DOI: https://doi.org/10.17816/humeco643562 EDN: DWWQOU

Comprehensive assessment of nutritional status in university students

Olga V. Sazonova, Regina V. Hamtsova, Mikhail Yu. Gavryushin, Sabrina R. Trubetskaya, Sophia Yu. Tokareva

Samara State Medical University, Samara, Russia

ABSTRACT

BACKGROUND: The increasing prevalence of nutrition-related disorders among university students, driven by poor dietary habits and high academic workload, warrants special attention. This issue is particularly relevant for medical students, who experience significant psycho-emotional stress during their training. Assessing nutritional status during this period is a crucial aspect of preclinical preventive care, as detected deviations may contribute to chronic diseases, ultimately affecting quality of life and professional performance in future healthcare professionals.

AIM: To conduct a comprehensive assessment of the nutritional status of medical university students.

MATERIALS AND METHODS: A cross-sectional study was conducted among 935 students aged 18–25 years, including an assessment of dietary intake, bioimpedance analysis of body composition, and a questionnaire survey covering dietary habits, meal structure, physical activity, and eating behavior. Statistical analysis was performed using IBM SPSS Statistics 28, including descriptive statistics, normality testing, and significance testing.

RESULTS: Dietary imbalances and macronutrient deficiencies were identified among students. The average BMI was within the normal range in 49.05% of female and 43.52% of male students. Bioimpedance analysis revealed statistically significant differences between students from different academic years and between male and female participants. A significant positive correlation was found between body fat percentage and confectionery consumption frequency, BMI and physical activity levels, as well as BMI and eating behavior type.

CONCLUSION: The identified negative trends in the nutritional status of medical students, particularly in the context of increasing metabolic disorders and the global obesity epidemic, emphasize the need for implementing comprehensive preventive programs aimed at promoting a healthy lifestyle among students.

Keywords: medical students; nutritional status; diet; dietary pattern; eating behavior; physical activity.

To cite this article:
Sazonova OV, Hamtsova RV, Gavryushin MYu, Trubetskaya SR, Tokareva SYu. Comprehensive assessment of nutritional status in university students. *Ekologiya cheloveka (Human Ecology).* 2024;31(8):598–607. DOI: 10.17816/humeco643562 EDN: DWWQOU

Received: 30.12.2024 **Accepted:** 07.02.2025 **Published online:** 20.02.2025

DOI: https://doi.org/10.17816/humeco643562 EDN: DWWQOU

Комплексная оценка пищевого статуса студенческой молодежи

О.В. Сазонова, Р.В. Хамцова, М.Ю. Гаврюшин, С.Р. Трубецкая, С.Ю. Токарева

Самарский государственный медицинский университет, Самара, Россия

АННОТАЦИЯ

Обоснование. Рост алиментарной патологии среди студенческой молодёжи, вызванный несоблюдением принципов рационального питания и высокой загруженностью, требует особого внимания, особенно у студентов-медиков, которые подвержены значительным психоэмоциональным нагрузкам в период обучения. Оценка пищевого статуса в этот период является важным этапом донозологического подхода в профилактике, поскольку выявленные отклонения могут привести к хроническим заболеваниям, влияющим на качество жизни и профессиональную деятельность будущих врачей.

Цель. Комплексная оценка нутритивного статуса студентов медицинского университета.

Материалы и методы. Проведено кросс-секционное исследование, в котором приняли участие 935 студентов 18–25 лет, включающее оценку фактического питания, биоимпедансный анализ состава тела, анкетирование по вопросам структуры и режима питания, физической активности и пищевого поведения. Статистическая обработка выполнена в программе IBM SPSS Statistics 28, включала в себя описательную статистику, определение нормальности распределения, а также оценку статистической значимости.

Результаты. Выявлены нарушения структуры питания, а также макронутриентная неполноценность рациона студентов. Средние значения индекса массы тела определялись у 49,05% девушек и 43,52% юношей. Результаты биоимпедансометрии показали статистически значимые различия среди студентов разных курсов, а также среди юношей и девушек. Обнаружены достоверные положительные корреляции между уровнем жировой массы состава тела и частотой употребления кондитерских изделий, между индексом массы тела и физической активностью, а также зависимость индекса массы тела от типа пищевого поведения.

