

## CORRELATION BETWEEN BEHAVIORAL FACTORS, PHYSICAL ACTIVITY, AND ACADEMIC PERFORMANCE OF MEDICAL STUDENTS

Prokhorov PYu ✉

Tula State University, Tula, Russia

Young adults suffer from high educational load when studying at the medical university. University training proceeds under the dynamically changing conditions. Psychological discomfort, low physical activity, noncompliance with the principles of rational nutrition, harmful habits can negatively affect both students' physical health and their academic performance. The review of scientific papers published in the international and Russian databases, eLibrary, PubMed, Cyberleninka, in 2019–2024 is provided. Analysis of the papers will allow us to choose the best health preservation practices. Information about the correlation between behavioral factors, academic performance and health of medical students is essential for prevention programming. The development of exercises considering personal preferences in physical activity can positively affect academic performance, reduce psycho-emotional discomfort, thereby reducing the risk of professional burnout after graduation from the university.

**Keywords:** academic performance, students, lifestyle, physical activity, medical university

✉ **Correspondence should be addressed:** Pavel Yu. Prokhorov  
Prospekt Lenina, 92, Tula, 300012, Russia; prohorov\_71@bk.ru

**Received:** 01.11.2024 **Accepted:** 01.11.2024 **Published online:** 18.06.2025

**DOI:** 10.24075/rbh.2025.129

## ВЗАИМОСВЯЗЬ ПОВЕДЕНЧЕСКИХ ФАКТОРОВ, ФИЗИЧЕСКОЙ АКТИВНОСТИ И УСПЕШНОСТИ ОБУЧЕНИЯ В МЕДИЦИНСКОМ ВУЗЕ

П. Ю. Прохоров ✉

Тульский государственный университет, Тула, Россия

Во время обучения в медицинском вузе молодые люди сталкиваются с высокой учебной нагрузкой. Обучение в вузе происходит в динамически изменяющихся условиях. Психологический дискомфорт, низкий уровень физической активности, несоблюдение принципов рационального питания, вредные привычки могут негативно влиять как на физическое здоровье, так и на успешность обучения студентов. Представлен обзор научных статей, опубликованных в международных и российских базах данных eLibrary, PubMed, КиберЛенинка в 2019–2024 гг. Анализ публикаций позволит отобрать лучшие практики здоровьесбережения. Сведения о взаимосвязи поведенческих факторов и успешности обучения в медицинском вузе и здоровья необходимы для составления программ профилактики. Разработка упражнений с учетом индивидуальных предпочтений в физической активности может благоприятно отразиться на успешности обучения, уменьшить психоэмоциональный дискомфорт, тем самым снизив риск профессионального выгорания после окончания учебного заведения.

**Ключевые слова:** успешность обучения, студенты, образ жизни, физическая активность, медицинский вуз

✉ **Для корреспонденции:** Павел Юрьевич Прохоров  
Проспект Ленина, д. 92, г. Тула, 300012, Россия; prohorov\_71@bk.ru

**Статья получена:** 01.11.2024 **Статья принята к печати:** 01.11.2024 **Опубликована онлайн:** 18.06.2025

**DOI:** 10.24075/rbh.2025.129

Health preservation during training is relevant for students in all countries. The learning process is accompanied by alteration of social conditions and lifestyle [1, 2].

Today, it seems urgent to maintain the contingent of students in medical universities due to the shortage of doctors in the Russian Federation. It is traditionally believed that academic load associated with mastering medical specialties, especially in junior students, is considerably higher compared to the workload of students with other directions of training [3].

Health deterioration can be one of the causes of academic performance reduction leading to termination of training. It is well-known that behavioral factors associated with lifestyle are considered to play an important role in health preservation under changing conditions [4].

The lack of motivation to learn and the increasing psychological discomfort represent the factors both reducing academic performance during training and leading to leaving the profession after graduation from the higher educational institution [5].

Investigation of the effect of health preservation indicators on academic performance in specialists mastering the postgraduate training programs is also relevant [6].

The study aimed to assess and summarize information about the effect of health preservation indicators on academic performance in medical students.

The review of scientific papers published in the international and Russian databases, E-Library, PubMed, Cyberleninka, in 2019–2024 was conducted.

