubono K, Ogawa M. The analysis of main stressors among high-stress primary school teachers by job positions: a nationwide survey in Japan. *Front Public Health.* 2022; (10): 990141. DOI: 10.3389/fpubh.2022.990141. PubMed PMID: 36620252; PMCID: PMC9815557.
22. Maida CA, Marcus M, Xiong D, Ortega-Verdugo P, Agredano E, Huang Y, et al. Investigating perceptions of teachers and school nurses on child and adolescent oral health in Los Angeles County. *Int J Environ Res Public Health.* 2022; 19 (8): 4722. DOI: 10.3390/ijerph19084722. PubMed PMID: 35457591; PMCID: PMC9032022.
23. Naing KM, Htun YM, Tun KM, Win TT, Lin H, Sein TT. Involvement of high school teachers in Health Promoting School program in selected township, Yangon Region, Myanmar: a cross-sectional mixed methods study. *PLoS One.* 2022; 17 (6): e0270125. DOI: 10.1371/journal.pone.0270125. PubMed PMID: 35709210; PMCID: PMC9202905.
24. Wanga V, Danielson ML, Bitsko RH, Holbrook JR, Lipton C, Claussen AH, et al. Stability of mental disorder prevalence estimates among school-aged children and adolescents: findings from the community-based project to learn about youth-mental health (PLAY-MH) and replication-PLAY-MH (Re-PLAY-MH), 2014–2017. *Ann Epidemiol.* 2022; 72: 82–90. DOI: 10.1016/j.annepidem.2022.05.007. PubMed PMID: 35661706.

## LIFESTYLE-ASSOCIATED RISK FACTORS AFFECTING YOUNG PEOPLE

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The lack of a well-defined healthy lifestyle culture adopted by young people is one of the reasons behind them developing chronic non-communicable diseases. The review summarizes the results of a number of scientific investigations of the relationship between behavioral risk factors and health indicators as registered in the working and studying youth; we present the values reflecting the relative link between onset of chronic diseases and alcohol consumption, smoking, low physical activity, sleep disturbance, nutritional habits and use of gadgets, and highlight the specific aspects of how the risk factors associated with the lifestyle of youth are perceived.

**Keywords:** health, students, working youth, lifestyle, risk factors

**Author contribution:** Aminova OS — literature review, manuscript writing.

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## ФАКТОРЫ РИСКА ДЛЯ ЗДОРОВЬЯ, СВЯЗАННЫЕ С ОБРАЗОМ ЖИЗНИ МОЛОДЕЖИ

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Отсутствие сформированной культуры здоровья у молодого поколения провоцирует развитие хронических неинфекционных заболеваний. В обзоре представлены результаты научных исследований взаимосвязи поведенческих факторов риска и показателей состояния здоровья работающей и учащейся молодежи. Приведены значения относительного риска развития хронических болезней при употреблении алкоголя, табакокурении, низкой физической активности, нарушении режима сна, питания и использовании гаджетов. Отмечены особенности восприятия факторов риска, связанных с образом жизни молодежи.

**Ключевые слова:** здоровье, студенты, работающая молодежь, образ жизни, факторы риска

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In the recent years, there has been much discussion revolving around the diminishing share of young people among the population of Russia, increasing level of morbidity, poorer overall physical development of the people, disrupted morphofunctional capabilities of the body [1–6], while the background for all these issues is the society's urgent need for active, healthy, creative individuals who are ready to realize their potential in all spheres of life, with a focus on professional activities [7].

At the ages 18 through 25, the body becomes biologically mature and morphofunctional indicators reach their definitive values, which makes young people interesting research subjects; this is when they define their independent lifestyle that largely shapes the state of health of a human being [8, 9]. Apart from the working young people, this age group includes students that make up the majority of the country's young population [10].

This review aims to analyze and summarize the results of a number of scientific investigations of the relationship between behavioral risk factors and health indicators as registered in the working and studying youth;

## Materials and methods

This is an analytical review of research investigating the relationship between behavioral risk factors and health status indicators in working and studying youth aged 18 to 25 years; the papers reviewed were published from 2013 to 2023.

We searched for the papers in eLibrary, East View, PubMed, Google Scholar, Cyberleninka.

## Top behavioral risk factors for health of young people

According to the World Health Organization (WHO), some of the key promoters of morbidity and mortality are addictive behavior, poor nutrition and insufficient physical activity [11]. The negative consequences of alcohol abuse, both at the level of individuals and population as a whole, make this habit a national security concern. Alcohol is a proven factor triggering development of diseases of various organs and systems of the body [12]. There is a review [13] that summarizes Russian medical and sociological studies of the causes and consequences of alcohol consumption. The researchers note that young people are particularly susceptible to the grave effects of alcohol.

A noteworthy indicator is the rather high alcohol- and drug-associated death rate among young people: in the last decade, it has climbed up to 4.3 persons per 100000 population [14]. Among people aged 20 through 39, alcohol is a factor in 13.5% of deaths [15]. Because of the social and economic crises, unexpected unemployment, deteriorating living conditions and quality of life, more young people began to consume alcohol regularly, although previously they never had the habit [13, 16].

According to another study, working population of Russia, young people included, saw no direct link between the frequency of alcohol consumption and their health status, although strong alcoholic beverages promote heart disease

(RR = 1.426; 95% CI: 1.190–1.709), hypertension (RR = 1.378; 95% CI: 1.236–1.536) and liver disease (RR = 1.245; 95% CI: 1.008–1.538) [17]. In the cohort of higher school students, the number of those suffering from chronic diseases increased together with the frequency of consumption of alcohol. The researchers have established the average correlation between self-assessed health condition and alcohol abuse ( $r = 0.43$ ), and the relative risk (RR) of poor health was 1.1 [16].

The problem of tobacco smoking remains very acute among the youth [18]. Smoking is an effective contributor to the development and progression of diseases and disorders of the cardiovascular system, such as atherosclerosis, vascular endothelial damage, reduced oxygen supply to the tissues and higher activity of the sympathetic nervous system. Moreover, smoking boosts platelet aggregation and decreases the level of high-density lipoproteins. According to a research paper [19], young people that smoke run a 3.33 times higher risk of myocardial infarction than their non-smoking counterparts, and the elderly have this risk only 2.44 times higher.

An analysis of how the working population perceives risks allowed identifying the difference between objective and subjective knowledge. A paper [20] highlights that while the participants of the respective study declared high danger of smoking for human health, subjectively they underestimated the significance of the risk in question. In terms of importance for health, workers involved in industrial production rated smoking fifth most important factor, while those in other professions — third. Responding to the question of link between smoking and health of the respondents, the respondents assessed the danger of smoking ambiguously: 22% of smokers surveyed considered smoking to be very dangerous (5 points out of 5), 45% of respondents from this group gave it 4 points, and 23% of the smoking respondents found it difficult to characterize the health hazard potential of smoking. The possible reason behind this ambiguity is the fact that only 46% of smokers felt the harmful effects of smoking on their health. The researchers revealed no significant age- or gender-related differences in the assessment of smoking. According to the published papers [17], smoking increased the likelihood of chronic respiratory diseases in the working population (RR = 1.39; 95% CI: 1.104–1.749). Another study discovered that smokers felt sick more often than non-smokers, and their sicknesses lasted longer [15]. Higher school students 17 through 20 years old already exhibited negative consequences of smoking: weakness (61%), sleep disorders (58%), headaches (43%), frequent sore throats (39%), acute respiratory diseases (33%), cough with sputum (31%), shortness of breath (15%), disorders of the digestive system (8%). There are results of medical examinations confirming complaints of the students [16].

Scientific circles in Russia and abroad have long been discussing the mass indulgence of young people in smoking hookahs, vaporizers and electronic cigarettes. The results of the analysis of study reports authored by Russian and foreign researchers lead to an unambiguous conclusion about the destructive effect of electronic cigarettes: the damage they do is comparable to smoking a classic cigarette and aggravated by inhalation of the electronic cigarette's smoking liquid [21, 22]. In the survey, young people mentioned stress, social unsettledness and lack of knowledge of effective ways of relaxation as the main causes of their addictive behavior [16].

Systematic violation of the daily routine, as confirmed by numerous studies in this area, puts an additional burden on the health of young people. Violation of the "sleep-wakefulness" rhythm brings desynchronization, which breaks the harmony between the body's biological rhythms and those of the

environment; this broken bond brings disorders of the immune [23], endocrine [24], cardiovascular, respiratory, digestive and other functional systems [25]. One of the first Russian studies [26] investigating the relationship between the sleep-wakefulness rhythm patterns (regularity, fragmentation) and cardiometabolic indicators revealed that a stable sleep pattern, high daytime and low nighttime activity are associated with a better condition of the circulatory system. The "social jetlag" (SJL) term suggested by T. Roenneberg et al. reflects the difference between the average nighttime sleep on workdays and weekends. Currently, SJL is known to be associated with several behavioral outcomes: less healthy eating patterns [27], poorer performance in high school and university [28], higher physical and verbal aggression exhibited by students [29]. Prolonged sleep restriction affects behavioral responses to food choices, especially hedonic food stimuli [24].

Workers, young people included, involved in industrial production and other professions did not consider sleep disturbance to be a highly significant factor of health deterioration [20]. In higher school students, there was established a strong link between a full night's sleep and how well they felt ( $r = 0.86$ ); against the background of a broken daily routine, the RR of them self-assessing their health status as low was 1.8 [16]. A lifestyle peculiarity for young students was the longer gadget screen time [6, 30]. It was shown that the actual daily routine of students actively using information and communication technologies changed: they tended to sleep less at night, were less physically active and consumed their meals within shorter periods of time [2]. Changed structure of the daily routine and use of various electronic devices for both educational and leisure purposes had a negative effect on the health and well-being of young people [31, 32]. Studies have also revealed the relative risks of hearing loss in young people that use headphones at the maximum volume every day (RR = 3.20; 95% CI: 2.40–5.21) [33] and the risk of development of eye and adnexa diseases as a result of non-compliance with the hygienic rules developed for users of electronic devices (RR = 1.21; 95% CI: 1.1–1.6) [6].

Throughout life, nutrition is a necessity for a human being, and it has specific features in every age period. The health of society depends on how well nutrition of a person and population in general fits the physiological needs [11, 34, 35]. Researchers often discuss the issues of faulty catering, imbalanced food sets and biological value of diets of children, adolescents, youth and adults in various regions of Russia [5, 17]. They conclude that the current pattern of nutrition practiced by the young people generally discourages adoption of a healthy food consumption culture and, on the contrary, causes development of alimentary-dependent diseases [4, 36]. Along with unfavorable environmental conditions, in some cases harmful working conditions exacerbate the deficiency of essential nutrients against the background of any disease, stress, antibiotics intake and widely followed dieting plans [37].

Unsound diets, faulty in nutritional value and food intake time alike, is a common problem for the working population [38]. Often, lacking time and awareness of the basics of healthy nutrition, working people did not focus on what kind of food and how much they ate, preferring deeply processed foodstuff [39]. In a study that assessed behavioral health risks faced by the working population of Russia, regression analysis showed that 55% of the examined "unhealthy eaters" were prone to developing chronic diseases, with the probability of endocrine system diseases being 1.6 times higher for them than for the control group [17]. An interesting fact [20]: only

19% of the respondents employed in the industrial sector regarded unhealthy nutrition as one of the top five strongest factors affecting health of an individual. Those working outside industrial production facilities expressed similar opinion in 33% of cases ( $p = 0.010$ ). Among industrial workers who stated the absolute need to maintain a healthy diet, only 23% included nutrition in the system of important risk factors, while among the respondents from other walks of life this number was 34% ( $p = 0.020$ ). According to the leading Russian scientists, malnutrition accounts for 30% to 50% of the causes of various chronic non-communicable diseases [5, 35].

It has been proven that a full value breakfast helps feel full throughout the day, reduces cravings for high-calorie foods and mitigates the risk of obesity [40]. Foreign researchers have shown that a snack-free diet that includes a mandatory breakfast and implies consumption of most of the daily calories in the morning and around noon [41], as well as a varied diet [42], reduce chronic inflammation, improve circadian regulation, stress tolerance and the state of the intestinal microbiome. People who ate a large amount of whole grains and vegetables had a healthy gut microflora [43]. However, the habits of young people indicated early formation of incorrect nutritional behavioral patterns: frequent dismissal of breakfast, high consumption of sugar, salt, fats, refined food and insufficient consumption of dishes from cereals, vegetables, fruits, fish and oils [2, 18, 44, 45]. The assessment of the effect poor nutrition has on the health of higher school students revealed a close relationship thereof with chronic diseases ( $r = 0.85$ ), with the RR of health disorders at 4.9 [16].

It has been established that consumption of food high in added sugar and frequent snacking provoke growth of the level of cholesterol, triglycerides and low-density lipoproteins in blood, increases body mass index and reduces insulin sensitivity [46]. The situation is further aggravated by the high popularity of products with low biological value: consumed in excess, they contribute significantly to the development of metabolic syndrome [47]. A study [18] has shown that Russian higher school students, compared to their English peers, snack on hamburgers and hot dogs 3 times less often, do not prefer potato chips between meals (chosen by 2.9% of the former compared to 47.4% of the latter) and drink sweet carbonated drinks only occasionally (0.5% vs. 41.4% of students, respectively).

The matter of significance of insufficient physical activity is an urgent one for the healthcare systems all over the world, not only in Russia [48]. Physical activity is a broader concept than just sports. It includes any movement of the body powered by the skeletal muscles that results in expenditure of energy at the level exceeding that of state of rest. Sports activities make up only 5 through 15% of the daily energy expenditure generally in the population. Regardless of gender and age, regular physical activity has a positive effect: alleviates arterial hypertension, reduces severity of hyperglycemia and dyslipidemia, and helps control excessive body weight [11].

According to the research reports, workers that moved less self-assessed their health worse than those who purposefully practiced physical activity (RR = 1.208; 95% CI: 1.138–1.281),

and the former were 1.3 time more likely to have chronic lung diseases, hypertension and high blood pressure than the latter [17]. Another study has established that students whose level of physical activity was low felt worse in general, with the link between the level and the self-perceived health status being significant ( $r = 0.75$ ), and the RR of health disorders for such students was at 1.5 [16].

### Health risk analysis methodology

The health risk analysis methodology includes three interrelated elements: assessment of the risk, communication of the respective information/message and risk management. In this sequence, communication is an element in its own right because there are two levels of risk interpretation: 1) expert knowledge, formed on the basis of scientific research on risk assessment, and 2) ordinary knowledge, formed by laypersons based on the subjective experience and data obtained directly through everyday communication and online. The perception of behavioral risk factors had a multilevel structure: firstly, risks to the health of the respondents themselves and health in general were perceived differently; secondly, awareness of the risk and self-preserving behavior were not interconnected directly; thirdly, respondents more often found important threats that they had less control of, e.g., workers involved in industrial production attached more importance to unfavorable environmental factors and not lifestyle factors [20]. Therefore, to match the "observed" and "perceived" risks and consequently improve control over them, it would help to correctly assess the risks and communicate results of the studies to laypersons in a timely manner. Development of understanding of the need for positive changes in the lifestyle and creation of the respective motivation in relation to a person's health are considered to be of great importance.

Researchers [1–6, 8, 35, 49] believe that preventive measures planting the healthy lifestyle among young people will lead to positive changes in their physical health and quality of life, including psychological well-being, social relationships and interaction with the environment.

### CONCLUSION

The review showed that behavioral risk factors, to varying degrees, had a negative effect on both how young people self-assess their health and its objective condition confirmed clinically. The research papers pay much attention to evaluation of health of young students, prevalence of individual behavioral risk factors and their relationship with the development of non-communicable diseases. The data on the health status and lifestyle of the working youth more often cover either the entire working-age population or those over 25 years of age. There are very few publications that assess the risk factors peculiar to the lifestyle of young working people starting their professional careers. In order to develop health-preserving programs for deployment in work and higher school environments, it is necessary to investigate the modifiable risk factors in different age and social groups of young people.