Заключение. Выявленные негативные тенденции в нутритивном статусе студентов медиков, особенно в условиях распространённости метаболических нарушений и пандемии ожирения, подчёркивают необходимость внедрения комплексных профилактических программ, направленных на обеспечение здорового образа жизни студенческой молодежи.

Ключевые слова: студенты-медики; пищевой статус; рацион питания; структура питания; пищевое поведение; физическая активность.

Как цитировать:

Сазонова О.В., Хамцова Р.В., Гаврюшин М.Ю., Трубецкая С.Р., Токарева С.Ю. Комплексная оценка пищевого статуса студенческой молодежи // Экология человека. 2024. Т. 31, № 8. С. 598–607. DOI: 10.17816/humeco643562 EDN: DWWQOU

Рукопись поступила: 30.12.2024 **Рукопись одобрена:** 07.02.2025 **Опубликована online:** 20.02.2025

DOI: https://doi.org/10.17816/humeco643562 EDN: DWWQOU

医学生群体的营养状况综合评估

Olga V. Sazonova, Regina V. Hamtsova, Mikhail Yu. Gavryushin,
Sabrina R. Trubetskaya, Sophia Yu. Tokareva

Samara State Medical University, Samara, Russia

摘要

论证。由于大学生群体在高强度学习期间未能遵循合理的膳食原则，导致营养相关疾病的发病率上升，该问题尤需重视。尤其是医学生，由于学习过程中承受较大的心理和情绪压力，更容易受到膳食失衡的影响。在此阶段对其营养状况进行评估，是亚临床阶段预防策略的重要组成部分，因为已发现的偏差可能会引发慢性疾病，进而影响未来医生的生活质量和职业活动。

目的。综合评估医科大学生的营养状况。

材料与方法。本研究为横断面研究，共纳入935名18–25岁的学生。评估内容包括实际膳食状况、生物电阻抗分析测定体成分，以及关于膳食结构和模式、体育活动及饮食行为的问卷调查。统计分析使用IBM SPSS Statistics 28软件，包含描述性统计、正态性检验及统计显著性评估。

结果。研究发现大学生的膳食结构存在失衡，膳食的宏量营养素构成不均衡。调查数据显示，女生和男生的平均体重指数分别为49.05%和43.52%。生物电阻抗分析测量结果显示，不同年级学生之间以及性别之间的体成分存在统计学显著差异。此外，研究发现：体脂含量与甜食摄入频率呈正相关，体重指数与体育活动水平呈负相关，体重指数还受饮食行为类型的影响。

结论。研究结果凸显了推广综合性预防项目的必要性，这些项目旨在促进大学生健康的生活方式，尤其是在代谢疾病普遍存在和肥胖流行的背景下，这一需求尤为迫切。

关键词：医学生；营养状况；食物定量；膳食结构；饮食行为；体育活动。

引用本文:
Sazonova OV, Hamtsova RV, Gavryushin MYu, Trubetskaya SR, Tokareva SYu. 医学生群体的营养状况综合评估. *Ekologiya cheloveka (Human Ecology).* 2024;31(8):598–607. DOI: 10.17816/humeco643562 EDN: DWWQOU

收到：30.12.2024 **接受：**07.02.2025 **发布日期:** 20.02.2025

BACKGROUND

Preservation and promotion of public health are directly related to healthy lifestyles [1]. During the student years, balanced diet is a key factor in achieving optimal mental and physical performance, as well as maintaining a healthy body [1–3]. Moreover, a proper diet provides the necessary resistance to the psychoemotional loads, stress, and irregular work and rest schedules that students face during their training [1, 4].

Recently, diet-related disorders have increased among students. This increase is associated with noncompliance with the basic principles of balanced diet and an insufficient physical activity. These factors are due to heavy workloads, lack of time for full meals, frequent consumption of fast food, and consequently, eating disorders [5–8]. Medical students require special attention. Their training includes significant classroom work, laboratory research, and practical experience in medical institutions [9–11].