Most papers are focused on assessing the correlation between academic performance and the young adults' health and lifestyle indicators during training. It is difficult to assess the effect of health preservation indicators on the academic performance of student youth due to its multifaceted nature.

Deterioration of the health indicators that are somehow associated with lifestyle, poor nutrition, excessive intake of fast food and carbonated beverages, insufficient sleep, reduced motor activity, increased psycho-emotional load due to learning intensity, as well as spending much time staring at the computer monitor, tablet or phone is more and more often reported in today's adolescents [7].

Reduced physical activity in adolescents is reported all over the world. And yet, regular physical activity is a potent method to adjust adolescents' body weight and prevent non-communicable diseases in the future [8].

Knowledge of primary school students and their parents about hygiene is insufficient, which can reduce academic performance during training. The questionnaire survey of 322 primary school students and 487 parents showed that it was difficult to answer the question about permissible amounts of sugar and sugar-sweetened beverages on the daily diet for 68.3% of students and 70% of parents. Only 70% of students and 75% of parents specified the normal amount of salt in the diet correctly [9].

In the initial years of university, young adults demonstrate low adherence to the principles of rational nutrition. And yet, nutrition, being a modifiable aspect of healthy lifestyle, is more and more often considered as a prerequisite for successful learning. Thus, assessment of nutritional status in 663 Malaysian university students revealed the correlation between adherence to rational nutrition and academic performance [10, 11].

A systematic review assessing the students' adherence to the Mediterranean Diet showed that the decrease in consumption of fruit and vegetables, as well as the increase in consumption of sugar-sweetened beverages were negatively correlated to the average academic score in students [12].

Consumption of products with high content of low-quality fat, sugars can result in mental fatigue. Thus, assessment of the answers related to the daily diet of 161 students attending the medical university in Florida (USA) showed that students with higher academic scores more often answered that they did not consume fast food (63%), than students with lower academic scores (33%) [13].

Inclusion of fish and seafood, along with foods with high protein content in the diet can improve cognitive functions in young adults and have a beneficial effect on the learning process [14].

However, insufficient consumption of foods with high protein content is typical for student youth. Gender differences in food choices may also be observed [15].

Catering also has an effect on academic performance. Inclusion of breakfast in the daily routine can positively affect learning. Breakfast with loved ones has a beneficial effect on the young adults' psycho-emotional state [16].

Students master various programs when studying at the medical university. Young adults study principles of rational nutrition within the framework of hygienic training. Complementing the classes with the easy-to-memorize visuals, check-lists can improve the training process and thereby ensure the long-term storage of knowledge about the basics of nutrition in the future physicians [17].

Physical activity improves memory consolidation processes, brings the sleep-wake cycle back to normal, contributing to adaptation to training [18].

Assessment of academic performance in 379 female students of medical colleges in Saudi Arabia showed that students, who reported their physical activity status as low, had lower academic scores [19].

Physical activity status can change during training. The analysis of physical activity levels in young adults studying at the University of Munich (Germany) showed that more than a half of respondents reported the decrease in their physical activity during training [20].

At the same time, after graduating from the medical university, when being through the postgraduate education program, the physical activity status of graduates continues to decline, but the risk of professional burnout increases [21].

The data on the influence of various methods and physical activity complexes on adaptation and academic performance are controversial; the development of exercises for optimization of lifestyle indicators is currently relevant [22, 23].

Harmful habits have a negative effect on both students' health and their academic performance. Assessment of the risk factors of non-communicable diseases in 2036 medical students in Tomsk (1<sup>st</sup> to 6<sup>th</sup> year) showed that the rate of smoking reached 16.7%. The rate of alcohol consumption significantly increased in senior students compared to junior students [24].

Besides the fact that smoking negatively affects physical health and represents a serious medical and social issue, it also can negatively affect the young adults' academic performance. When conducting the questionnaire survey of 411 being through bachelor programs in universities of Canada, smoking was conducted as a predictor of bad marks [25].

In addition to low average academic score, medical students with the smoking experience of 2–3 years more often have academic debts. The increase in cigarette smoking is significantly correlated to the larger number of absences and debts [26].

Educational load can increase psychological discomfort in medical students. Anxiety can increase when the students' schedule is inconvenient, especially in individuals with the evening chronotype. It is traditionally believed that students of morning type demonstrate higher academic performance when mastering theoretical subjects, than students of evening type [27].