### References

1. Kuchma VR, Naryshkina EV. Shkol'naya i universitetskaya meditsina v Evrope: sostoyaniye, problemy i puti resheniya (nekotorye itogi XIX Evropeyskogo kongressa po shkol'noy i universitetskoy meditsine). *Pediatrya. Zhurnal im. GN Speranskogo*. 2018; 97 (5): 217–23 (in Rus.).
2. Milushkina OYu, Skoblina NA, Markelova SV, Bulatseva MB, Mamchur NN, Gracheva MN. *Gigienicheskaya kharakteristika obraza zhizni sovremennoy studencheskoy molodezhi*. V knige: Gerasimenko NF, Glybochko PV, Milushkina OYu, Popov VI,



- Starodubov VI, Tutelyan VA, redaktory. Zdorov'e molodezhi: novye vyzovy i perspektivy. M., 2019; p. 32–44 (in Rus.).
3. Popov VI, Sudakov DV, Sudakov OV. Otsenka psikhologicheskogo zdorov'ya studentov meditsinskogo vuza. V knige: Gerasimenko NF, Glybochko PV, Esaulenko IE, Milushkina OYu, Popov VI, Starodubov VI, Tutelyan VA, redaktory. Zdorov'e molodezhi: novye vyzovy i perspektivy. M., 2019; p. 110–26 (in Rus.).
  4. Setko AG, Bulycheva EV, Setko NP. Osobennosti razvitiya donozologicheskikh izmeneniy v psikhicheskom i fizicheskom zdorov'e u uchashchikhsya pokoleniya Z. Analiz riska zdorov'yu. 2019; (4): 158–64 (in Rus.).
  5. Istomin AV, Saarkoppel LM. Sovremennye gigienicheskie problemy fakticheskogo pitaniya naseleniya. V sbornike: Materialy mezhdunarodnoy nauchno-prakticheskoy konferentsii «Zdorov'e i okruzhayushchaya sreda»; 19–20 noyabrya 2020 g.; Minsk: Belorusskiy gosudarstvennyy universitet, 2021: 275–7 (in Rus.).
  6. Skoblina NA, Popov VI, Eremin AL, Markelova SV, Milushkina OYu, Obrubov SA, et al. Riski razvitiya bolezney glaza i ego pridatochnogo apparata u obuchayushchikhsya v usloviyakh narusheniya gigienicheskikh pravil ispol'zovaniya elektronnykh ustroystv. Gigiena i sanitariya. 2021; 100 (3): 279–84 (in Rus.).
  7. Bukhtiyarov IV, Zemlyakova SS. Meditsinskaya deyatel'nost' v sisteme okhrany zdorov'ya rabotayushchikh grazhdan v Rossiyskoy Federatsii. Meditsina truda i promyshlennaya ekologiya. 2022; 62 (6): 362–76 (in Rus.).
  8. Sokolova NV, Goncharova IG, Gubina OI, Melikhova EP. Osobennosti formirovaniya tsennosti zdorov'ya i zdorovogo obraza zhizni sovremennoy molodezhi. V knige: Starodubov VI, Tutelyan VA, redaktory. Sistema zdorov'esberezheniya studentcheskoy molodezhi: XXI vek. M., 2021; p. 90–104 (in Rus.).
  9. Musau Z. Lifestyle diseases pose new burden for Africa. Africa Renewal. 2017; 30 (3): 10–11.
  10. Kopylov AS. Zdorov'e studentcheskoy molodezhi i faktory riska, ego opredelyayushchie. Rossiyskiy vestnik gigieny. 2022; (1): 38–45 (in Rus.).
  11. Drapkina OM, Kontsevaya AV, Kalinina AM, Avdeev SN, Agaltsov MV, Aleksandrova LM, et al. Profilaktika khronicheskikh neinfektsionnykh zabolevaniy v Rossiyskoy Federatsii. Natsional'noe rukovodstvo 2022. Kardiovaskulyarnaya terapiya i profilaktika. 2022; 21 (4): 5–232 (in Rus.).
  12. Shapovalova EB, Indukaeva EV, Artamonova GV. Strategii obshchestvennogo zdoravookhraneniya po snizheniyu vrednogo vozdeystviya alkogolya. Profilakticheskaya meditsina. 2021; 24 (7): 7–13 (in Rus.).
  13. Lebedeva-Nesevrya NA, Zhdanova-Zaplevichko IG, Rerke VI, Barg AO. Potrebleniye alkogolya kak faktor riska zdorov'yu naseleniya: obzor rossiyskikh issledovaniy. Analiz riska zdorov'yu. 2017; (4): 147–60 (in Rus.).
  14. Akishin SV, Dementev AA. Sovremennoe sostoyaniye i problemy formirovaniya zdorovogo obraza zhizni, otsenka riska faktorov obraza zhizni na zdorov'e obuchayushcheysya molodezhi g. Ryazani. V knige: Gerasimenko NF, Glybochko PV, Esaulenko IE, Milushkina OYu, Popov VI, Starodubov VI, Tutelyan VA, redaktory. Zdorov'e molodezhi: novye vyzovy i perspektivy. M., 2019; p. 78–93 (in Rus.).
  15. Kontsevaya AV, Antsiferova AA, Kalinina AM, Popovich MV, Gambaryan MG, Gornyy BE, et al. Obzor otechestvennogo opyta realizatsii korporativnykh programm ukrepleniya zdorov'ya, napravlennykh na korrektsiyu povedencheskikh faktorov riska. Profilakticheskaya meditsina. 2021; 24 (1): 109–17 (in Rus.).
  16. Esaulenko IE, Popov VI, Petrova TN. Vliyaniye usloviy i obraza zhizni na zdorov'e studentov: mediko-sotsial'naya kharakteristika prioritetnykh faktorov riska. V knige: Gerasimenko NF, Glybochko PV, Esaulenko IE, Milushkina OYu, Popov VI, Starodubov VI, Tutelyan VA, redaktory. Zdorov'e molodezhi: novye vyzovy i perspektivy. M., 2019; p. 8–31 (in Rus.).
  17. Lebedeva-Nesevrya NA, Eliseeva SYu. Otsenka riska, svyazannogo s vozdeystviem povedencheskikh faktorov na zdorov'e rabotayushchego naseleniya Rossii. Zdorov'e naseleniya i sreda obitaniya — ZNiSO. 2018; 5 (302): 8–11 (in Rus.).
  18. Gorbatkova EYu, Zulkarnaev TR, Akhmadullin UZ, Akhmadullina KhM, Gorbatkova SA, Khusnutdinova ZA, et al. Gigienicheskaya otsenka obraza zhizni studentov vysshikh uchebnykh zavedeniy. Gigiena i sanitariya. 2022; 101 (5): 532–8 (in Rus.).
  19. Novikova IA, Khlynova OV, Nekrutenko LA. Profil' faktorov riska infarkta miokarda: fokus na molodoy vozrast. Analiz riska zdorov'yu. 2021; (3): 160–6 (in Rus.).
  20. Barg AO. Osobennosti povedencheskikh faktorov riska zdorov'yu u rabotnikov promyshlennykh predpriyatiy. Gigiena i sanitariya. 2016; 95 (1): 48–53 (in Rus.).
  21. Skvortsova ES, Mamchenko MM. Kurenije elektronnykh sigaret kak mediko-sotsial'naya problema. Profilakticheskaya meditsina. 2021; 24 (8): 89–94 (in Rus.).
  22. El Golli N, Jrad-Lamine A, Neffati H, Rahali D, Dallagi Y, Dkhili H, et al. Impact of e-cigarette refill liquid with or without nicotine on liver function in adult rats. Toxicology Mechanisms and Methods. 2016; 26 (6): 433–40.
  23. Benedict C, Vogel H, Jonas W, Woting A, Blaut M, Schürmann A, et al. Gut microbiota and glucometabolic alterations in response to recurrent partial sleep deprivation in normal-weight young individuals. Molecular Metabolism. 2016; 5 (12): 1175–86.
  24. Cedernaes J, Lampola L, Axelsson EK, Liethof L, Hassanzadeh S, Yeganeh A, et al. A single night of partial sleep loss impairs fasting insulin sensitivity but does not affect cephalic phase insulin release in young men. Journal of Sleep Research; 2016; 25 (1): 5–10.
  25. Zenina OYu, Makarova II, Ignatova YuP, Aksenova AV. Khronofiziologiya i khronopatologiya serdechno-sosudistoy sistemy (obzor literatury). Ekologiya cheloveka. 2017; (1): 25–33 (in Rus.).
  26. Bochkarev MV, Korostovtseva LS, Tataraidze AB, Orlov AV, Rotar OP, Ragozin RO, et al. Regulynost' ritma «son-bodrstvovanie» i kardiometabolicheskie pokazateli. Zhurnal nevrologii i psikiatrii imeni S. S. Korsakova. 2021; 121 (4): 57–62 (in Rus.).
  27. Almoosawi S, Palla L, Walshe I, Vingeliene S, Ellis J. Long sleep duration and social jetlag are associated inversely with a healthy dietary pattern in adults: results from the UK national diet and nutrition survey rolling programme Y1–4. Nutrients. 2018; 10 (9): 1131.
  28. Díaz-Morales JF, Escibano C. Social jetlag, academic achievement and cognitive performance: understanding gender/sex differences. Chronobiol Int. 2015; 32 (6): 822–31.
  29. Randler C, Vollmer C. Aggression in young adults — A matter of short sleep and social jetlag? Psychol Rep. 2013; 113 (3): 754–65.
  30. Ushakov IB, Popov VI, Skoblina NA, Markelova SV. Dlitel'nost' ispol'zovaniya mobil'nykh elektronnykh ustroystv kak sovremennyy faktor riska zdorov'yu detey, podrostkov i molodezhi. Ekologiya cheloveka. 2021; (7): 43–50 (in Rus.).
  31. Milushkina OYu, Popov VI, Skoblina NA, Markelova SV, Pavlova GV, Martyusheva VI, et al. Dlitel'nost' ispol'zovaniya mobil'nykh elektronnykh ustroystv s naushnikami uchashchimisya, kak sovremennyy faktor riska sostoyaniyu ikh organa slukha. Sovremennye problemy zdoravookhraneniya i meditsinskoy statistiki. 2021; (3): 77–90 (in Rus.).
  32. Setko NP, Korshunova RV. Gigienicheskaya kharakteristika faktorov riska narusheniya zreniya u studentov. Sanitarnyy vrach. 2021; (2): 37–43 (in Rus.).
  33. Skoblina NA, Pavlova GV, Melikhova EP, Martyusheva VI, Markelova SV, Popov MV, et al. Vliyaniye ispol'zovaniya mobil'nykh elektronnykh ustroystv s audionaushnikami na samochuvstvie lits molodogo vozrasta. Zdorov'e naseleniya i sreda obitaniya — ZNiSO. 2022; 30 (3): 24–9 (in Rus.).
  34. Kuchma VR, Sokolova SB. Osnovnye trendy povedencheskikh riskov, opasnykh dlya zdorov'ya. Analiz riska zdorov'yu. 2019; (2): 4–13 (in Rus.).
  35. Tutelyan VA. Zdorovoe pitaniye dlya obshchestvennogo zdorov'ya. Obshchestvennoye zdorov'e. 2021; 1 (1): 56–64. Russian.
  36. Kodentsova VM, Beketova NA, Nikityuk DB, Tutelyan VA. Kharakteristika obespechennosti vitaminami vzroslogo naseleniya Rossiyskoy Federatsii. Profilakticheskaya meditsina. 2018; 21 (4): 32–7 (in Rus.).
  37. Rusakov VN, Istomin AV, Rummyantseva LA, Vetrova OV, Mikhaylov IG, Vedilina MT. Razvitiye fundamental'nykh i prikladnykh issledovaniy v oblasti gigieny pitaniya (obzor literatury). Gigiena i sanitariya. 2021; 100 (9): 991–7 (in Rus.).
  38. Karannova NS, Shalnova SA, Deev AD, Tarasov VI, Balanova YuA, Imaeva AE, et al. Kharakter pitaniya vzroslogo naseleniya po rezul'tatam epidemiologicheskogo issledovaniya ESSE-RF. Kardiovaskulyarnaya terapiya i profilaktika. 2018; (4): 61–6 (in Rus.).
  39. Onufrak SJ, Zaganjor H, Pan L, Lee-Kwan SH, Park S, Harris DM. Foods and beverages obtained at worksites in the United States.



- Journal of the academy of nutrition and diabetics. 2019; 119 (6): 999–1008.
40. Maksimenko LV, Karavaeva Rokhas T. Zavtrak kak mera profilaktiki izbytochnoy massy tela sredi studentov. Voprosy pitaniya. 2018; 87 (S5): 96–7 (in Rus.).
  41. Maugeri A, Vinciguerra M. The Effects of meal timing and frequency, caloric restriction, and fasting on cardiovascular health: an overview. *Journal of Lipid and Atherosclerosis*. 2020; 9 (1): 140.
  42. Johnson AJ, Vangay P, Al-Ghalith GA, Hillmann BM, Ward TL, Shields-Cutler RR, et al. Daily sampling reveals personalized diet-microbiome associations in humans. *Cell Host & Microbe*. 2019; 25 (6): 789–802.e5.
  43. David LA, Maurice CF, Carmody RN, Gootenberg DB, Button JE, Wolfe BE, et al. Diet rapidly and reproducibly alters the human gut microbiome. *Nature*. 2014; 505 (7484): 559–63.
  44. Glybochko PV, Esauleiko IE, Popov VI, Petrova TN. Zdorov'e studentov meditsinskih vuzov Rossii: problemy i puti ikh resheniya. *Sechenovskiy vestnik*. 2017; 2 (28): 4–11 (in Rus.).
  45. Mitrokhin OV, Matveev AA, Ermakova NA, Belova EV. Otsenka riska vzniknoveniya alimentarno-zavisimyykh zabolevaniy studentov v svyazi s usloviyami pitaniya. *Analiz riska zdorov'yu*. 2019; (4): 69–76 (in Rus.).
  46. DiNicolantonio JJ, Lucan SC. The wrong white crystals: not salt but sugar as aetiological in hypertension and cardiometabolic disease. *Open Heart*. 2014; 1 (1): e000167.
  47. Greenwood DC, Threapleton DE, Evans CE, Cleghorn CL, Nykjaer C, Woodhead C, et al. Association between sugar-sweetened and artificially sweetened soft drinks and type 2 diabetes: systematic review and dose-response meta-analysis of prospective studies. *Br J Nutr*. 2014; 12 (5): 725–34.
  48. Grishan MA. Fiziologicheskie posledstviya gipodinamii dlya organizma cheloveka. *Zhurnal nauchnykh statey. Zdorov'e i obrazovanie v XXI veke*. 2018; 20 (12): 70–3 (in Rus.).
  49. Gorbatkova EYu, Akhmadullina KhM, Akhmadullin UZ. Rol' gigenicheskogo obucheniya i vospitaniya v sisteme sokhraneniya i ukrepleniya zdorov'ya studentov vuzov. *Gigiena i sanitariya*. 2023; 102 (2): 162–8 (in Rus.).