The most critical stage in the premorbid diagnosis of eating disorders is the assessment of nutritional status. Nutritional deficiencies during the student years may lead to chronic conditions with severe symptoms in adulthood. These conditions will affect the performance and quality of care provided by future health professionals [2, 12].

The **study aimed** to conduct a comprehensive assessment of the nutritional status of medical university students.

MATERIALS AND METHODS

We conducted a cross-sectional study involving 935 students aged 1825 years from Samara State Medical University of the Ministry of Health of the Russian Federation (1st–6th years of study). Prior to inclusion in the study, all participants voluntarily signed an informed consent. The study was approved by the Ethics Committee (protocol No. 297 dated November 20, 2024).

A Google Form questionnaire was used to collect data on dietary habits, eating behavior, and physical activity.[1] The questionnaire included questions developed by the authors about dietary intake, food and dietary patterns, as well as questions from international questionnaires that were translated into Russian. To assess physical activity, for example, a shortened version of the International Physical Activity Questionnaire (IPAQ) was used. This version included 11 questions about the time respondents spent on strenuous and moderate physical activities.[2] The level of physical activity was assessed by comparing the results with the World Health Organization (WHO) guidelines on physical activity and sedentary lifestyles for individuals aged 18 to 64.[3]

The Dutch Eating Behavior Questionnaire (DEBQ) consisting of 33 questions designed to identify different types of eating behaviors was used to evaluate students' dietary habits [13]. We identified three types of eating behaviors: emotiogenic, external, and restrictive. For the emotiogenic type, an emotional trigger is the primary stimulus for eating. For the external type, external stimuli, such as the sight or smell of certain foods, play a key role. The predominant stimuli in the restrictive type are self-restriction in eating and deliberate efforts to maintain the desired weight.

Additionally, the dietary intake and body composition of the students were evaluated. The dietary intake was analyzed using the frequency method with the Nutri-Prof software [14]. The macronutrient composition and energy value of the diet were analyzed and compared with the standard physiological requirements for different population groups in the Russian Federation based on sex, age, and physical activity [15].

Body composition was assessed using bioimpedance analysis (BIA), an instrumental method based on the different electrical conductivities of body tissues. The BIA was performed using the Medass ABC-01 internal environment analyzer (Russia) at a probing current frequency of 50 kHz with the standard tetrapolar scheme. Electrodes were fixed to the wrists and ankles in the supine position. The following parameters were evaluated: basal metabolism, fat mass (kg), lean mass (kg)—which includes active cell mass (kg) and skeletal muscle mass (kg)—and total body water (kg). This method objectively assesses nutritional status and detects increased fat mass in individuals with a normal BMI, also known as normal-weight obesity [16].

Before the BIA analysis, standard anthropometry was performed, including the measurement of body length and weight with certified medical equipment. Body length was measured with a height gauge ("Tves", Russia) with an accuracy of 0.5 cm. Body weight was measured using VEM-150-Massa-K scales (Massa-K, Russia) with an accuracy of 60 g. BMI was then calculated based on the anthropometric measurements and estimated using the centile tables of anthropometric indices of the Russian population [17].

The primary data were statistically processed using the IBM SPSS Statistics 28 software. The following descriptive statistics were calculated: arithmetic mean (M), median (Me), standard error of the mean (m), and interquartile range (25th and 75th percentiles). The Kolmogorov–Smirnov test was used to determine the normality of the distribution of the obtained results. Parametric Student's *t*-test and one-factor analysis of variance (ANOVA) were used to determine the significance of differences between samples with normal

[1] https://docs.google.com/forms/d/1d2iEHkdAmyFnx0TtVU86bule4RFF92BSph-VeeL3ngg/edit.

[2] Guidelines for Data Processing and Analysis of the International Physical Activity Questionnaire (IPAQ) – Short and Long Forms Contents. Available at: https://www.academia.edu/5346814/Guidelines_for_Data_Processing_and_Analysis_of_the_International_Physical_Activity_Questionnaire_IPAQ_Short_and_Long_Forms_Contents.