Psychological well-being is essential for training at the medical university. Comprehensive assessment and optimization of appropriate factors are a priority [28].

## CONCLUSION

The accumulated knowledge about the impact of behavioral factors on academic performance in medical students should be taken into account when developing the programs for individual and mass prevention. Optimization of psycho-emotional state, motivation to learn in students can be realized through ensuring regular physical activity considering personal preferences. The development of personalized exercises can make it possible to improve academic performance of medical students, thereby reducing the risk of professional burnout after graduation.

## References

1. Kuchma VR, Sokolova SB. Osnovnye trendy povedencheskih riskov, opasnyh dlja zdorov'ja. Analiz riska zdorov'ju. 2019; (2): 4–13 (in Rus.). DOI: 10.21668/health.risk/2019.2.01.
2. Milushkina OJu, Skoblina NA, Markelova SV, et al. Gigienicheskaja karakteristika obraza zhizni sovremennoj studencheskoj molodezhi. V knige: Zdorov'e molodezhi: novye vyzovy i perspektivy. M.: Nauchnaja kniga, 2019; 32–44 (in Rus.).
3. Ilevleva OV. Subektivnaja ocenka studentami-medikami svoej priverzhennosti k zdorovomu obrazu zhizni. Voprosy shkol'noj i universitetskoj mediciny i zdorov'ja. 2021; (4): 37–9 (in Rus.).
4. Popov VI. Aktualizacija problemy ohrany zdorov'ja studencheskoj molodezhi. Voprosy shkol'noj i universitetskoj mediciny i zdorov'ja. 2021; (4): 46–7 (in Rus.).