## Литература

1. Кучма В. Р., Нарышкина Е. В. Школьная и университетская медицина в Европе: состояние, проблемы и пути решения (некоторые итоги XIX Европейского конгресса по школьной и университетской медицине). *Педиатрия. Журнал имени Г. Н. Сперанского*. 2018; 97 (5): 217–23.
2. Милушкина О. Ю., Скоблина Н. А., Маркелова С. В., Булацева М. Б., Мамчур Н. Н., Грачева М. Н. Гигиеническая характеристика образа жизни современной студенческой молодежи. В книге: Герасименко Н. Ф., Глыбочко П. В., Милушкина О. Ю., Попов В. И., Стародубов В. И., Тутьян В. А., редакторы. *Здоровье молодежи: новые вызовы и перспективы*. М., 2019; с. 32–44.
3. Попов В. И., Судаков Д. В., Судаков О. В. Оценка психологического здоровья студентов медицинского вуза. В книге: Герасименко Н. Ф., Глыбочко П. В., Есауленко И. Э., Милушкина О. Ю., Попов В. И., Стародубов В. И., Тутьян В. А., редакторы. *Здоровье молодежи: новые вызовы и перспективы*. М., 2019; с. 110–26.
4. Сетко А. Г., Булычева Е. В., Сетко Н. П. Особенности развития донозологических изменений в психическом и физическом здоровье у учащихся поколения Z. *Анализ риска здоровью*. 2019; (4): 158–64.
5. Истомин А. В., Сааркоппель Л. М. Современные гигиенические проблемы фактического питания населения. В сборнике: *Материалы международной научно-практической конференции «Здоровье и окружающая среда»*; 19–20 ноября 2020 г.; Минск: Белорусский государственный университет; 2021; 275–7.
6. 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.
7. Бухтияров И. В., Землякова С. С. Медицинская деятельность в системе охраны здоровья работающих граждан в Российской Федерации. *Медицина труда и промышленная экология*. 2022; 62 (6): 362–76.
8. Соколова Н. В., Гончарова И. Г., Губина О. И., Мелихова Е. П. Особенности формирования ценности здоровья и здорового образа жизни современной молодежи. В книге: Стародубов В. И., Тутьян В. А., редакторы. *Система здоровьесбережения студенческой молодежи: XXI век*. М., 2021; с. 90–104.
9. Musau Z. Lifestyle diseases pose new burden for Africa. *Africa Renewal*. 2017; 30 (3): 10–11.
10. Копылов А. С. Здоровье студенческой молодежи и факторы риска, его определяющие. *Российский вестник гигиены*. 2022; (1): 38–45.
11. Драпкина О. М., Концевая А. В., Калинина А. М., Авдеев С. Н., Агальцов М. В., Александрова Л. М. и др. Профилактика хронических неинфекционных заболеваний в Российской Федерации. Национальное руководство 2022. *Кардиоваскулярная терапия и профилактика*. 2022; 21 (4): 5–232.
12. Шаповалова Э. Б., Индукаева Е. В., Артамонова Г. В. Стратегии общественного здравоохранения по снижению вредного воздействия алкоголя. *Профилактическая медицина*. 2021; 24 (7): 7–13.
13. Лебедева-Несевря Н. А., Жданова-Заплесвичко И. Г., Рерке В. И., Барг А. О. Потребление алкоголя как фактор риска здоровью населения: обзор российских исследований. *Анализ риска здоровью*. 2017; (4): 147–60.
14. Акишин С. В., Дементьев А. А. Современное состояние и проблемы формирования здорового образа жизни, оценка риска факторов образа жизни на здоровье обучающейся молодежи г. Рязани. В книге: Герасименко Н. Ф., Глыбочко П. В., Есауленко И. Э., Милушкина О. Ю., Попов В. И., Стародубов В. И., Тутьян В. А., редакторы. *Здоровье молодежи: новые вызовы и перспективы*. М., 2019; с. 78–93.
15. Концевая А. В., Андиферова А. А., Калинина А. М., Попович М. В., Гамбарян М. Г., Горный Б. Э. и др. Обзор отечественного опыта реализации корпоративных программ укрепления здоровья, направленных на коррекцию поведенческих факторов риска. *Профилактическая медицина*. 2021; 24 (1): 109–17.
16. Есауленко И. Э., Попов В. И., Петрова Т. Н. Влияние условий и образа жизни на здоровье студентов: медико-социальная характеристика приоритетных факторов риска. В книге: Герасименко Н. Ф., Глыбочко П. В., Есауленко И. Э., Милушкина О. Ю., Попов В. И., Стародубов В. И., Тутьян В. А., редакторы. *Здоровье молодежи: новые вызовы и перспективы*. М., 2019; с. 8–31.
17. Лебедева-Несевря Н. А., Елисеева С. Ю. Оценка риска, связанного с воздействием поведенческих факторов на здоровье работающего населения России. *Здоровье населения и среда обитания — ЗНСО*. 2018; 5 (302): 8–11.
18. Горбаткова Е. Ю., Зулкарнаев Т. Р., Ахмадуллин У. З., Ахмадуллина Х. М., Горбатов С. А., Хуснутдинова З. А. и др. Гигиеническая оценка образа жизни студентов высших учебных заведений. *Гигиена и санитария*. 2022; 101 (5): 532–8.
19. Новикова И. А., Хлынова О. В., Некрутенко Л. А. Профиль факторов риска инфаркта миокарда: фокус на молодой возраст. *Анализ риска здоровью*. 2021; (3): 160–6.
20. Барг А. О. Особенности поведенческих факторов риска здоровью у работников промышленных предприятий. *Гигиена и санитария*. 2016; 95 (1): 48–53.
21. Скворцова Е. С., Мамченко М. М. Курение электронных сигарет как медико-социальная проблема. *Профилактическая медицина*. 2021; 24 (8): 89–94.
22. El Golli N, Jrad-Lamine A, Neffati H, Rahali D, Dallagi Y, Dkhili H, et al. Impact of e-cigarette refill liquid with or without nicotine on

- liver function in adult rats. *Toxicology Mechanisms and Methods*. 2016; 26 (6): 433–40.
23. Benedict C, Vogel H, Jonas W, Woting A, Blaut M, Schürmann A, et al. Gut microbiota and glucometabolic alterations in response to recurrent partial sleep deprivation in normal-weight young individuals. *Molecular Metabolism*. 2016; 5 (12): 1175–86.
  24. Cedernaes J, Lampola L, Axelsson EK, Liethof L, Hassanzadeh S, Yeganeh A, et al. A single night of partial sleep loss impairs fasting insulin sensitivity but does not affect cephalic phase insulin release in young men. *Journal of Sleep Research*; 2016; 25 (1): 5–10.
  25. Зенина О. Ю., Макарова И. И., Игнатова Ю. П., Аксенова А. В. Хронофизиология и хронопатология сердечно-сосудистой системы (обзор литературы). *Экология человека*. 2017; (1): 25–33.
  26. Бочкарев М. В., Коростовцева Л. С., Татаридзе А. Б., Орлов А. В., Ротарь О. П., Рагозин Р. О. и др. Регулярность ритма «сон-бодрствование» и кардиометаболические показатели. *Журнал неврологии и психиатрии имени С. С. Корсакова*. 2021; 121 (4): 57–62.
  27. Almoosawi S, Palla L, Walshe I, Vingeliene S, Ellis J. Long sleep duration and social jetlag are associated inversely with a healthy dietary pattern in adults: results from the UK national diet and nutrition survey rolling programme Y1–4. *Nutrients*. 2018; 10 (9): 1131.
  28. Díaz-Morales JF, Escribano C. Social jetlag, academic achievement and cognitive performance: understanding gender/sex differences. *Chronobiol Int*. 2015; 32 (6): 822–31.
  29. Randler C, Vollmer C. Aggression in young adults — A matter of short sleep and social jetlag? *Psychol Rep*. 2013; 113 (3): 754–65.
  30. Ушаков И. Б., Попов В. И., Скоблина Н. А., Маркелова С. В. Длительность использования мобильных электронных устройств как современный фактор риска здоровья детей, подростков и молодежи. *Экология человека*. 2021; (7): 43–50.
  31. Милушкина О. Ю., Попов В. И., Скоблина Н. А., Маркелова С. В., Павлова Г. В., Мартюшева В. И. и др. Длительность использования мобильных электронных устройств с наушниками учащимися как современный фактор риска состоянию их органа слуха. *Современные проблемы здравоохранения и медицинской статистики*. 2021; (3): 77–90.
  32. Сетко Н. П., Коршунова Р. В. Гигиеническая характеристика факторов риска нарушения зрения у студентов. *Санитарный врач*. 2021; (2): 37–43.
  33. Скоблина Н. А., Павлова Г. В., Мелихова Е. П., Мартюшева В. И., Маркелова С. В., Попов М. В. и др. Влияние использования мобильных электронных устройств с аудионаушниками на самочувствие лиц молодого возраста. *Здоровье населения и среда обитания — ЗНиСО*. 2022; 30 (3): 24–9.
  34. Кучма В. Р., Соколова С. Б. Основные тренды поведенческих рисков, опасных для здоровья. *Анализ риска здоровью*. 2019; (2): 4–13.
  35. Тутельян В. А. Здоровое питание для общественного здоровья. *Общественное здоровье*. 2021; 1 (1): 56–64.
  36. Коденцова В. М., Бекетова Н. А., Никитюк Д. Б., Тутельян В. А. Характеристика обеспеченности витаминами взрослого населения Российской Федерации. *Профилактическая медицина*. 2018; 21 (4): 32–7.
  37. Русаков В. Н., Истомин А. В., Румянцева Л. А., Ветрова О. В., Михайлов И. Г., Ведилина М. Т. Развитие фундаментальных и прикладных исследований в области гигиены питания (обзор литературы). *Гигиена и санитария*. 2021; 100 (9): 991–7.
  38. Карамнова Н. С., Шальнова С. А., Деев А. Д., Тарасов В. И., Баланова Ю. А., Имаева А. Э. и др. Характер питания взрослого населения по результатам эпидемиологического исследования ЭССЕ-РФ. *Кардиоваскулярная терапия и профилактика*. 2018; (4): 61–6.
  39. Onufrak SJ, Zaganjor H, Pan L, Lee-Kwan SH, Park S, Harris DM. Foods and beverages obtained at worksites in the United States. *Journal of the academy of nutrition and diabetics*. 2019; 119 (6): 999–1008.
  40. Максименко Л. В., Караваева Рохас Т. Завтрак как мера профилактики избыточной массы тела среди студентов. *Вопросы питания*. 2018; 87 (S5): 96–7.
  41. Maugeri A, Vinciguerra M. The Effects of meal timing and frequency, caloric restriction, and fasting on cardiovascular health: an overview. *Journal of Lipid and Atherosclerosis*. 2020; 9 (1): 140.
  42. Johnson AJ, Vangay P, Al-Ghalith GA, Hillmann BM, Ward TL, Shields-Cutler RR, et al. Daily sampling reveals personalized diet-microbiome associations in humans. *Cell Host & Microbe*. 2019; 25 (6): 789–802.e5.
  43. David LA, Maurice CF, Carmody RN, Gootenberg DB, Button JE, Wolfe BE, et al. Diet rapidly and reproducibly alters the human gut microbiome. *Nature*. 2014; 505 (7484): 559–63.
  44. Глыбочко П. В., Есауленко И. Э., Попов В. И., Петрова Т. Н. Здоровье студентов медицинских вузов России: проблемы и пути их решения. *Сеченовский вестник*. 2017; 2 (28): 4–11.
  45. Митрохин О. В., Матвеев А. А., Ермакова Н. А., Белова Е. В. Оценка риска возникновения алиментарно-зависимых заболеваний студентов в связи с условиями питания. *Анализ риска здоровью*. 2019; (4): 69–76.
  46. DiNicolantonio JJ, Lucan SC. The wrong white crystals: not salt but sugar as aetiological in hypertension and cardiometabolic disease. *Open Heart*. 2014; 1 (1): e000167.
  47. Greenwood DC, Threapleton DE, Evans CE, Cleghorn CL, Nykjaer C, Woodhead C, et al. Association between sugar-sweetened and artificially sweetened soft drinks and type 2 diabetes: systematic review and dose-response meta-analysis of prospective studies. *Br J Nutr*. 2014; 12 (5): 725–34.
  48. Гришан М. А. Физиологические последствия гиподинамии для организма человека. *Журнал научных статей. Здоровье и образование в XXI веке*. 2018; 20 (12): 70–3.
  49. Горбаткова Е. Ю., Ахмадуллина Х. М., Ахмадуллин У. З. Роль гигиенического обучения и воспитания в системе сохранения и укрепления здоровья студентов вузов. *Гигиена и санитария*. 2023; 102 (2): 162–8.

## PRESERVATION OF HEALTH OF MEDICAL STUDENTS, INCLUDING THOSE WITH SPECIAL EDUCATIONAL NEEDS: CURRENT PROBLEMS

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The article analyzes the experience of developing health preservation competencies of medical students in the context of blended learning and application of innovative health preservation techniques. Health preservation is a multilevel problem that requires an integrated approach implying readiness of medical graduates to respond flexibly to the changing landscape of their professional activities; therefore, the article discusses some promising options of mastering universal competencies and their integration into the educational process while factoring in the current knowledge on hygiene education, patterns of thinking, psychology of consciousness, decision-making and practical skills, all of which should be developed and consolidated by applying the various current forms, technologies and methods of work.

**Keywords:** students, health preservation, hygiene education, blended learning, special educational needs

**Author contribution:** Dubrovina EA — search for relevant published papers and analysis thereof; Goncharova GA — study concept, search for relevant published papers and analysis thereof, article authoring and editing.

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## АКТУАЛЬНЫЕ ПРОБЛЕМЫ ЗДОРОВЬЕСБЕРЕЖЕНИЯ СТУДЕНТОВ-МЕДИКОВ, В ТОМ ЧИСЛЕ ЛИЦ С ОСОБЫМИ ОБРАЗОВАТЕЛЬНЫМИ ПОТРЕБНОСТЯМИ

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Статья посвящена анализу опыта формирования здоровьесберегающих компетенций будущих врачей в условиях смешанного образования, а также применению здоровьесберегающих инновационных технологий. В связи с тем, что здоровьесбережение является многоуровневой проблемой, которая требует комплексного подхода, предполагающего готовность выпускников медицинских вузов к гибкому реагированию на изменяющиеся потребности профессиональной деятельности, в статье рассмотрены некоторые перспективные направления освоения универсальных компетенций и встраивания их в образовательный процесс с учетом важности современных знаний по гигиеническому воспитанию, работе мышления, психологии сознания, принятия решений, а также практических навыков, которые следует развивать и закреплять посредством применения различных современных форм, технологий и методов работы.

**Ключевые слова:** студенты, здоровьесбережение, гигиеническое воспитание, смешанное образование, особые образовательные потребности

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The global challenges of the present and the new wave of reforms of healthcare, education and social policy add to the urgency of the health preservation problems.

The priority factors fostering health preservation and healthy lifestyle among students are regulations supporting the state policy aimed at the maintenance and improvement of the health of students, development of the respective educational system in educational establishments, as well as promotion of a favorable atmosphere there and in the families of students.

Health-oriented pedagogy rests on the foundation of health saving techniques part of the educational process; such techniques are described in the "Concept of Implementation of the National Goals in the Field of Science and Higher Education until 2030" [1].

As stipulated by the Russian Federation strategic development tasks and national goals (Decree of the President of the Russian Federation № 204 of May 7, 2018), many federal projects in the fields of healthcare, education and social policy seek to solve the problems of public health improvement and preservation, organization of the learning processes and digital

educational environment, creation of the new opportunities for everyone and "social elevators", etc. [2].

Young people in general and students in particular play a special role in the life of society because they possess a significant social, demographic, industrial, intellectual and reproductive potential. The state of health of students reflects the level of socio-economic and cultural development of the state [3].

The current Federal State Higher Education Standard effective since 2020 regulates training of medical personnel; the Standard guides medical students to develop both universal competencies (UC) and general professional competencies (GPC) in the context of the General Medicine and Pediatrics specializations. In particular, there are following sets of competencies: UC 7, aimed at self-organization and self-development (health preservation); UC 8, enabling to create and maintain safe conditions in everyday and professional lives; GPC 2, aimed at establishment of control of effectiveness of the public prevention measures, healthy lifestyle and sanitary/hygienic education efforts; GPC 10, guiding to search for solutions to the standard professional problems using

information and communication technologies while accounting for the basic information security requirements [4, 5].

Currently, against the background of the experience of the pandemic and distance learning [6] coupled with insufficiency of the students' health preservation competencies [7], the task set before the higher education and professional medical training establishments prescribes mastering (by students) of a number of competencies significant from the point of view of their future profession and social life, as well as skills allowing to preserve and improve health and apply the innovative health saving techniques. Therefore, this review aims to analyze the experience of developing health preservation competencies of medical students in the context of blended learning, and learning the universal competencies in the broader sense.

## Materials and methods

Observing the principles of scientific objectivity and complexity, we analyzed the prospective studies and major achievements in the field of development of health preservation competencies of doctors-to-be, such development being a current task in curricula of the medical universities. We considered the papers published in periodic research and practical publications between 1 January, 2000 and 31 December, 2022, accessible in the Russian and foreign databases (RSCI and PubMed).

## Health preservation as a multifactorial and multicomponent construct in the system of organization of educational activities

Analysis of the notional, conceptual aspects of health preservation yielded identification of the problems embedded in the very definition of health (its two polar states and the many transitional conditions between "well" and "sick"), various systemic levels (health of an individual, group, population), various conceptual models of health (biological, medical, biomedical, biosocial, value-social) [8]. Moreover, the concept of health is dynamic, it changes over time and reflects the shifts in epidemiological situation, dubbed "epidemiological revolutions"; in this connection, the content of the "quality of life" indicator was reinvented to better show the possibility of an individual to realize his/her potential (including individuals with special educational needs) and not simply the capability to recover from the diseases, i.e., be at a given health state level [9].