[3] The World Health Organization. The WHO Global Plan of Action for Increasing Physical Activity for 2018–2030: Increasing people's activity levels to promote global health. Available at: https://www.who.int/ru/news-room/fact-sheets/detail/physical-activity.

distribution. The Mann–Whitney U test was used for samples with a distribution other than normal. The degree of correlation between the indicators was studied using the Spearman correlation coefficient. The significance level was taken at $p < 0.05$.

RESULTS

The questionnaire revealed the peculiarities of students' food patterns at the medical university (see Table 1). Half of the students consume meat products and cereals daily; whereas one-third consume fruit, vegetables, and milk and dairy products. More than 40% of students eat candy, wafers, cookies, gingerbread, cakes, and chocolate daily. In students who have snacks between classes, 79.25% choose these products. Interestingly, over 12% of students do not eat fish and more than 2% refuse to consume dairy products.

A mere 11.1% of respondents adhered to the balanced diet principles; whereas 45.9% attempted to adhere to it and over 43% of respondents did not have a balanced diet. According to 37.9% of respondents, their academic workload and lack of time for full meals affect their eating habits.

The dietary intake assessment (see Table 2) corroborates the survey data. The median energy value of the diet exceeded the recommended energy and nutrient standards by 7.3% for male students and 8.7% for female students. Both sex groups had protein deficiencies (more than 20.8% below the standard for men and approximately 5.0% below the standard for women) and excess carbohydrate intake (5.2% and 3.9%, respectively). Significant differences in dietary intake were found for male and female students in terms of energy value, fat, and carbohydrate intake, but not for protein intake.

When assessing BMI, average values (25th and 75th percentiles) were observed in 43.5% of males and 49.0% of females. Meanwhile, below-average values (10th and 25th percentiles) and low values (3rd and 10th percentiles) were found in 17.2% and 13.3% of male students and 9.8% and 8.8% of female students, respectively. The prevalence of overweight relative to the standard is noteworthy. Values above the 75th and 90th percentiles were found in 13.4% of males and 21.76% of females. High values above the 90th and 97th percentiles were found in 6.8% and 16.0% of males and females, respectively.

The analysis of body composition showed significant differences in students of different years, as well as between females and males.

Thus, sex-specific features of body composition and basal metabolism were revealed for all evaluation parameters except fat mass (see Table 3). The main factors of body weight in students of different sexes are lean mass and total body water, which differ statistically in students of different years and sexes.

The most optimal body composition and metabolism are found in 3rd- and 4th-year students, who have a significant difference compared to 1st- and 2nd-year and 5th- and 6th-year students in terms of lean (p=0.016), active cellular (p=0.019), and skeletal muscle (p=0.018) mass, as well as total body water (p=0.018). There were significant positive correlations between body fat mass measured by BIA and the frequency of confectionery consumption (R=0.53; p=0.04).

Considering the changes in BMI and body fat mass growth, the results of the students' physical activity assessment are unfavorable. Only 3.1% of participants have average physical activity, which corresponds to the WHO's global recommendations, and only 10.4% have an above-average physical activity. Most students (86.5%) had low physical activity, which positively correlated with BMI (R=0.49; p=0.02).

In addition, the relationship between eating behavior types and the BMI of the participants is of interest. According to the DEBQ questionnaire, 7.6% of students do not have a specific eating behavior type; whereas 55.7% have a restrictive type, 24.8% have an emotiogenic type, and 11.9% have an external type. A combination of several eating behaviors was found in 48.2% of students. No significant differences in the relationship between eating behavior types and sex were revealed.

The study showed the relationship between BMI and eating behavior. For example, 72.3% of students without specific eating behaviors had an average BMI (25th to 75th percentile). Conversely, young people with external or emotiogenic eating behaviors had higher weight-to-height ratios with BMIs in the 90th to 97th percentile range; whereas students with restrictive eating behaviors had BMIs in the 10th to 25th

Table 1. Food patterns of students by main food group distribution

Food group	Frequency of use, %			
	Never	Daily	Several times a week	Several times a month
Fruit and vegetables	0.5	27.8	56.4	15.3
Cereals and pasta	0.9	46.1	45.6	7.5
Milk and dairy products	2.4	36.8	44.8	16.0
Meat and poultry	0.4	54.3	38.9	6.3
Fish and seafood	12.8	1.6	15.7	69.8
Confectionery	2.6	43.4	44.3	9.7