5. Modak MB, Gray AZ. Junior doctor perceptions of education and feedback on ward rounds. *J Paediatr Child Health*. 2021; 57 (1): 96–102. DOI: 10.1111/jpc.15135.
6. Tomilovskij SD, Kolpakov EA, Esin EV, Melnichuk AS, Samushija MA, Vdovina IV, et al. Kompleksnyj analiz obrazovatel'nogo opyta, motivacii i stepeni samovыgoraniya sredi ordinatov. *Kremlevskaja medicina. Klinicheskij vestnik*. 2024; (3): 29–35 (in Rus.).
7. Soloveva JuV, Skoblina NA. Ocenka komponentov obraza zhizni sovremennyh podrostkov. *Sovremennye problemy gigieny, radiacionnoj i jekologicheskoy mediciny: sbornik nauchnyh statej*. Grodno, 2023; 161–5 (in Rus.).
8. Shikaleva AA, Shulaev AV, Titova SA, Ziatdinov AI. Metabolicheskij sindrom i ozhirenie u detej kak social'no-gigienicheskaja problema. *Rossijskij vestnik gigieny*. 2022; (4): 10–3 (in Rus.). DOI: 10.24075/rbh.2022.059.
9. Horosheva IV, Devrishov RD, Skoblina NA, Markelova SV, Kirillova AV. Ocenka znanij o zdorovom pitanii u shkol'nikov mladshih klassov i ih roditelej. *Vestnik novyh medicinskih tehnologij. Jelektronnoe izdanie*. 2024; (2): publikacija 2-1 (in Rus.). DOI: 10.24412/2075-4094-2024-2-2-1.
10. López-Gil JF, Mesas AE, Álvarez-Bueno C, Pascual-Morena C, SazLara A, Cавero-Redondo I. Association between eating habits and perceived school performance: a cross-sectional study among 46,455 adolescents from 42 countries. *Front Nutr*. 2022; (9): 797415. DOI: 10.3389/fnut.2022.797415.
11. Ahmad NSS, Sulaiman N, Sabri MF. Psychosocial factors as mediator to food security status and academic performance among university students. *Int J Environ Res Public Health*. 2022; 19 (9): 5535. DOI: 10.3390/ijerph19095535.
12. Antonopoulou M, Mantzourou M, Serdari A, Bonotis K, Vasios G, Pavlidou E, et al. Evaluating Mediterranean diet adherence in university student populations: does this dietary pattern affect students' academic performance and mental health? *Int J Health Plann Manage*. 2020; 35 (1): 5–21. DOI: 10.1002/hpm.2881.
13. Neuman J, Ina EA, Huq SO, Blanca A, Petrosky SN. Cross-sectional analysis of the effect of physical activity, nutrition, and lifestyle factors on medical students' academic achievement. *Cureus*. 2024; 16 (3): e56343. DOI: 10.7759/cureus.56343.
14. Alkazemi D. Gender differences in weight status, dietary habits, and health attitudes among college students in Kuwait: a cross-sectional study. *Nutr Health*. 2019; 25 (2): 75–84. DOI: 10.1177/0260106018817410.
15. Venevceva JuL, Putlin LV, Prohorov PJu. Problemy racional'nogo pitaniya studentov medicinskogo vuza i puti ih resheniya V knige: Starodubov VA, Tuteljan VA, redaktory. *Zdorovoe pitanie — zdorovaja molodezh': XXI vek*. M.: Nauchnaja kniga, 2022; 129–49 (in Rus.).
16. Chandrasekhar A, Xie L, Mathew MS, Fletcher JG, Craker K, Parayil M, et al. Academic and attendance outcomes after participation in a school breakfast program. *J Sch Health*. 2023; 93 (6): 508–14. DOI: 10.1111/josh.13320.
17. Milushkina OY, Skoblina NA, Markelova SV, Dubrovina EA, levleva OV. Medical students' hygiene training on healthy eating as part of classes at the department of hygiene. *Russian Bulletin of Hygiene*. 2022; (3): 4–8. 2022; (3): 4–8. DOI: 10.24075/rbh.2022.050.
18. Sánchez-Miguel PA, Molina-López J, Vaquero-Solís M, Tapia-Serrano MA. Sedentary behaviours and their relationship with academic performance in adolescents: a mediation analysis. *J Sports Sci*. 2022; 40 (23): 2570–7. DOI: 10.1080/02640414.2023.2174731.
19. Alhazmi A, Aziz F, Hawash MM. Association of BMI, physical activity with academic performance among female students of health colleges of King Khalid University, Saudi Arabia. *Int J Environ Res Public Health*. 2021; 18 (20): 10912. DOI: 10.3390/ijerph182010912.
20. Tan SL, Jetzke M, Vergeld V, Müller C. Independent and combined associations of physical activity, sedentary time, and activity intensities with perceived stress among university students: internet-based cross-sectional study. *JMIR Public Health Surveill*. 2020; 6 (4): e20119. DOI: 10.2196/20119.
21. Howie EK, Cannady N, Messias EL, McNatt A, Walter CS. Associations between physical activity, sleep, and self-reported health with burnout of medical students, faculty and staff in an academic health center. *Sport Sci Health*. 2022; 18 (4): 1311–9. DOI: 10.1007/s11332-022-00902-7.
22. Barbosa A, Whiting S, Simmonds P, Scotini Moreno R, Mendes R, Breda J. Physical activity and academic achievement: an umbrella review. *Int J Environ Res Public Health*. 2020; 17 (16): 5972. DOI: 10.3390/ijerph17165972.
23. Pastor D, Ballester-Ferrer JA, Carbonell-Hernández L, Baladzhaeva S, Cervello E. Physical exercise and cognitive function. *Int J Environ Res Public Health*. 2022; 19 (15): 9564. DOI: 10.3390/ijerph19159564.
24. Kobjakova OS, Deev IA, Fajulina NM, Starovojtova EA, Almikeeva AA, Zagromova TA, et al. Chastota povedencheskih faktorov riska hronicheskijh neinfekcionnyh zabolevanij i uroven' kachestva zhizni u studentov raznyh napravlenij podgotovki v zavisimosti ot goda obucheniya. *Profilakticheskaja medicina*. 2021; 24 (4): 23–9 (in Rus.).
25. Schwartz BD, Pellerine LP, Bray NW, Fowles JR, Furlano JA, Morava A, et al. Binge drinking and smoking are associated with worse academic performance in Canadian undergraduate students. *J Am Coll Health*. 2025; 73 (2): 684–90. DOI: 10.1080/07448481.2023.2232871.
26. Alqahtani JS, Aldhahir AM, Alanazi Z, Alsulami EZ, Alsulaimani MA, Alqarni AA, et al. Impact of smoking status and nicotine dependence on academic performance of health sciences students. *Subst Abuse Rehabil*. 2023; (14): 13–24. DOI: 10.2147/SAR.S393062.
27. Montaruli A, Castelli L, Galasso L, Mulè A, Bruno E, Esposito F, et al. Effect of chronotype on academic achievement in a sample of Italian University students. *Chronobiol Int*. 2019; 36 (11): 1482–95. DOI: 10.1080/07420528.2019.1652831.
28. Popov VI, Milushkina OJu, Skoblina NA, Markelova SV, Sokolova NV, Dementev AA. Povedencheskie riski zdorov'ju studentov v period provedeniya distancionnogo obucheniya. *Gigiena i sanitarija*. 2020; 99 (8): 854–60 (in Rus.).