One of the obstacles on the path of development and introduction of health preservation into the curricula is terminology, namely, the discrepancies therein. There is no single definition of "health preservation" and "healthy lifestyle", the concept and notion behind them are fuzzy, which inevitably complicates understanding of the respective terminological construct and its practical application in educational activities [10].

Most researchers addressing the problem define "health preservation" as activity aimed at maintaining health, interconnected and unified at all levels of human life. The said researchers also underscore the fact that the construct is not used as much as it should be in real-life practice [8–11].

Some theoretical studies and practical systems promote "health preservation" as an interconnected set of measures that raise awareness of people about health saving and improving practices; in other words, such measures foster taking health as something of value [12].

Considering health preservation through the lens of the systematic approach, it is important to factor in not only environmental

influences but also the individual personal characteristics of the student, since the success and effectiveness of the educational effort depends on them.

The tiered approach implies management of external and internal factors, as well as the conditions of health preservation. There are different factors and conditions peculiar to different tiers of health (individual, group, population). While at the tier of an individual the assessment of health relies on physical, physiological, biochemical, clinical and other indicators, at the level of population "health" is a socio-economic category with procreation, duration and quality of life at its base [8].

The different characteristics of health at the tiers of an individual and population require considering health preservation as a multidimensional discipline, and plan appropriate vectors of activity aimed at protecting health of students in the educational, medical, psychological, social and other aspects.

The vectors support health maintenance and extension of active years of life, professional activities of people, their social and spiritual development, efforts contributing to building and reinforcing a healthy family [13].

In addition, the term "health preservation" is often used as a generalized concept of "healthy lifestyle" as a special case of "lifestyle", which encompasses physical training activities, principles of rational nutrition, work and rest, psychohygiene, spiritual culture as protection from the stressful impact of intellectual and emotional psycho-traumatic factors of society, all of which are necessary for the psychosocial development of the individual and formation of his/her moral ideals and a habit of healthy lifestyle [11–14].

The term "health saving educational technology" has a broader sense behind it. There is more to it that just a qualitative characteristic of the respective method of teaching, its "safe for health" certificate [15].

Depending on the goal and focus of the application, health saving educational technologies affect different factors and ultimately harmonize and transform the environment around students into a health saving one, subsequently promoting formation of a health preservation space at a given tier (individual, group or population). The resulting health saving effect relies on wide range of techniques, methods and means, including traditional and innovative technologies of education and upbringing.

Below, we contemplate some technologies through the lens of their impact on the most significant factors and different levels of health.

## Health preservation technologies and their impact factors

### *Educational factor and its components*

Jointly with family and society, higher education establishments play an important part in the student healthcare system. The health saving aspects of the establishment's curriculum, in addition to being designed to teach professional competencies, include a wide range of environmental influences that create conditions for development of the student in the intellectual, information and communication, object-spatial, recreational and other areas [16].

Learning the "ready-made knowledge" from textbooks does not guarantee that the student evolves into a person capable of professional activity, continuous self-education and self-development. It is very important to teach students how to effectively search for the necessary information, comprehend it, formulate a problem, analyze ways to solve it, get a reliable result and reasonably prove the correctness of their point



of view. Thus, introduction of active learning methods into the higher education system and integration of innovative technologies with the educational process seek to optimize the learning routine, form a value-driven attitude in students in the context of their professional development as doctors-to-be, and, consequently, promote health preservation [16, 17].

Such technologies, applied in the form of a productive discussion of creative, original, non-standard issues, can evoke an emotional response and trigger a keen interest in the problem; they enable development of the ability to think, process information (analyze, structure, evaluate, etc.), creatively solve theoretical and practical problems, give feedback (reflect), convey ideas, formulate and express thoughts.

Current research confirms there is a link between academic performance, learning motivation and development of the emotional intelligence [18–21]. A high emotional intelligence supports effective metacognitive decision-making strategies applied in learning [22], good self-regulation abilities [23] and the creative thinking ability, all of which contribute to success in studying [24]. Students with high emotional intelligence adapt better and enjoy harmony in their study/life balance [25].

Interactive classes have an especially valuable aspect: students actively participate in the teaching process, which ensures effectiveness of learning; they interact, work in groups and realize their potential. Thus, students learn to establish social contacts, overcome self-doubt and fears, creatively approach certain problems that are interesting for them and can actually be solved by them, and they also learn to set priorities and take responsibility for the results of educational activities [16, 26, 27]. All this directly or indirectly contributes to the improvement of health on the levels of an individual and the group.

#### *Infrastructural factor (exemplified on the students with special educational needs)*

Teaching healthy lifestyle to students with special educational needs is an interdisciplinary problem.

For students with special educational needs, it is essential to have access to various educational, informational systems, work opportunities, societal activities on the same level as their fellow students without such needs. Currently, there is a sufficient choice of resources enabling education of students with special educational needs without any harm to their health. According to S.G. Serikov, they can be divided into procedural, related to the educational process itself, and environmental or accompanying, i.e., related to setting up conditions favorable for studying and a health preserving space. Rational organization of studying, harmonization of the associated load, personalization of the schedule to effectively combine learning and task solving, mixing mental and physical activities, practicing the student-centered approach, etc. All of these are procedural health saving resources [28, 29]. As for the environmental or accompanying resources, these include material and technical means, sanitary and hygienic conditions, favorable psychological climate, information support for health preservation [28–30].

Distance learning technology and special teaching aids enable successful development of universal competencies in students with special educational needs in the context of their professional training [31].

Facilitation of the educational process for children with special educational needs should start at preschool age and continue through the general educational institutions, thus ensuring the possibility of professional self-fulfillment for such children when they grow to be young adults [32].

For young people with special educational needs, who are learning new trades, the health saving educational process should be designed to eliminate the obstacles or maximize social adaptation, since training can expose them to the factors associated with the industrial environment and labor process that affect the body [33, 34].

#### *Medical treatment and prevention factor and components thereof*

To form the health preservation competencies in future doctors, it is also necessary to purposefully teach hygiene, psychology and pedagogy, with the respective curriculum including health-improving, sport, creative and educational activities revolving about health [35].

In addition to teaching universal and general professional competencies, following health preservation techniques are successfully used at the levels of an individual and a group for the purpose of hygienic education of medical students: rational nutrition checklists, physical activity, etc. [36, 37], successful development of communication skills, managerial decision-making, interpersonal relationships, adequate self-esteem, self-respect that aid socio-psychological adaptation as, in particular, a factor in effective interaction between a doctor and a patient. The effectiveness of interaction is one of the tools enabling relevant clinical decisions that factor in the opinion of the patient, thus making the medical consultation patient-oriented [38].

There are various types of positive social activity (needs promotional support in the form of social ads) that are the opposite of the unhealthy lifestyle. Such activity, involving the youth, offers alternative forms of leisure time, such as sports, travel, creative and research activities; the purpose is to convey information about the positive effect of healthy lifestyle through the media (social networks, television, radio, newspapers). Such programs, being part of a higher educational establishment's educational policy, are implemented as various student events teaching healthy lifestyle and behavior; they make their impact at the group and population health tiers [14, 35].

#### *Psychological and social factors*

Positive emotions and development of the emotional intellect in general, their impact on health and life, management of emotions and navigation through stressful situations, are very important in the context of receiving an education. A student's academic performance and emotional state are strongly influenced by the system of relationships that student is a part of, namely, the relations with fellow students and teachers, as they affect the manifested behavioral patterns inherent in a particular person, i.e. in the types of interpersonal relationships. Therefore, teaching students to be aware of and control emotions, switch them from one modality to another without resorting to various forms of self-destructive behavior, helps increase their efficiency, competence, self-esteem, develop the ability to consciously pursue a healthy lifestyle and resist bad habits, especially in the context of distance learning [39].

Along with AI technology, improvement of health of an individual requires betterment of human qualities relying on the achievements of neuroscience, positive psychology, evolutionary biology, together with clinical practices, behavioral therapy etc. Individual abilities, capabilities and personal qualities of a student are growing more and more important, since they, in the first place, require understanding at the level of thinking, beliefs, worldview and decision-making, and, most



importantly, at the level of emotions, motivation and ability to act, as well as the ability to increase energy potential and stress resistance resources using innovative health-saving techniques.

The educational process should be completed with the current knowledge about thinking (as a process), psychology of consciousness, neuroplasticity and learning the skills needed to manage emotions, resist stress, self-help to increase energy balance, foster emotional stability, immunity and vitality.

This is especially relevant for medical students and people in other helping professions. For them, it is especially important to be able (taught) to seek assistance in difficult life situations, understand and name feelings of other people, understand the cause-and-effect relationships between one's actions and responses, be friendly, appropriate and observant, control attention.

Learning innovative health preservation techniques and methods, mastering the step-by-step instructions (checklists) enabling recognition and neutralization of cognitive distortions, limiting beliefs, fears, etc., can help reduce anxiety, the effects of stress, disappointment in everyday life and difficult life situations.

It is the teacher's duty and responsibility to create a favorable climate in the group of students and in the context of teacher-student interactions. At the group health tier, these goals require that the teacher had the knowledge and the experience in the field of personality psychology and group work, psychology of communication with students and application of the innovative health preservation techniques. It is important to use training regimens, programs aimed at improving interaction between teachers and students. To create a favorable psychological climate in a group of students, it is necessary to teach them to recognize non-verbal communication mechanisms, form certain behavioral strategies that stem from personal experience, actively involve students themselves in various simulated situations having them formulate personal attitudes to their lifestyle [16, 27].

A multifactorial and multicomponent systemic approach to the concept of teaching health preservation as a universal competence has proven to be the most promising, since the effectiveness of such an approach directly depends

on the number of components it includes, and the greater the amount of such components is, the more reliable and universal the system is [31, 40].

## Conclusion

Analysis of the experience of forming health preservation competencies in medical students allowed concluding that health preservation techniques that affect certain factors, external or internal, create favorable conditions for a health-saving environment and shape the needed health-saving space. Depending on the goal and the focus, a health preservation technique affects health on a certain tier (individual, group or population) directly and throughout indirectly. Thus, we can control the health preservation process: improving individual health, we improve health of a group, which, in turn, has a beneficial effect at the tier of population and betters the quality of life in general.

Economic, political, social, demographic and other challenges and life realities manifesting at the population tier force young people to compete fiercely and struggle for a successful career and personal development. Introduction of the health preservation techniques to the educational process and daily routines of students can help offset the impact of negative factors, optimize the process of learning, mitigate the risks of health disorders, reduce fatigue, with one of the positive factors in this context being the habit of a healthy lifestyle, independent health monitoring and control. The curricula should be extended with the theoretical knowledge about the work of thinking, psychology of consciousness, decision-making, as well as practical skills in occupational health, emotion management and conflict resolution, communication skills that improve health on both individual and group levels.

Adding the health preservation components to the educational process with the help of innovative techniques and student education patterns, coupled with optimization of the learning load resulting from application of health saving pedagogical techniques in an active sensory-developing environment (including for young people with special educational needs), will assist conscious formation of a culture of health that medical students can rely on in their future professional lives.

## References

1. Концепция реализации до 2030 года национальных целей в сфере науки и высшего образования [Internet]. Совет по стратегическому развитию и национальным проектам; 13 июля 2020 г. [cited 23.03.2023]. Available from: <http://www.coal.sbras.ru/wp-content/uploads/2020/07/Концепция-НЦ-21.07.pdf>.
2. Ukaz Prezidenta RF ot 7 maja 2018 g. № 204 "O nacional'nyh celjah i strategicheskikh zadachah razvitiya Rossijskoj Federacii na period do 2024 goda".
3. Minibaev TSh, Rapoport IK, Chubarovskij VV, Timoshenko KT, Goncharova GA, Katenko SV. Metodicheskie rekomendacii po kompleksnoj ocenke sostojaniya zdorov'ja studentov po rezul'tatam medicinskih osmotrov Voprosy shkol'noj i universitetskoj mediciny i zdorov'ja. 2015; (2): 40–57 (in Rus).
4. Prikaz Minobrnauki Rossii ot 12.08.2020 № 988 "Ob utverzhdenii Federal'nogo gosudarstvennogo obrazovatel'nogo standarta vysshego obrazovaniya —specialitet po special'nosti 31.05.01 Lechebnoe delo".
5. Prikaz Minobrnauki Rossii ot 12.08.2020 № 965 "Ob utverzhdenii Federal'nogo gosudarstvennogo obrazovatel'nogo standarta vysshego obrazovaniya — specialitet po special'nosti 31.05.02 Pediatrija".
6. Popov VI, Milushkina OJu, Skoblina NA, Markelova SV, Sokolova NV, Dementev AA. Povedencheskie riski zdorov'ju studentov v period provedeniya distancionnogo obuchenija. Gigiena i sanitarija. 2020; 99 (8): 854–60 (in Rus.). DOI: <https://doi.org/10.47470/0016-9900-2020-99-8-854-860>.
7. Rapoport IK, Laponova ED, Gudina ZhV, Sokolova NV, Tikashkina OV, Vaskovskaja JuS. Osobennosti zhiznedejatel'nosti i samochuvstvie studentov v cifrovoj srede. Gigiena i sanitarija. 2022; 101 (3): 323–30 (in Rus.). DOI: <https://doi.org/10.47470/0016-9900-2022-101-3-323-330>.
8. Ajzman RI, Melnikova MM, Kosovanova LV. Zdorov'esberegajushhie tehnologii v obrazovanii: uchebnoe posobie dlja akademicheskogo bakalavriata. 2-e izd., ispr. i dop. M.: izdatel'stvo Jurajt, 2017; 241 p. (in Rus).
9. Rybakovskij LL, Kalmykova NM, Arhangel'skij VM, et al. Demografija: uchebnik dlja vuzov. 2-e izd. M.: Logos, 2010; 279 p. (in Rus.).
10. Shljubul EJu. Problemy v opredelenii ponjatija "zdorov'esberezhenie" v kontekste pedagogicheskogo dejatel'nosti. Teorija obrazovaniya i obuchenija. Obrazovatel'nye tehnologii. 2020; (1): 10–19 (in Rus.).

11. Molodcova II. Zdorov'esberezhenie studentov v usloviyah distancionnogo obuchenija. V sbornike: Aktual'nye problemy professional'nogo pedagogicheskogo i tehnologicheskogo obrazovanija. Materialy IX Vserossijskoj nauchno-prakticheskoy konferencii; Shadrinsk, 2021; 221–4 (in Rus.).
12. Nazarova EN, Zhilov JuD. Zdorovyj obraz zhizni i ego sostavljajushhie: uchebnoe posobie dlja studentov vysshih uchebnyh zavedenij. M.: Akademija, 2007; 256 p. (in Rus.).
13. Kapilevich LV, Andreev VI. Zdorov'e i zdorovyj obraz zhizni: uchebnoe posobie. Tomsk: Izdatel'stvo Tomskogo politehnicheskogo universiteta, 2008; 102 p. (in Rus.).
14. Chernaja NL, Ganuzin VM, Baraboshin AT, Maskova GS. Analiz faktorov, vlijajushhih na obraz zhizni universitetskoy molodezhi. Voprosy shkol'noj i universitetskoy mediciny i zdorov'ja. 2020; (2): 56–62 (in Rus.).
15. Eliseeva JuV, Dubrovina EA, Eliseev JuJu, Istomin AV. Sostojanie realizacii zdorov'esberegajushhih tehnologij v obrazovatel'nyh uchrezhdenijah. Zdorov'e naselenija i sreda obitanija. 2017; 4 (289): 35–7 (in Rus.).
16. Sholudchenko IE. Formirovanie zdorov'esberegajushhih kompetencij v usloviyah smeshannogo obuchenija. V sbornike: Aktual'nye problemy realizacii zdorov'esberegajushhih tehnologij v obrazovatel'noj srede. Sbornik materialov. V Vserossijskoj nauchno-prakticheskoy konferencii. Rostov-na-Donu, 2022; 120–3 (in Rus.).
17. Skoblina NA, Milushkina OJu, Popov VI, Markelova SV, Bokareva NA, Tatarinchik AA, et al. Ot tradicionnogo k distancionnomu obucheniju: gigenicheskie problemy ohrany zdorov'ja obuchajushhihsja. Gigiena i sanitarija. 2021; 100 (4): 373–9 (in Rus.). DOI: <https://doi.org/10.47470/0016-9900-2021-100-4-373-379>.
18. Platonova NS, Tulupeva TV. Jemocional'noe liderstvo: vzaimosvjaz' urovnja obrazovanija i jemocional'nogo intellekta. Upravlenskoe konsultirovanie. 2020; 10 (142): 109–23 (in Rus.). DOI: [10.22394/1726-1139-2020-10-109-123](https://doi.org/10.22394/1726-1139-2020-10-109-123).
19. Svidunovich AD. Vzaimosvjaz' uspešnosti uchebnoj dejatel'nosti i osobennostej samodeterminacii lichnosti. V sbornike: Molodezh'. Nauka. Sovremennost'. Sbornik statej VII Vserossijskoj nauchno-prakticheskoy konferencii s mezhdunarodnym uchastiem. Izhevsk, 2020; 146–9 (in Rus.).
20. Chamunderswari S. Emotional intelligence and academic achievement among students at the higher secondary level. International Journal of Academic Research in Economics and Management Sciences. 2013; 2 (4): 178–87.
21. Costa A, Faria L. Implicit theories of emotional intelligence, ability and trait-emotional intelligence and academic achievement. Psihologijske Teme. 2020; 29 (1): 43–6.
22. Perikova EI, Lovjagina AE, Byzova VM. Jefferektivnost' metakognitivnyh strategij prinjatija reshenij v uchebnoj dejatel'nosti. Science for Education Today. 2019; 9 (4): 19–35 (in Rus.).
23. Iolkina NI. Neuspevajushhie obuchaemye v processe usvoenija inostrannyh jazykov: sodержanie ponjatija i tipologija. Vestnik Samarskogo gosudarstvennogo tehničeskogo universiteta. Serija: Psihologo-pedagogičeskie nauki. 2019; 4 (44): 74–87 (in Rus.). DOI: [10.17673/vsgtu-pps.2019.4.5](https://doi.org/10.17673/vsgtu-pps.2019.4.5).
24. Kochetova JuA, Klimakova MV. Jemocional'nyj intellekt i tipy mezhlčnostnyh otnošenij u molodyh ljudej s različnymi sociometričeskimi statusami. Psihologo-pedagogičeskie issledovanija. 2021; 13 (3): 98–117 (in Rus.).
25. Kotomina OV. Issledovanie vzaimosvjazi jemocional'nogo intellekta i akademicheskoj uspevaemosti studentov universiteta. Obrazovanie i nauka. 2017; 19 (10): 96–110 (in Rus.). DOI: [10.17853/1994-5639-2017-10-96-110](https://doi.org/10.17853/1994-5639-2017-10-96-110).
26. Milushkina OJu, Skoblina NA, Markelova SV, et al. Simulation game to educate medical students about healthy lifestyle. Russian Bulletin of Hygiene. 2021; (1): 15–18. DOI: [10.24075/rbh.2021.002](https://doi.org/10.24075/rbh.2021.002).
27. Nosacheva EA. Zdorov'esberezhenie studentov posredstvom ispol'zovanija interaktivnyh metodov obuchenija. V sbornike: Aktual'nye problemy realizacii zdorov'esberegajushhih tehnologij v obrazovatel'noj srede. Sbornik materialov V Vserossijskoj nauchno-prakticheskoy konferencii; Rostov-na-Donu. 2022; 83–6 (in Rus.).
28. Serikov SG. Zdorov'esberezhenie studentov s ogranichenymi vozmožnostjami zdorov'ja v inkluzivnom obrazovatel'nom processe vuza. Vestnik JuUrGU. Serija "Obrazovanie. Pedagogičeskie nauki". 2018; 10 (4): 21–30 (in Rus.). DOI: [10.14529/ped180403](https://doi.org/10.14529/ped180403).
29. Goncharova GA, Lazurenko SB, Drobysheva MM. Zdorov'esberegajushhie tehnologii v processe obuchenija detej s ogranichenymi vozmožnostjami zdorov'ja. Problemy social'noj gigieny, zdravoohraneniya i istorii mediciny. 2022; 30 (4): 673–8 (in Rus.). DOI: [10.32687/0869-866X-2022-30-4-673-678](https://doi.org/10.32687/0869-866X-2022-30-4-673-678).
30. Nurlygajonov IN, Soloveva TA, Lazurenko SB, Golubchikova AV. Zdorov'esberezhenie v obrazovanii obuchajushhihsja s OVZ: principy i organizacija. Psihologičeskaja nauka i obrazovanie. 2022; 27 (5): 34–45 (in Rus.). DOI: <https://doi.org/10.17759/pse.202270503>.
31. Goncharova GA. New digital opportunities in diagnosis and prevention of students' mental health. Russian Bulletin of Hygiene. 2021; (4): 42–6. DOI: [10.24075/rbh.2021.030](https://doi.org/10.24075/rbh.2021.030).
32. Dubrovina EA. Principy sovershenstvovanija obrazovatel'noj sredy dlja detej-invalidov i lic s ogranichenymi vozmožnostjami zdorov'ja (obzor). Saratovskij nauchno-meditsinskij zhurnal. 2022; 18 (3): 452–8 (in Rus.).
33. Vojtovich AA. Analiz povedencheskih riskov u podrostkov s ogranichenymi vozmožnostjami zdorov'ja, imejushhih različnye urovni trevožnosti. Rossijskij mediko-biologičeskij vestnik imeni akademika I. P. Pavlova. 2019; 27 (4): 468–74 (in Rus.). DOI: [10.23888/PAVLOVJ2019274468-474](https://doi.org/10.23888/PAVLOVJ2019274468-474).
34. Milushkina OJu. Tehnologii diagnostiki i profilaktiki narušenij adaptacii detej k sistematičeskemu obucheniju. V knige: Zdorov'e molodezhi: novye vyzovy i perspektivy. Tom 3. M.: Izdatel'sko-poligrafičeskij centr "Nauchnaja kniga", 2019; p. 4161 (in Rus.).
35. Milushkina OJu, Markelova SV, Skoblina NA, et al. Osobennosti obraza zhizni sovremennoj studentcheskoj molodezhi. Zdorov'e naselenija i sreda obitanija. 2018; 11 (308): 5–8 (in Rus.). DOI: [10.35627/2219-5238/2018-308-11-5-8](https://doi.org/10.35627/2219-5238/2018-308-11-5-8).
36. Milushkina OJu, Skoblina NA, Markelova SV, et al. Medical students' hygiene training on healthy eating as part of classes at the department of hygiene. Russian Bulletin of Hygiene. 2022; (3): 4–8. DOI: [10.24075/rbh.2022.050](https://doi.org/10.24075/rbh.2022.050).
37. Skoblina NA, Milushkina OJu, Tatarinchik AA, et al. Mesto gadžetov v obraze zhizni sovremennyh shkol'nikov i studentov. Zdorov'e naselenija i sreda obitanija. 2017; 7 (292): 41–3 (in Rus.). DOI: [10.35627/2219-5237/2017-292-7-41-43](https://doi.org/10.35627/2219-5237/2017-292-7-41-43).
38. Samojlenko NV, Djachenko EV. Obraz pacienta kak sostavljajushhaja obraza mira studentov pri obuchenii v medicinskom vuze. Psihologo-pedagogičeskie issledovanija. 2020; 12 (1): 122–38 (in Rus.). DOI: [10.17759/psyedu.2020120109](https://doi.org/10.17759/psyedu.2020120109).
39. Setko NP, Bulycheva EV. Osobennosti psihojemocional'nogo sostojanija studentov medicinskogo universiteta v usloviyah distancionnogo obuchenija. Medicinskoe obrazovanie i professional'noe razvitie. 2021; 12 (1): 109–16 (in Rus.).
40. Baranov AA, Kuchma VR, Suhareva LM, et al. Profilaktičeskie meroprijatija po bor'be s upotrebleniem narkotikov det'mi i podrostkami na sovremenno jetape: posobie dlja vrachej. M., 2004; 60 p. (in Rus.).

## Литература

1. Концепция реализации до 2030 года национальных целей в сфере науки и высшего образования [Интернет]. Совет по стратегическому развитию и национальным проектам; 13 июля 2020 г. [дата обращения 23.03.2023]. URL: <http://www.coal.sbras.ru/wp-content/uploads/2020/07/Концепция-НЦ-21.07.pdf>.
2. Указ Президента РФ от 7 мая 2018 г. № 204 «О национальных целях и стратегических задачах развития Российской Федерации на период до 2024 года».
3. Миннибаев Т. Ш., Рапопорт И. К., Чубаровский В. В., Тимошенко К. Т., Гончарова Г. А., Катенко С. В. Методические

- рекомендации по комплексной оценке состояния здоровья студентов по результатам медицинских осмотров. Вопросы школьной и университетской медицины и здоровья. 2015; (2): 40–57.
4. Приказ Минобрнауки России от 12.08.2020 № 988 «Об утверждении Федерального государственного образовательного стандарта высшего образования — специалитет по специальности 31.05.01 Лечебное дело».
  5. Приказ Минобрнауки России от 12.08.2020 № 965 «Об утверждении Федерального государственного образовательного стандарта высшего образования — специалитет по специальности 31.05.02 Педиатрия».
  6. Попов В. И., Милушкина О. Ю., Скоблина Н. А., Маркелова С. В., Соколова Н. В., Дементьев А. А. Поведенческие риски здоровью студентов в период проведения дистанционного обучения. Гигиена и санитария. 2020; 99 (8): 854–60. DOI: <https://doi.org/10.47470/0016-9900-2020-99-8-854-860>.
  7. Рапопорт И. К., Лапонова Е. Д., Гудинова Ж. В., Соколова Н. В., Тикашкина О. В., Васьковская Ю. С. Особенности жизнедеятельности и самочувствие студентов в цифровой среде. Гигиена и санитария. 2022; 101 (3): 323–30. DOI: <https://doi.org/10.47470/0016-9900-2022-101-3-323-330>.
  8. Айзман Р. И., Мельникова М. М., Косованова Л. В. Здоровьесберегающие технологии в образовании: учебное пособие для академического бакалавриата. 2-е изд., испр. и доп. М.: издательство Юрайт, 2017; 241 с.
  9. Рыбаковский Л. Л., Калмыкова Н. М., Архангельский В. М. и др. Демография: учебник для вузов. 2-е изд. М.: Логос, 2010; 279 с.
  10. Шлюбуль Е. Ю. Проблемы в определении понятия «здоровьесбережение» в контексте педагогической деятельности. Теория образования и обучения. Образовательные технологии. 2020; (1): 10–19.
  11. Молодцова И. И. Здоровьесбережение студентов в условиях дистанционного обучения. В сборнике: Актуальные проблемы профессионального педагогического и технологического образования. Материалы IX Всероссийской научно-практической конференции; Шадринск, 2021; 221–4.
  12. Назарова Е. Н., Жилев Ю. Д. Здоровый образ жизни и его составляющие: учебное пособие для студентов высших учебных заведений. М.: Академия, 2007; 256 с.
  13. Капилевич Л. В., Андреев В. И. Здоровье и здоровый образ жизни: учебное пособие. Томск: Издательство Томского политехнического университета, 2008; 102 с.
  14. Черная Н. Л., Ганузин В. М., Барабошин А. Т., Маскова Г. С. Анализ факторов, влияющих на образ жизни университетской молодежи. Вопросы школьной и университетской медицины и здоровья. 2020; (2): 56–62.
  15. Елисеева Ю. В., Дубровина Е. А., Елисеев Ю. Ю., Истомин А. В. Состояние реализации здоровьесберегающих технологий в образовательных учреждениях. Здоровье населения и среда обитания. 2017; 4 (289): 35–7.
  16. Шолудченко И. Е. Формирование здоровьесберегающих компетенций в условиях смешанного обучения. В сборнике: Актуальные проблемы реализации здоровьесберегающих технологий в образовательной среде. Сборник материалов V Всероссийской научно-практической конференции. Ростов-на-Дону, 2022; 120–3.
  17. Скоблина Н. А., Милушкина О. Ю., Попов В. И., Маркелова С. В., Бокарева Н. А., Татаринчик А. А. и др. От традиционного к дистанционному обучению: гигиенические проблемы охраны здоровья обучающихся. Гигиена и санитария. 2021; 100 (4): 373–9. DOI: <https://doi.org/10.47470/0016-9900-2021-100-4-373-379>.
  18. Платонова Н. С., Тулупьева Т. В. Эмоциональное лидерство: взаимосвязь уровня образования и эмоционального интеллекта. Управленческое консультирование. 2020; 10 (142): 109–23. DOI: [10.22394/1726-1139-2020-10-109-123](https://doi.org/10.22394/1726-1139-2020-10-109-123).
  19. Свидунович А. Д. Взаимосвязь успешности учебной деятельности и особенностей самодетерминации личности. В сборнике: Молодежь. Наука. Современность. Сборник статей VII Всероссийской научно-практической конференции с международным участием. Ижевск, 2020; 146–9.
  20. Chamunderswari S. Emotional intelligence and academic achievement among students at the higher secondary level. International Journal of Academic Research in Economics and Management Sciences. 2013; 2 (4): 178–87.
  21. Costa A, Faria L. Implicit theories of emotional intelligence, ability and trait-emotional intelligence and academic achievement. Psihologijske Teme. 2020; 29 (1): 43–6.
  22. Перикова Е. И., Ловягина А. Е., Бызова В. М. Эффективность метакогнитивных стратегий принятия решений в учебной деятельности. Science for Education Today. 2019; 9 (4): 19–35.
  23. Иголкина Н. И. Неуспевающие обучаемые в процессе усвоения иностранных языков: содержание понятия и типология. Вестник Самарского государственного технического университета. Серия: Психолого-педагогические науки. 2019; 4 (44): 74–87. DOI: [10.17673/vsgtu-pps.2019.4.5](https://doi.org/10.17673/vsgtu-pps.2019.4.5).
  24. Кочетова Ю. А., Климакова М. В. Эмоциональный интеллект и типы межличностных отношений у молодых людей с различными социометрическими статусами. Психолого-педагогические исследования. 2021; 13 (3): 98–117.
  25. Котомина О. В. Исследование взаимосвязи эмоционального интеллекта и академической успеваемости студентов университета. Образование и наука. 2017; 19 (10): 96–110. DOI: [10.17853/1994-5639-2017-10-96-110](https://doi.org/10.17853/1994-5639-2017-10-96-110).
  26. Милушкина О. Ю., Скоблина Н. А., Маркелова С. В. и др. Деловая игра как метод повышения информированности обучающихся медицинского вуза о навыках здорового образа жизни. Российский вестник гигиены. 2021; (1): 15–18. DOI: [10.24075/rbh.2021.002](https://doi.org/10.24075/rbh.2021.002).
  27. Носачева Е. А. Здоровьесбережение студентов посредством использования интерактивных методов обучения. В сборнике: Актуальные проблемы реализации здоровьесберегающих технологий в образовательной среде. Сборник материалов V Всероссийской научно-практической конференции. Ростов-на-Дону, 2022; 83–6.
  28. Сериков С. Г. Здоровьесбережение студентов с ограниченными возможностями здоровья в инклюзивном образовательном процессе вуза. Вестник ЮУрГУ. Серия «Образование. Педагогические науки». 2018; 10 (4): 21–30. DOI: [10.14529/ped180403](https://doi.org/10.14529/ped180403).
  29. Гончарова Г. А., Лазуренко С. Б., Дробышева М. М. Здоровьесберегающие технологии в процессе обучения детей с ограниченными возможностями здоровья. Проблемы социальной гигиены, здравоохранения и истории медицины. 2022; 30 (4): 673–8. DOI: [10.32687/0869-866X-2022-30-4-673-678](https://doi.org/10.32687/0869-866X-2022-30-4-673-678).
  30. Нурлыгаянов И. Н., Соловьева Т. А., Лазуренко С. Б., Голубчикова А. В. Здоровьесбережение в образовании обучающихся с ОВЗ: принципы и организация. Психологическая наука и образование. 2022; 27 (5): 34–45. DOI: <https://doi.org/10.17759/pse.2022270503>.
  31. Гончарова Г. А. Новые возможности цифровых технологий в диагностике и профилактике психического здоровья обучающихся. Российский вестник гигиены. 2021; (4): 42–6. DOI: [10.24075/rbh.2021.030](https://doi.org/10.24075/rbh.2021.030).
  32. Дубровина Е. А. Принципы совершенствования образовательной среды для детей-инвалидов и лиц с ограниченными возможностями здоровья (обзор). Саратовский научно-медицинский журнал. 2022; 18 (3): 452–8.
  33. Войтович А. А. Анализ поведенческих рисков у подростков с ограниченными возможностями здоровья, имеющих различные уровни тревожности. Российский медико-биологический вестник имени академика И. П. Павлова. 2019; 27 (4): 468–74. DOI: [10.23888/PAVLOVJ2019274468-474](https://doi.org/10.23888/PAVLOVJ2019274468-474).
  34. Милушкина О. Ю. Технологии диагностики и профилактики нарушений адаптации детей к систематическому обучению. В книге: Здоровье молодежи: новые вызовы и перспективы. Том 3. М.: Издательско-полиграфический центр «Научная книга», 2019; с. 4161.
  35. Милушкина О. Ю., Маркелова С. В., Скоблина Н. А. и др. Особенности образа жизни современной студенческой молодежи. Здоровье населения и среда обитания. 2018; 11 (308): 5–8. DOI: [10.35627/2219-5238/2018-308-11-5-8](https://doi.org/10.35627/2219-5238/2018-308-11-5-8).