## Литература

1. Кучма В. Р., Соколова С. Б. Основные тренды поведенческих рисков, опасных для здоровья. *Анализ риска здоровью*. 2019; (2): 4–13. DOI: 10.21668/health.risk/2019.2.01.
2. Милушкина О. Ю., Скоблина Н. А., Маркелова С. В. и др. Гигиеническая характеристика образа жизни современной студенческой молодежи. В книге: *Здоровье молодежи: новые вызовы и перспективы*. М.: Научная книга, 2019; 32–44.
3. Иевлева О. В. Субъективная оценка студентами-медиками своей приверженности к здоровому образу жизни. *Вопросы школьной и университетской медицины и здоровья*. 2021; (4): 37–9.
4. Попов В. И. Актуализация проблемы охраны здоровья студенческой молодежи. *Вопросы школьной и университетской медицины и здоровья*. 2021; (4): 46–7.
5. Modak MB, Gray AZ. Junior doctor perceptions of education and feedback on ward rounds. *J Paediatr Child Health*. 2021; 57 (1): 96–102. DOI: 10.1111/jpc.15135.
6. Томиловский С. Д., Колпаков Е. А., Есин Е. В., Мельничук А. С., Самушия М. А., Вдовина И. В. и др. Комплексный анализ образовательного опыта, мотивации и степени самовыгорания среди ординаторов. *Кремлевская медицина. Клинический вестник*. 2024; (3): 29–35.
7. Соловьева Ю. В., Скоблина Н. А. Оценка компонентов образа жизни современных подростков. *Современные проблемы гигиены, радиационной и экологической медицины: сборник научных статей*. Гродно, 2023; 161–5.
8. Шикалева А. А., Шулаев А. В., Титова С. А., Зиятдинов А. И. Метаболический синдром и ожирение у детей как социально-гигиеническая проблема. *Российский вестник гигиены*. 2022; (4): 10–3. DOI: 10.24075/rbh.2022.059.
9. Хорошева И. В., Девришов Р. Д., Скоблина Н. А., Маркелова С. В., Кириллова А. В. Оценка знаний о здоровом питании у школьников младших классов и их родителей. *Вестник новых*