36. Милушкина О. Ю., Скоблина Н. А., Маркелова С. В. и др. Гигиеническое воспитание студентов-медиков по вопросам здорового питания в рамках занятий на кафедре гигиены. Российский вестник гигиены. 2022; (3): 4–8. DOI: 10.24075/rbh.2022.050.
37. Скоблина Н. А., Милушкина О. Ю., Татаринчик А. А. и др. Место гаджетов в образе жизни современных школьников и студентов. Здоровье населения и среда обитания. 2017; 7 (292): 41–3. DOI: 10.35627/2219–5237/2017–292–7–41–43.
38. Самойленко Н. В., Дьяченко Е. В. Образ пациента как составляющая образа мира студентов при обучении в медицинском вузе. Психолого-педагогические исследования. 2020; 12 (1): 122–38. DOI: 10.17759/psyedu.2020120109.
39. Сетко Н. П., Бульчева Е. В. Особенности психоэмоционального состояния студентов медицинского университета в условиях дистанционного обучения. Медицинское образование и профессиональное развитие. 2021; 12 (1): 109–16.
40. Баранов А. А., Кучма В. Р., Сухарева Л. М. и др. Профилактические мероприятия по борьбе с употреблением наркотиков детьми и подростками на современном этапе: пособие для врачей. М., 2004; 60 с.

## HYGIENE TRAINING OF SCHOOLCHILDREN AND STUDENTS USING THE "HABIT TRACKERS – CHECKLISTS" TECHNOLOGY

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Healthy lifestyle formation is one of the tasks of the hygiene education of children, adolescents and young adults. That is why it is necessary for educational institutions to implement the technologies focused on health preservation in students. The study was aimed to develop and test the technology for hygiene training of students. In 2017–2019 we tested the "Habit Trackers – Checklists" technology in dynamics within the framework of the hygiene training of schoolchildren in the Moscow and Astrakhan regions, and in 2021–2023 the technology was tested for college and university students. A total of 502 schoolchildren, 234 college students, and 429 university students were enrolled. In educational institutions, where the hygiene training program was implemented, the number of schoolchildren with the diseases of the musculoskeletal system and connective tissue decreased by 1.4 times, and the number of students with eye diseases decreased by 2.6 times compared to other educational institutions of the Astrakhan region. Later, when the technology was tested for college and university students, the number of students having medium and high levels of physical activity increased from 46.0% (before the hygiene training) to 72.0% (after the hygiene training). The findings allow us to recommend replicating the proposed hygiene training program in educational institutions.

**Keywords:** schoolchildren, students, hygiene education, checklists, healthy lifestyle

**Author contribution:** the authors have made equal contributions to preparation of a publication.

**Compliance with ethical standards:** the study was approved by the Ethics Committee of the Pirogov Russian National Research Medical University (protocol № 203 of 20 December 2020, protocol № 209 of 28 June 2021) and the Ethics Committee of the Astrakhan State Medical University (protocol № 9 of 19 June 2017). The informed consent was obtained for each study participant. The study was consistent with the principles of biomedical ethics and did not endanger the subjects.

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## ГИГИЕНИЧЕСКОЕ ВОСПИТАНИЕ ШКОЛЬНИКОВ И СТУДЕНТОВ С ИСПОЛЬЗОВАНИЕМ ТЕХНОЛОГИИ «ТРЕКЕРЫ ПРИВЫЧЕК — ЧЕК-ЛИСТЫ»

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Одной из задач гигиенического воспитания детей, подростков и молодежи является формирование здорового образа жизни. В этой связи организациям, осуществляющим образовательную деятельность, необходима реализация технологий, направленных на здоровьесбережение обучающихся. Целью работы было разработать и апробировать технологию гигиенического воспитания обучающихся. С 2017 по 2019 г. в динамике апробировали технологию «Трекеры привычек — чек-листы», применяя ее в гигиеническом воспитании школьников Московского и Астраханского регионов, а в период с 2021 по 2023 г. технологию апробировали для студентов колледжа и вуза. В исследовании приняли участие 502 школьника, 234 студента колледжа и 429 студентов вуза. В образовательных учреждениях, где была внедрена программа гигиенического воспитания, число школьников с болезнями костно-мышечной системы и соединительной ткани снизилось в 1,4 раза, с болезнями глаза и его придаточного аппарата — в 2,6 раза по сравнению с другими образовательными организациями Астраханского региона. Впоследствии, когда технология была апробирована для студентов колледжа и вуза, число студентов, демонстрировавших средний и высокий уровень двигательной активности, выросло с 46,0% (до гигиенического воспитания) до 72,0% (после проведения гигиенического воспитания). Результаты исследования позволяют рекомендовать тиражирование предложенной программы гигиенического воспитания в образовательных организациях.

**Ключевые слова:** школьники, студенты, гигиеническое воспитание, чек-листы, формирование здорового образа жизни

**Вклад авторов:** авторы внесли равный вклад в подготовку публикации.

**Соблюдение этических стандартов:** исследование одобрено этическим комитетом РНИМУ имени Н. И. Пирогова (протокол № 203 от 20 декабря 2020 г., протокол № 209 от 28 июня 2021 г.) и этическим комитетом ФГБОУ ВО Астраханский ГМУ Минздрава России (протокол № 9 от 19 июня 2017 г.). Добровольное информированное согласие было получено для каждого участника. Исследование соответствовало принципам биомедицинской этики и не подвергало опасности участников.

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The objectives of hygiene education of children, adolescents and youth as one of the areas of the public health system multidimensional activity are shaping the healthy lifestyle and improvement of the hygiene skills aimed at health promotion [1–4].

The health-preserving technologies as a component of educational environment intended to reduce the negative

impact of various factors are characterized by indiscriminate use of methods [5–7].

The issue of improving motivation to participate in the hygiene education programs and stimulation of interest to healthy lifestyle using the activity elements popular among students are discussed in the scientific literature [8–11].



## Гигиенический норматив

### Учеба

Время на выполнение домашнего задания:  
до 2 часов – ученики младших классов,  
2-3 часа – ученики средних классов,  
3-4 часа – старшеклассники.

Рациональная организация рабочего места и соответствие роста-возрастным показателям школьника. Контроль правильности посадки ребенка во время выполнения домашнего задания.

Естественное и искусственное освещение должно быть с левой стороны, не бить в глаза (ребенок – левша, то наоборот).

Работа за персональным компьютером, ноутбуком, на планшете и др. с учётом занятий в школе:  
1-2 класс – 80 мин;  
3-4 класс – 90 мин;  
5-9 класс – 120 мин;  
10-11 класс – 170 мин.



## Совет, как выполнить

- перед выполнением домашнего задания немного отдохни или прогуляйся;
- настрой свет и садись таким образом, чтобы он падал с левой стороны (если ты левша – то справа);
- чередуй выполнение письменных и устных заданий;
- в школе и дома старайся сидеть правильно, спину и голову держи ровно, ноги должны быть согнуты в коленях, ступни полностью опираются на пол или на подставку для ног;
- не делай уроки, лёжа на диване или в кресле;
- не работай с планшетом или смартфоном на максимальной яркости, не держи их близко перед глазами;
- пользуйся компьютером или ноутбуком только по необходимости.



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## Принципы здорового образа жизни для детей школьного возраста

Здоровый образ жизни – залог здоровья, хорошего самочувствия и успехов в учебе!

Fig. 1. Example of a booklet for hygiene training of schoolchildren

Educational institutions play a vital part in the issues related to the health of children and adolescents. That is why it is important to bring the proven technologies that contribute to health preservation in children, adolescents and youth, the effectiveness of which is scientifically grounded, to the work of the institutions.

The study was aimed to develop and test the technology for hygiene training of students.

## METHODS

In 2017–2019, we tested the “Habit Trackers — Checklists” technology in dynamics within the framework of the hygiene training of schoolchildren in the Moscow and Astrakhan regions. In 2021–2023, the technology was tested among college and university students. The study involved 502 schoolchildren attending various schools of the Astrakhan region (gymnasiums, lyceums, secondary schools); 234 college students studying in various areas of training (Tourism and Hospitality, Hair Styling Technology and Makeup Design, Economics and Accounting, Information Systems and Programming, Cookery and Confectionery); 429 university students (Pirogov Russian National Research Medical University).

Inclusion criteria: age 7–20 years; belonging to the group of students; availability of the informed consent. Exclusion criteria: another age group; not belonging to the group of students; no informed consent available.

Statistical processing of the data obtained was performed using the Statgraphics (Statgraphics Technologies; USA), Microsoft Office Excel (Microsoft; USA), Statistica 13 PL (StatSoft; USA) software packages. The Student's *t*-test

for independent samples was used to assess the significance of differences between the mean values. When testing the statistical hypotheses, the significance level was set as  $p \leq 0.05$ .

## RESULTS

Various preventive, health-improving and health-preserving technologies are quite often used in educational institutions, however, the use of such technologies is haphazard, and the measures are often selected based on the teacher's subjective beliefs. There is usually no verification of the effectiveness of implementation of such technologies.

In the Astrakhan region, we tested a comprehensive multidisciplinary approach proposed by the Ministry of Education of the Astrakhan Region and the Department of Hygiene of the Faculty of Preventive Medicine, Astrakhan State Medical University, considering the regional particularities and environmental factors influencing children. The “Habit Trackers — Checklists” technology was developed and tested, the instructional materials for implementation of the technology were prepared. The habit tracker is a tool that helps develop good habits. This may be in the form of a paper notebook, leaflet or a healthy lifestyle smartphone application. It is used to record the habit and the days of the task completion. The tracker helps incorporate new good habits and get rid of old ones. It is believed that on average, a habit takes 30 days to develop. Checklists are the lists of tips and actions widely used in the modern education system, i.e. represent the format that can be understood by today's schoolchildren. The checklists developed for schoolchildren provide simple

and easily achievable recommendations on shaping adherence to healthy lifestyle in school students. Thus, the checklist for schoolchildren contained the following recommendations:

- take a break or take a walk before doing homework;
- fine-tune the amount of light and sit down so that the light falls from the left (from the right if you are a left-hander);
- alternate between writing and oral tasks;
- at school and at home try to maintain a correct sitting position with your back and head straight, legs bent at the knees, feet flat on the floor or footrest;
- do not do your homework lying down on the sofa or in the armchair;
- do not use a tablet or smartphone holding it close to your eyes;
- check the time on your electronic device.

To provide the hygiene training of schoolchildren, educational institutions themselves developed a visual guide in the form of booklets containing information about the main components of daily routine and principles of healthy eating. The booklets were posted on the websites of the educational institutions taking part in the study, and the hard copies were distributed during the parents' meetings. The materials developed turned out to be in demand, these were used in the practice of the Regional Center for Public Health and Medical Prevention of the Astrakhan region (Fig. 1).

The proposed approach showed its effectiveness: in educational institutions, where the hygiene training was conducted, the number of schoolchildren with the diseases of the musculoskeletal system and connective tissue decreased by 1.4 times, and the number of students with eye diseases decreased by 2.6 times compared to other educational institutions of the Astrakhan region.

Later the technology was tested for college and university students. The technology made it possible to improve the students' awareness of the issues related to healthy lifestyle and the degree of adherence to the principles of healthy living.

Almost all students (95.0%) learned how to use the health smartphone applications and started to monitor their physical activity and other parameters (Fig. 2). During their hygiene training 90.0% of students subscribed for various Internet resources provided by the medical institutions engaged in preventive work among the population.

During the technology testing the students chose the habit they wanted to develop themselves and created a specific habit tracker. The vast majority of students (85.5%) focused on the habit tracker for improvement of the levels of physical activity and chose the checklist for improvement of physical activity among the checklists developed within the framework of the checklist-based technology methodological support.

The materials developed turned out to be in demand, these were used in the practice of the Regional Center for Public Health and Medical Prevention of the Yamal-Nenets Autonomous Area, being the leader in the field of preventive work among the population (Fig. 3).

The proposed approach showed its effectiveness: the number of students having medium and high levels of physical activity increased from 46.0% (before the hygiene training) to 72.0% (after the hygiene training) ( $p \leq 0.05$ ).

## DISCUSSION

The importance of health protection in children and adolescents is determined by the fact that deterioration of health in this population group can worsen unfavourable demographic situation, reduce the country's labor, defense and intellectual potential [12, 13].

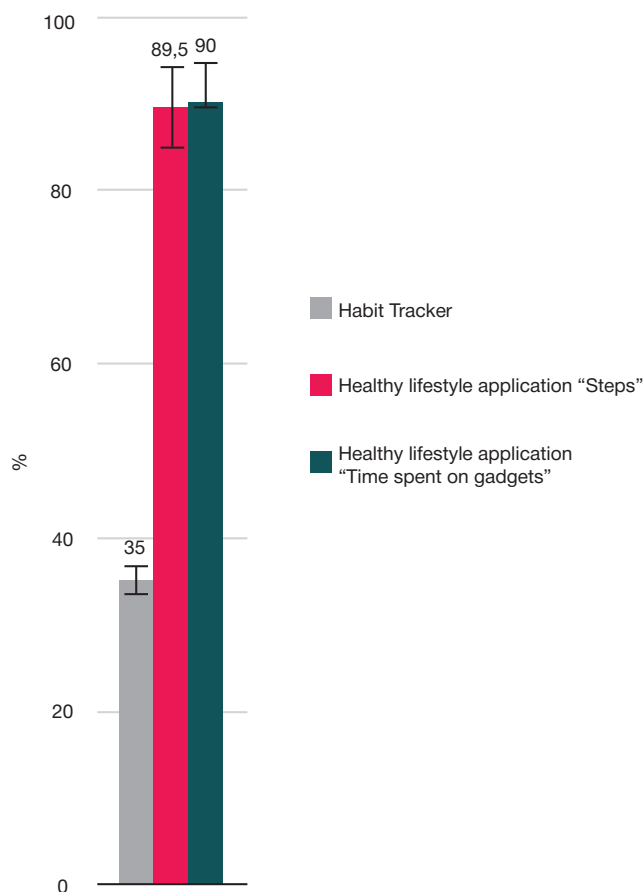


Fig. 2. The rates of various health smartphone applications the students started using on a regular basis after the hygiene training (%)



Fig. 3. Example of a booklet for hygiene training of students

The students' vision of the healthy lifestyle is on a tabloid level, it implies mainly the lack of harmful habits. Many schoolchildren and students do not realize that the key roles are also played by healthy eating, restful sleep, sufficient physical activity, coping skills, skills of proper spare time management. This suggests their insufficient awareness and insufficient adherence to the principles of healthy living [14–19].

However, the literature describes not all the techniques for hygienic training of students that contribute to formation of health-preserving skills, proper assessment of the risk of eye diseases, disorders of the musculoskeletal system, etc.

Useful skills can be applied via the habit tracker applications allowing one to develop a good habit within a certain time period [20].

Checklists are an essential component of the process of useful skill development and preparation of the hygiene

training materials. The practical significance of checklists has been proven when using these for consolidation of acquired skills in the youth and skills training. The checklist is a memo used to note important moments and subsequently applied during activities. It may look like a mini plan or algorithm of actions for prevention of problems related to vision, stress, etc. [21].

Testing and assessment of the efficiency of the proposed technology suggest the increase in the students' awareness of the health risk factors, preventive measures, healthy lifestyle basics, and learning health-preserving skills in daily life.

## CONCLUSIONS

The findings allow us to recommend replicating the proposed technology as one of the practices used for effective hygiene training of students of all skill levels.

## References

1. Kuchma VR, Milushkina OJu, Bokareva NA, Skobolina NA. Sovremennye napravleniya profilakticheskoy raboty v obrazovatel'nykh organizatsiyah. *Gigiena i sanitariya*. 2014; 93 (6): 107–11 (in Rus.).
2. Lipanova LL, Nasybullina GM. Gigienicheskaya ocenka kompetentnosti shkol'nikov v voprosakh ukrepleniya zdorov'ya i formirovaniya zdorovogo obraza zhizni. *Zdorov'e naseleniya i sreda obitaniya — ZNiSO*. 2018; 12 (309): 36–40 (in Rus.). DOI: 10.35627/2219-5238/2018-309-12-36-40.
3. Lipanova LL, Nasybullina GM. Gigienicheskoe obosnovanie sistemy ukrepleniya zdorov'ya obuchajushchih v obshheobrazovatel'nykh shkolakh Ekaterinburga. *Voprosy shkol'noj i universitetskoj mediciny i zdorov'ya*. 2019; (3): 59–60 (in Rus.).
4. Polunina NV, Polunin VS, Buslaeva GN. Zdorov'ye obraz zhizni — vazhnejshij faktor, opredelyajushhij zdorov'e individuuma i obshhestva v celom. *Sovremennye problemy zdravoohraneniya i medicinskoj statistiki*. 2019; (5): 136–7 (in Rus.).
5. Rapoport IK, Sokolova SB, Chubarovskij VV. Sistematizacija profilakticheskikh i ozdorovitel'nykh tehnologij kak instrument sovershenstvovaniya zdorov'esberegajushhej dejatel'nosti v shkolakh. *Zdorov'e naseleniya i sreda obitaniya — ZNiSO*. 2016; 10 (283): 26–8 (in Rus.).
6. Setko AG, Zhdanova OM, Tyurin AV. Scientific justification of the innovative approach to health control in students from general educational institutions of various types. *Russian Bulletin of Hygiene*. 2021; (3): 12–6. DOI: 10.24075/rbh.2021.024.
7. Aleksandrova IJe, Sokolova SB, Hramcov PI, Vershinina MG. Trebovaniya k razrabotke i ocenke jeffektivnosti zdorov'esberegajushhih obrazovatel'nykh tehnologij. *Shkol'nye tehnologii*. 2022; (1): 90–6 (in Rus.). DOI: 10.52422/22202641\_2022\_1\_90.
8. Eliseeva JuV, Dubrovina EA, Eliseev JuJu, Istomin AV. Sostojanie zdorov'esberegajushhih tehnologij v obrazovatel'nykh uchrezhdenijah. *Zdorov'e naseleniya i sreda obitaniya — ZNiSO*. 2017; 4 (289): 35–7 (in Rus.). DOI: 10.35627/2219-5238/2017-289-4-35-37.
9. Devrishov RD, Dauletova LA, Gelachev MG. Gigienicheskaja ocenka rezhima dnja i pitaniya studentov medicinskogo universiteta. *Mezhdunarodnyj nauchno-issledovatel'skij zhurnal*. 2021; 12-2 (114): 156–9 (in Rus.). DOI: 10.23670/IRJ.2021.114.12.063.
10. Kolomin VV, Kudryasheva IA, Devrishov RD, Khorosheva IV, Gololobov MI, Khabchiev RK, et al. Health aspects of innovation in modern society. *Russian Bulletin of Hygiene*. 2021; (2): 19–21. DOI: 10.24075/rbh.2021.013.
11. Lee A, Lo Chee Siu A, Keung WM, Kwong CMA, Wong KK. Effective health promoting school for better health of children and adolescents: indicators for success. *BMC Public Health*. 2019; 19 (1): 1088. DOI: 10.1186/s12889-019-7425-6.
12. Akishin SV, Dementev AA. Ocenka riska dlja zdorov'ja faktorov obraza zhizni obuchajushhejsja molodezhi. *Vestnik novykh medicinskih tehnologij. Jelektronnoe izdanie*. 2020; (1): 77–84 (in Rus.). DOI: 10.24411/2075-4094-2020-16535.
13. Kuchma VR, Sokolova SB, Rapoport IK, Chubarovskij VV. Vlijanie povedencheskikh faktorov riska na formirovanie otklonenij v sostojanii zdorov'ja obuchajushchih. *Gigiena i sanitariya*. 2022; 101 (10): 1206–13 (in Rus.). DOI: 10.47470/0016-9900-2022-101-10-1206-1213.
14. Skobolina NA, Milushkina OJu, Tatarinchik AA, Fedotov DM. Mesto gadzhetov v obraze zhizni sovremennykh shkol'nikov i studentov. *Zdorov'e naseleniya i sreda obitaniya — ZNiSO*. 2017; 7 (292): 41–3 (in Rus.). DOI: 10.35627/2219-5237/2017-292-7-41-43.
15. Shubochkina EI, Ivanov VJu, Blinova EG, Novikova II, Janushanec OI, Petrova EA. Regional'nye osobennosti zhiznedejatel'nosti i zdorov'ja uchashchihsja podrostkovogo vozrasta (po dannym mnogocentrovnykh issledovanij). *Zdorov'e naseleniya i sreda obitaniya — ZNiSO*. 2018; 8 (305): 47–50 (in Rus.). DOI: 10.35627/2219-5238/2018-305-8-47-50.
16. Kuchma VR, Gorelova ZhJu, Ivanenko AV, Petrenko AO, Soloveva JuV, Letuchaja TA, et al. Nauchnoe obosnovanie i razrabotka sovremennykh racionov pitaniya shkol'nikov. *Pediatrica. Zhurnal imeni G.N. Speranskogo*. 2019; 98 (3): 124–34 (in Rus.). DOI: 10.24110/0031-403H-2019-98-3-124-134.
17. Bronskih NA, Sharenko EM, Popova OS, Nasybulina GM. Hygienic description of lifestyle factors among students of colleges. *Russian Bulletin of Hygiene*. 2022; (4): 19–25. DOI: 10.24075/rbh.2022.057.
18. Medvedeva NY, Gunina SV, Urtenova AY. Contributions of certain lifestyle factors to health status of contemporary schoolchildren. *Russian Bulletin of Hygiene*. 2023; (1): 17–21. DOI: 10.24075/rbh.2023.064.
19. Goncharova DG, Sokolova AI, Izotova LV. Self-assessment of health and lifestyle as a basis for understanding health preservation by schoolchildren. *Russian Bulletin of Hygiene*. 2023; (1): 4–7. DOI: 10.24075/rbh.2023.061.
20. Badikova IK. Ispol'zovanie tehnologij chek-listov dlja organizacii nauchno-issledovatel'skoj dejatel'nosti studentov v oblasti pedagogiki i psihologii. *Vestnik Voronezhskogo gosudarstvennogo universiteta. Serija: Problemy vysshego obrazovaniya*. 2018; (3): 168–73 (in Rus.).
21. Shaposhnikova EV, Maisenko DA, Egorova AT, Galaktionova MJu. Opyt ispol'zovaniya "chek-listov" v ocenke vypolneniya professional'nykh navykov po akusherstvu. *Alma mater (Vestnik vysshej shkoly)*. 2016; (8): 109–12 (in Rus.). DOI: http://dx.doi.org/10.20339/AM.08-16.109.



## Литература

1. Кучма В. Р., Милушкина О. Ю., Бокарева Н. А., Скоблина Н. А. Современные направления профилактической работы в образовательных организациях. Гигиена и санитария. 2014; 93 (6): 107–11.
2. Липанова Л. Л., Насыбуллина Г. М. Гигиеническая оценка компетентности школьников в вопросах укрепления здоровья и формирования здорового образа жизни. Здоровье населения и среда обитания — ЗНиСО. 2018; 12 (309): 36–40. DOI: 10.35627/2219-5238/2018-309-12-36-40.
3. Липанова Л. Л., Насыбуллина Г. М. Гигиеническое обоснование системы укрепления здоровья обучающихся в общеобразовательных школах Екатеринбурга. Вопросы школьной и университетской медицины и здоровья. 2019; (3): 59–60.
4. Полунина Н. В., Полунин В. С., Буслаева Г. Н. Здоровый образ жизни — важнейший фактор, определяющий здоровье индивидуума и общества в целом. Современные проблемы здравоохранения и медицинской статистики. 2019; (5): 136–7.
5. Рапопорт И. К., Соколова С. Б., Чубаровский В. В. Систематизация профилактических и оздоровительных технологий как инструмент совершенствования здоровьесберегающей деятельности в школах. Здоровье населения и среда обитания — ЗНиСО. 2016; 10 (283): 26–8.
6. Сетко А. Г., Жданова О. М., Тюрин А. В. Научное обоснование инновационного подхода к управлению здоровьем обучающихся общеобразовательных организаций различного типа. Российский вестник гигиены. 2021; (3): 12–6. DOI: 10.24075/rbh.2021.024.
7. Александрова И. Э., Соколова С. Б., Храмцов П. И., Вершинина М. Г. Требования к разработке и оценке эффективности здоровьесберегающих образовательных технологий. Школьные технологии. 2022; (1): 90–6. DOI: 10.52422/22202641\_2022\_1\_90.
8. Елисеева Ю. В., Дубровина Е. А., Елисеев Ю. Ю., Истомин А. В. Состояние здоровьесберегающих технологий в образовательных учреждениях. Здоровье населения и среда обитания — ЗНиСО. 2017; 4 (289): 35–7. DOI: 10.35627/2219-5238/2017-289-4-35-37.
9. Девришов Р. Д., Даулетова Л. А., Гелачев М. Г. Гигиеническая оценка режима дня и питания студентов медицинского университета. Международный научно-исследовательский журнал. 2021; 12-2 (114): 156–9. DOI: 10.23670/IRJ.2021.114.12.063.
10. Коломин В. В., Кудряшева И. А., Девришов Р. Д., Хорошева И. В., Хабчиев Р. К., Гололобов М. И. и др. Гигиенические аспекты инновационных процессов в современном обществе. Российский вестник гигиены. 2021; (2): 20–3. DOI: 10.24075/rbh.2021.013.
11. Lee A, Lo Chee Siu A, Keung WM, Kwong CMA, Wong KK. Effective health promoting school for better health of children and adolescents: indicators for success. BMC Public Health. 2019; 19 (1): 1088. DOI: 10.1186/s12889-019-7425-6.
12. Акишин С. В., Дементьев А. А. Оценка риска для здоровья факторов образа жизни обучающейся молодежи. Вестник новых медицинских технологий. Электронное издание. 2020; (1): 77–84. DOI: 10.24411/2075-4094-2020-16535.
13. Кучма В. Р., Соколова С. Б., Рапопорт И. К., Чубаровский В. В. Влияние поведенческих факторов риска на формирование отклонений в состоянии здоровья обучающихся. Гигиена и санитария. 2022; 101 (10): 1206–13. DOI: 10.47470/0016-9900-2022-101-10-1206-1213.
14. Скоблина Н. А., Милушкина О. Ю., Татаринчик А. А., Федотов Д. М. Место гаджетов в образе жизни современных школьников и студентов. Здоровье населения и среда обитания — ЗНиСО. 2017; 7 (292): 41–3. DOI: 10.35627/2219-5237/2017-292-7-41-43.
15. Шубочкина Е. И., Иванов В. Ю., Блинова Е. Г., Новикова И. И., Янушанец О. И., Петрова Е. А. Региональные особенности жизнедеятельности и здоровья учащихся подросткового возраста (по данным многоцентровых исследований). Здоровье населения и среда обитания — ЗНиСО. 2018; 8 (305): 47–50. DOI: 10.35627/2219-5238/2018-305-8-47-50.
16. Кучма В. Р., Горелова Ж. Ю., Иваненко А. В., Петренко А. О., Соловьева Ю. В., Летучая Т. А. и др. Научное обоснование и разработка современных рационов питания школьников. Педиатрия. Журнал имени Г. Н. Сперанского. 2019; 98 (3): 124–34. DOI: 10.24110/0031-403X-2019-98-3-124-134.
17. Бронских Н. А., Шаренко Е. М., Попова О. С., Насыбуллина Г. М. Гигиеническая характеристика факторов образа жизни учащихся колледжей. Российский вестник гигиены. 2022; (4): 19–25. DOI: 10.24075/rbh.2022.057.
18. Медведева Н. Ю., Гунина С. В., Уртенкова А. Ю. Вклад отдельных факторов образа жизни в формирование состояния здоровья современных школьников. Российский вестник гигиены. 2023; (1): 18–22. DOI: 10.24075/rbh.2023.064.
19. Гончарова Д. Г., Соколова А. И., Изотова Л. В. Самооценка состояния здоровья и образа жизни как основа формирования представлений школьников о здоровьесбережении. Российский вестник гигиены. 2023; (1): 4–8. DOI: 10.24075/rbh.2023.061.
20. Бадикова И. К. Использование технологии чек-листов для организации научно-исследовательской деятельности студентов в области педагогики и психологии. Вестник Воронежского государственного университета. Серия: Проблемы высшего образования. 2018; (3): 168–73.
21. Шапошникова Е. В., Маисеенко Д. А., Егорова А. Т., Галактионова М. Ю. Опыт использования «чек-листов» в оценке выполнения профессиональных навыков по акушерству. Alma mater (Вестник высшей школы). 2016; (8): 109–12. DOI: <http://dx.doi.org/10.20339/AM.08-16.109>.

## HEALTH PROVISION TO STUDENTS IN RUSSIA IN THE PAST AND TODAY

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Currently, a significant increase in the drive to get higher education is noted among young people. After falling into new conditions, students experience changes in their lifestyle and quality of life, as well as training mode. They have trouble adjusting to the new social and cultural community. The study was aimed to study the students' lifestyle, assess their health status, and compare the conditions of medical care provision to students in the past and today. The questionnaire survey involved 151 students (grades 1–3) of the Pirogov Russian National Research Medical University. The students noted changes in their sleep, diet, physical activity due to severe psychoemotional load arising from falling into new educational environment and exploring the higher education programs. Some students reported exacerbation of chronic diseases. The findings and the literature analysis make it possible to conclude that it is necessary to establish student outpatient clinics allowing for annual health screening.

**Keywords:** student communes, preventive measures, care provision to students, youth, students' health, harmful habits, unbalanced diet, age-related features

**Author contribution:** Bashmakov OA, Gunko AL — data acquisition, manuscript writing.

**Compliance with ethical standards:** all students submitted the informed consent to study participation.

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## ОКАЗАНИЕ МЕДИЦИНСКОЙ ПОМОЩИ СТУДЕНТАМ В РОССИИ В ПРОШЛОМ И НАСТОЯЩЕМ

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В настоящее время отмечают заметный рост стремления к получению высшего образования у молодежи. При попадании в новые условия у студентов происходят изменения в образе и качестве жизни, режиме обучения, возникают проблемы с адаптацией в измененном социокультурном обществе. Целью настоящего исследования было изучить образ жизни студентов, проанализировать состояние их здоровья, сравнить условия оказания медицинской помощи студентам в прошлом и настоящем. В исследовании, проведенном методом анкетирования, приняли участие 151 студент (1–3 курс) ФГАОУ ВО РНИМУ имени Н. И. Пирогова Минздрава России. Студенты отметили изменения сна, питания, физической активности из-за серьезных психоэмоциональных нагрузок, возникших при попадании в новую образовательную среду и освоении образовательных программ высшей школы. Некоторые из них сообщили об обострении хронических заболеваний. Полученные в ходе исследования данные и анализ литературы позволяют сделать вывод о необходимости создания студенческих поликлиник, в которых можно было бы ежегодно проводить диспансеризацию.

**Ключевые слова:** студенческие коммуны, профилактические мероприятия, медицинская помощь студентам, молодежь, здоровье обучающихся, вредные привычки, несбалансированное питание, возрастные особенности

**Вклад авторов:** О. А. Башмаков, А. Л. Гунько — сбор материала, написание статьи.

**Соблюдение этических стандартов:** все студенты подписали добровольное информированное согласие на участие в исследовании.

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Students attending educational institutions can be considered as a distinct population group with a number of characteristic features related to the age peculiarities, type of activity, living conditions, and other parameters of their everyday life. The declining trend of this social group general health associated with the negative impact of a number of adverse factors can be noted [1–3].

Today, a significant increase in the drive to get higher education is noted among young people. While in 1991 the number of students was about 2,824,500 people, in 2019 it reached 4,068,327 people [4].

Thus, due to rapidly increasing size of the group and the number of indications for the dynamic monitoring of the group members' health status and maintaining its high level, it is necessary to organize preventive measures and the measures focused on the early diagnosis and timely treatment of disorders.