- медицинских технологий. Электронное издание. 2024; (2): публикация 2-1. DOI: 10.24412/2075-4094-2024-2-2-1.
10. López-Gil JF, Mesas AE, Álvarez-Bueno C, Pascual-Morena C, SazLara A, Cervero-Redondo I. Association between eating habits and perceived school performance: a cross-sectional study among 46,455 adolescents from 42 countries. *Front Nutr*. 2022; (9): 797415. DOI: 10.3389/fnut.2022.797415.
  11. Ahmad NSS, Sulaiman N, Sabri MF. Psychosocial factors as mediator to food security status and academic performance among university students. *Int J Environ Res Public Health*. 2022; 19 (9): 5535. DOI: 10.3390/ijerph19095535.
  12. Antonopoulou M, Mantzorou M, Serdari A, Bonotis K, Vasios G, Pavlidou E, et al. Evaluating Mediterranean diet adherence in university student populations: does this dietary pattern affect students' academic performance and mental health? *Int J Health Plann Manage*. 2020; 35 (1): 5–21. DOI: 10.1002/hpm.2881.
  13. Neuman J, Ina EA, Huq SO, Blanca A, Petrosky SN. Cross-sectional analysis of the effect of physical activity, nutrition, and lifestyle factors on medical students' academic achievement. *Cureus*. 2024; 16 (3): e56343. DOI: 10.7759/cureus.56343.
  14. Alkazemi D. Gender differences in weight status, dietary habits, and health attitudes among college students in Kuwait: a cross-sectional study. *Nutr Health*. 2019; 25 (2): 75–84. DOI: 10.1177/0260106018817410.
  15. Веневцева Ю. Л., Путилин Л. В., Прохоров П. Ю. Проблемы рационального питания студентов медицинского вуза и пути их решения В книге: Стародубов В. И., Тутельян В. А., редакторы. Здоровое питание — здоровая молодежь: XXI век. М.: Научная книга, 2022; 129–49.
  16. Chandrasekhar A, Xie L, Mathew MS, Fletcher JG, Craker K, Parayil M, et al. Academic and attendance outcomes after participation in a school breakfast program. *J Sch Health*. 2023; 93 (6): 508–14. DOI: 10.1111/josh.13320.
  17. Милушкина О. Ю., Скоблина Н. А., Маркелова С. В., Дубровина Е. А., Ивлева О. В. 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.
  18. Sánchez-Miguel PA, Molina-López J, Vaquero-Solís M, Tapia-Serrano MA. Sedentary behaviours and their relationship with academic performance in adolescents: a mediation analysis. *J Sports Sci*. 2022; 40 (23): 2570–7. DOI: 10.1080/02640414.2023.2174731.
  19. Alhazmi A, Aziz F, Hawash MM. Association of BMI, physical activity with academic performance among female students of health colleges of King Khalid University, Saudi Arabia. *Int J Environ Res Public Health*. 2021; 18 (20): 10912. DOI: 10.3390/ijerph182010912.
  20. Tan SL, Jetzke M, Vergeld V, Müller C. Independent and combined associations of physical activity, sedentary time, and activity intensities with perceived stress among university students: internet-based cross-sectional study. *JMIR Public Health Surveill*. 2020; 6 (4): e20119. DOI: 10.2196/20119.
  21. Howie EK, Cannady N, Messias EL, McNatt A, Walter CS. Associations between physical activity, sleep, and self-reported health with burnout of medical students, faculty and staff in an academic health center. *Sport Sci Health*. 2022; 18 (4): 1311–9. DOI: 10.1007/s11332-022-00902-7.
  22. Barbosa A, Whiting S, Simmonds P, Scotini Moreno R, Mendes R, Breda J. Physical activity and academic achievement: an umbrella review. *Int J Environ Res Public Health*. 2020; 17 (16): 5972. DOI: 10.3390/ijerph17165972.
  23. Pastor D, Ballester-Ferrer JA, Carbonell-Hernández L, Baladzhaeva S, Cervello E. Physical exercise and cognitive function. *Int J Environ Res Public Health*. 2022; 19 (15): 9564. DOI: 10.3390/ijerph19159564.
  24. Кобякова О. С., Деев И. А., Файзулина Н. М., Старовойтова Е. А., Альмикеева А. А., Загрюмова Т. А. и др. Частота поведенческих факторов риска хронических неинфекционных заболеваний и уровень качества жизни у студентов разных направлений подготовки в зависимости от года обучения. *Профилактическая медицина*. 2021; 24 (4): 23–9.
  25. Schwartz BD, Pellerine LP, Bray NW, Fowles JR, Furlano JA, Morava A, et al. Binge drinking and smoking are associated with worse academic performance in Canadian undergraduate students. *J Am Coll Health*. 2025; 73 (2): 684–90. DOI: 10.1080/07448481.2023.2232871.
  26. Alqahtani JS, Aldhahir AM, Alanazi Z, Alsulami EZ, Alsulaimani MA, Alqarni AA, et al. Impact of smoking status and nicotine dependence on academic performance of health sciences students. *Subst Abuse Rehabil*. 2023; (14): 13–24. DOI: 10.2147/SAR.S393062.
  27. Montaruli A, Castelli L, Galasso L, Mulè A, Bruno E, Esposito F, et al. Effect of chronotype on academic achievement in a sample of Italian University students. *Chronobiol Int*. 2019; 36 (11): 1482–95. DOI: 10.1080/07420528.2019.1652831.
  28. 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.