The scheduled preventive health screening has been going on in recent years in Russia. Of course, all the citizens are covered by this scheme. A number of the higher education institutions arrange examination of students and employees in the outpatient clinics and medical centers

with which a treaty on healthcare provision exists. Such a model is implemented in the Peoples' Friendship University of Russia (RUDN). Students can take the examination they need for free (under the Compulsory Health Insurance) and use a number of healthcare services in the Clinical Diagnostic Center of the RUDN University.

Along with health screening, recently the check-ups often conducted at the Departments by the specialist doctors have become widely available. These allow one to conduct primary examination, detect some conditions and prevent certain complications, such as early stage of hypertension. Such check-ups are conducted in the Pirogov Russian National Research Medical University.

The complex of examinations conducted during triennial health screening in the age group of 18–30 years is as follows:

1) questionnaire: the doctor finds out the complaints, the family history of the disease and the symptoms typical for the most prevalent and dangerous diseases: cardiovascular, bronchopulmonary, gastrointestinal tract disorders. In addition, he/she fills the items about harmful habits, diet, and physical activity;



2) anthropometric measurements: stature, body weight and waist circumference are measured. The doctor uses these data to determine the body mass index;

3) blood pressure measurement;

4) estimation of total cholesterol levels in blood;

5) estimation of fasting blood glucose levels;

6) chest fluoroscopy (every two years);

7) electrocardiography (during the first preventive health screening, then, at the age of 35 years and older, every year);

8) intraocular pressure measurement (during the first preventive health screening, then, at the age of 40 years and older, every year);

9) gynecological examination (every year for women aged 18–39).

The primary aim of the study was to examine the processes of organizing the healthcare provision and preventive measures for health preservation in students at different times. In accordance with the aim, the study objectives were to determine the current features of the spread of chronic and acute disorders among students of medical higher educational institutions; to study the features of healthcare provision and preventive measures for preservation of students' health at different times; to develop proposals for the implementation of the above measures that are relevant at the moment.

## METHODS

The empirical study conducted in the Pirogov Russian National Research Medical University in the fall semester of the 2022/2023 academic year involved students of grades 1–3 (151 students, among them 107 females and 44 males). The subjects' age was 18–25 years. The questionnaire survey was conducted to obtain information about the students' health status. The questionnaire included questions about the students' age, gender, chronic diseases and the history of acute disorders in the last calendar year, as well as about their physical fitness, features of diet and daily routine, presence or absence of harmful habits.

To provide full and comprehensive analysis of the research problem we conducted the review of literature on medical care provision to students in Russia at different historical stages. Statistical analysis of the data obtained was performed by standard methods using the Excel spreadsheet (Microsoft; USA).

## RESULTS

The analysis of the surveyed sample health state showed the following:

1) a total of 30 respondents (19.9%) had chronic disorders affecting various organs and systems (chronic gastritis, chronic pancreatitis, bronchial asthma, congenital heart defect, etc.);

2) a total of 144 respondents (95.4%) had a history of acute respiratory virus disease in the last calendar year, among them 94 people (62.2%) got ill three times and more;

3) a total of 121 respondents (81.1%) exercised regularly;

4) a total of 69 respondents (46.7%) believed that their diet was full and balanced;

5) a total of 12 respondents (7.9%) used nicotine (cigarettes, e-cigarettes and tobacco heating systems) on a regular basis;

6) a total of 146 respondents (96.7%) slept less than 8 h per day, among them 52 people slept less than 4 h per day.

## DISCUSSION

The state government had been seeking for the mechanisms to control large population since 1920s. This was accomplished

through leveling the significance of such concepts, as personal freedom, private space. The group cult, creation of new social relationship forms, active promotion of collectivism had a marked impact on the daily life of all categories of citizens, including students [5].

Thus, in 1920s the first students' communes were established that allowed a certain number of students of higher education institutions to maintain a common household [6]. Thanks to the establishment of the students' communes, their members could substantially improve their material condition and establish some kind of domestic interaction [7].

The communard students shared financial and material resources that were common for all members of the commune. The communards even had common underwear [9, 10]. This aspect of their everyday life could lead to the active spread of infectious diseases, thereby significantly reducing people's general health, the same as the fact of accommodation of a sufficiently large number of students in one fairly small room.

Moreover, low income of the communard students contributed to a rather poor quality diet being a key factor of the development of gastrointestinal disorders, vitamin deficiencies, etc. [5].

During the World War II and the postwar period all the efforts of healthcare workers were focused on providing qualified, full medical care to victims of military operations. That is why no full medical check-ups or preventive healthcare measures for students were organized.

The heyday of preventive activities to protect the health of students falls on the end of the last century. The state policy contributed to realization of these on an ongoing basis by providing the following:

1) More than 30,000 specialized inpatient and outpatient clinics.

2) About 50,000 outpatient clinics and departments belonging to higher education institutions.

3) Medical and feldsher health centers, as well as dental clinics.

4) 175 student sanatoriums.

All the above organizations executed the common task: realization of preventive, therapeutic and diagnostic activities aimed at preservation, maintenance, and restoration of the students' health. During the Soviet era the main documents regulating preventive measures in the late 20<sup>th</sup> century were the Order of the Ministry of Healthcare of the USSR dated May 30, 1986 № 770 "On the Procedure for Conducting a General Medical Examination of the Population" and the "Statute of the Procedure for Conducting a General Medical Examination of the Population" issued on May 30, 1986 [8].

The fundamental unit that executed this task consisted of the student outpatient clinic and specialized student departments of urban outpatient clinics. Their key functions were as follows:

1) providing full-fledged qualified outpatient medical care to students of higher educational institutions;

2) organizing and conducting various activities aimed at prevention and reduction of morbidity among students of higher educational institutions;

3) comprehensive control of the students' admission to training in accordance with the current requirements of the lists of medical indications and contraindications to getting higher education;

4) organizing and conducting annual preventive examinations for students of higher education institutions of all grades with further support of individuals who needed additional diagnosis when they were through subsequent diagnostic tests during the examination;

5) organizing and implementing anti-epidemic measures.

However, by the end of the last century one could see that student outpatient clinics were not enough, and the development of this area was rather slow. As time passed, this problem grew exponentially: many pre-existing student outpatient clinics were liquidated, while organizations that continued to function, had no organized system for purchase of new equipment and medicines, as well as for employment of new staff members and encouraging the work of employees.

It is assumed that students can get medical care in the basic urban and municipal outpatient clinics, however, this approach has a number of disadvantages:

1) it is often noted that physicians working in urban and municipal outpatient clinics have no specific experience of working with the discussed social group;

2) regular preventive examinations and routine outpatient monitoring of the students' health are impossible. Thus, there is a fixed age that is preferable for health screening: the check-ups conducted at the age of 18 and 21 years fall on the period of studentship;

3) preventive measures aimed at preserving the health of this social group cannot be implemented.

To provide a thorough discussion of the problem, we studied whether it was possible for students to get the above medical care in medical universities of Moscow.

Thus, the Pirogov Russian National Research Medical University provides the possibilities of attaching to the "university-controlled" urban outpatient clinic № 203 and passing the annual medical examination in this clinic. A discount on paid medical services, provided by specialists, who work in the educational institution, specifically on the consultations provided by opticians-optometrists, obstetrician-gynecologist and dentist, is provided to students of the University.

The foreign students' health status is also actively monitored in the University. According to federal laws of the Russian Federation, all foreign students are obliged to have health insurance and pass annual medical examinations. To be admitted to studies at the medical institutions of Moscow, as well as to curricular practical training and clinical practice, foreign students have annual medical examinations. Thanks to close cooperation between the University and the clinics that provide medical care under the Compulsory Health Insurance, foreign students undergo health screening in a timely manner and receive all the necessary medical care. The software to control the expiry dates of health insurance and documents on the University foreign students' health status allowing one to enter information about all medical documents and analyze its relevance has been developed. Controlling the health insurance availability and the relevance of medical documents on the health status, as well as active cooperation between the University and medical institutions allow foreign students to preserve and improve their health, enable the timely diagnosis of a number of disorders, as well as timely treatment and prevention of complications.

Medical care provision and health screening for students are organized in the other medical university, Sechenov First Moscow State Medical University. However, admission is carried out in the same way, i.e. in a common queue. This significantly increases the duration of health screening, despite the fact that this aspect is often the main factor of the student's motivation to pass a preventive examination.

When comparing the leading medical universities, mention should also be made of the stage of development of health screening in other countries. Unfortunately, in the countries of Western Europe, there is currently no free health monitoring

for students. If students want, they can get a paid check-up in any clinic that provides such services.

During the period of studying at the higher education institution, i.e. at the age of 17–25 years, young men and women experience termination of the increase in body length, stabilization of pubertal development; the energy expenditures per unit of weight become close to that of adults. At the same time they still have a rather high level of lability of the nervous processes and emotions, excitatory processes clearly predominate over inhibition processes, while plasticity and endurance of the central nervous system mechanisms, speed of thinking, learning new information, and switching attention from one activity to another are rather high.

Meanwhile, a rapid increase in the load on students of higher education institutions is reported annually. The test/exam period implies rather high requirements for the student's level of training, which is associated with the significant overload of his/her intellectual and emotional sphere. According to statistics, the annual increase in the number of cases of various disorders and morbidity rate among young people aged 17–25 is 4–5%. The analysis of statistical data demonstrates the annual decrease of the health index together with the increase in overall morbidity.

In terms of hygiene, the students' everyday life also has many flaws: disturbance of the daily routine, low levels of physical activity, unfavorable conditions for organizing the self-study process and generally not very high quality of life when living in the dormitory are often typical for students. Disturbances of the regime and nature of nutrition resulting from a number of factors, including the financial one, are frequently reported. The members of this age group can also have harmful habits (smoking, alcohol consumption) [11, 12].

"Occupational" disorders affecting students include the following:

- disorders of the musculoskeletal system (scoliosis of varying severity, joint diseases of different etiology);
- gastrointestinal tract disorders (gastritis, duodenitis, digestive disorders, stomach and duodenal ulcers);
- vision problems (myopia);
- central nervous system disease (autonomic dysfunction syndrome, cerebrovascular disease);
- mental disorders (such as depression), etc.

Our findings and the literature analysis have shown that some disorders are definitely peculiar to students. These disorders are associated with the students' daily routine that cannot always be considered as proper and beneficial for students. The results of the questionnaire survey have shown that the increase in the incidence of acute respiratory disorders is observed in students after entering the higher education institution. Furthermore, the majority of respondents have harmful habits and unbalanced diet.

## CONCLUSIONS

The data provided allow us to draw some conclusions. Due to unbalanced diet, undefined working hours and frequent exposure to other stressors, students of higher education institutions are characterized by the presence of a number of chronic disorders, the course of which should be controlled in order to provide the necessary treatment. The students' health status should be continuously monitored due to the possibility of some disorders in members of this social group. Unfortunately, a negative trend in the development of this area in the Russian Federation relative to the earlier period (late 20<sup>th</sup> century) is currently observed. The findings allow us to put forward a number of proposals. To organize the full-fledged medical

support of students, it is necessary to adopt the well-ordered legislative framework to regulate the process of free medical care provision to this social group by the specialized medical institutions. To provide students the opportunity to get the full-fledged medical support, it is necessary to raise additional funds from the federal budget and the Compulsory Medical Insurance fund. Furthermore, it is necessary to consider the group of “students” as distinct medical and social community at the state level and make this group a priority

in the development of programs focused on implementation of measures related to health support and healthcare. It is important to develop the specialized medical programs adapted for this specific social group, focused on health support and healthcare among students, and including the development of the scheme for health screening and treatment (if necessary) together with adoption and implementation of the specialized projects aimed at shaping adequate and caring attitude to health in students.

## References

1. Popov VI, Kolesnikova EN, Petrova TN. Zdorov'e uchashhejsja molodezhi: Podhody k ocnke i sovershenstvovaniju. Nauchno-medicinskij vestnik Central'nogo Chernozem'ja. 2014; (58): 60–3 (in Rus.).
2. Zdravoohranenie v Rossii. 2019: Statisticheskij sbornik/Rosstat. M., 2019. 170 p. (in Rus.).
3. Federal'nyj zakon ot 29.12.2012 № 273-FZ “Ob obrazovanii v Rossijskoj Federacii”.
4. Starodubov VI, Tuteljan VA, redaktory. Sistema zdorov'esberezhenija studencheskoj molodezhi: HHI vek. monografija. M.: Nauchnaja kniga, 2021; 348 p. (in Rus.).
5. Mamonova E. Kolichestvo rossijan s vysshim obrazovaniem prevysilo 31 procent. Rossijskaja gazeta. 14 ijunja 2021 g. Available from: <https://rg.ru/2021/06/15/kolichestvo-rossiian-s-vysshim-obrazovaniem-prevysilo-31-procent.html>.
6. Artemenkov AA. Dinamika zabolevaemosti studentov v processe obucheniya. Zdravoohranenie Rossijskoj Federacii. 2012; (1): 47–9 (in Rus.).
7. Borshhenskaja TI, Bacukova NL, Sazanovec AV, et al. Gigienicheskaja ocnka vlijaniya uslovij obuchenija na sostojanie zdorov'ja studentov-medikov. Zdorov'e i okružhajushhaja sreda. 2016; (26): 71–3 (in Rus.).
8. Prikaz Minzdrava SSSR ot 30.05.1986 № 770 “O porjadke provedeniya vseobshhej dispanserizacii naselenija”.
9. Kuchma VR, Gorelova ZhJu, Jamshhikova NL. Ocnka polnocennosti i adekvatnosti pitaniya, korekcija fakticheskogo pishhevogo raciona: uchebno-metodicheskoe posobie dlja studentov pediatričeskogo fakul'teta. M.: Pervyj MGIMU im. I.M. Sečenova, 2014; 30 p. (in Rus.).
10. Rozhkov AJu. Molodoj chelovek v sovetskoj Rossii 1920-h godov: povsednevnaja zhizn' v gruppah sverstnikov [dissertacija]. Krasnodar, 2003. (In Rus.).
11. Bocharov. Kak razvivajas' kommuna (Iz opyta 2-go MGU). Krasnaja molodezh'. 1924; (3): 116–9 (in Rus.).
12. Pozdenko. O kommunah II MGU. Krasnoe studenčestvo. 1926; (11): 20–4 (in Rus.).

## Литература

1. Попов В. И., Колесникова Е. Н., Петрова Т. Н. Здоровье учащейся молодежи: Подходы к оценке и совершенствованию. Научно-медицинский вестник Центрального Черноземья. 2014; (58): 60–3.
2. Здравоохранение в России. 2019: Статистический сборник/ Росстат. М., 2019; 170 с.
3. Федеральный закон от 29.12.2012 № 273-ФЗ «Об образовании в Российской Федерации».
4. Стародубов В. И., Тутельян В. А., редакторы. Система здоровьесбережения студенческой молодежи: XXI век. монография. М.: Научная книга, 2021; 348 с.
5. Мамонова Е. Количество россиян с высшим образованием превысило 31 процент. Российская газета. 14 июня 2021 г. URL: <https://rg.ru/2021/06/15/kolichestvo-rossiian-s-vysshim-obrazovaniem-prevysilo-31-procent.html>.
6. Артеменков А. А. Динамика заболеваемости студентов в процессе обучения. Здравоохранение Российской Федерации. 2012; (1): 47–9.
7. Борщенская Т. И., Бацукова Н. Л., Сазановец А. В. и др. Гигиеническая оценка влияния условий обучения на состояние здоровья студентов-медиков. Здоровье и окружающая среда. 2016; (26): 71–3.
8. Приказ Минздрава СССР от 30.05.1986 № 770 «О порядке проведения всеобщей диспансеризации населения».
9. Кучма В. Р., Горелова Ж. Ю., Ямщикова Н. Л. Оценка полноценности и адекватности питания, коррекция фактического пищевого рациона: учебно-методическое пособие для студентов педиатрического факультета. М.: Первый МГМУ им. И.М. Сеченова, 2014; 30 с.
10. Рожков А. Ю. Молодой человек в советской России 1920-х годов: повседневная жизнь в группах сверстников [диссертация]. Краснодар, 2003.
11. Бочаров. Как развивалась коммуна (Из опыта 2-го МГУ). Красная молодежь. 1924; (3): 116–9.
12. Позденко. О коммунах II МГУ. Красное студенчество. 1926; (11): 20–4.