Table 2. Energy value and macronutrient content of students' dietary intake

Assessment parameters	Actual dietary intake of male students, Me (25%; 75%)	Percentage of normal physiological requirements for men [15]	Actual dietary intake of female students, Me (25%; 75%)	Percentage of normal physiological requirements for women [15]	Significance of differences by sex
Energy value, kcal	2950.3 (1974.4; 3455.2)	107.3	2390.9 (1355.5; 3022.4)	108.7	p <0.05*
Protein, g	70.5 (54.0; 97.1)	79.2	68.3 (50.1; 91.7)	94.9	p=0.06
Fat, g	100.4 (79.6; 127.0)	109.1	88.6 (70.4; 115.1)	121.4	p <0.05*
Carbohydrates, g	412.3 (358.8; 479.5)	105.2	326.2 (298.3; 366.2)	103.9	p <0.001*

* Significant differences in the energy value and macronutrient composition of students' dietary intake.

Table 3. Bioimpedance analysis of students' body composition (M ± m)

Parameters	1st–2nd years		3th-4th years		5th-6th years	
	Females	Males	Females	Males	Females	Males
Basal metabolism, kcal/day	1347.48±8.98	1744.94±27.79	1376.78±8.54	1801.22±23.70	1359.89±12.03	1766.86±33.88
Significance of differences by sex	p <0.001*		p <0.001*		p <0.001*	
Fat mass, kg	19.82±0.85	17.97±2.21	22.47±0.89	22.35±1.51	22.07±1.43	25.66±3.19
Significance of differences by sex	p=0.35		p=0.942		p=0.246	
Lean mass, kg	41.66±0.45	60.01±1.35	43.14±0.41	61.12±0.90	42.99±0.58	61.80±1.60
Significance of differences by sex	p <0.001*		p <0.001*		p <0.001*	
Active cell mass, kg	23.16±0.28	35.74±0.87	24.08±0.27	37.52±0.75	23.55±0.38	36.42±1.07
Significance of differences by sex	p <0.001*		p <0.001*		p <0.001*	
Skeletal muscle mass, kg	20.14±0.23	32.27±0.62	20.74±0.20	32.14±0.44	20.59±0.31	31.81±0.74
Significance of differences by sex	p <0.001*		p <0.001*		p <0.001*	
Total body water, kg	30.51±0.32	43.94±0.98	31.58±0.30	44.73±0.66	31.47±0.43	45.24±1.17
Significance of differences by sex	p <0.001*		p <0.001*		p <0.001*	

* Significant differences in the mean values of the body composition of university students.

percentile range. It is noteworthy that 79.1% of participants who consume confectionery products daily have external eating behaviors.

DISCUSSION

An analysis of the dietary intake of students showed certain food pattern disturbances in specific product categories, including meat, dairy products, as well as vegetables and fruit. Nutritional assessments of students at the Astrakhan State Medical University and the Ogaryov Mordovian State University had the same findings [10, 18]. Eating disorders in students, particularly those attending medical universities, are likely due to violations of daily and nutritional routines caused by high workloads and a lack of time for meal preparation and consumption.

Disrupting the food pattern may result in quantitative and qualitative dietary deficiencies and macronutrient imbalance. A comparison of the results with data from similar recent studies shows that the dietary patterns of medical students differ significantly by region. An assessment of the diets of Ryazan State Medical University's undergraduate students shows significant dietary deficiencies, mainly due to low carbohydrate consumption, as well as protein and fat deficiencies [1]. Most studies show protein deficiency in the diet [2, 4, 18].

Furthermore, the BMI assessment differ from data from other recent studies of the nutritional status of university

students. In a study conducted by the Omsk State Medical University, 63.27% of participants had a normal body weight, 36.73% were overweight, and no one was underweighted [19]. Studies at the Astrakhan State Medical University showed the following percentages of normal body weight, overweight, and low body weight: 76.9% and 75.0%; 9.6% and 16.7%; and 8.3% and 13.5% for females and males, respectively [2]. Similar results were obtained when assessing the BMI of students at the Ogaryov Mordovian State University, where 70.64% of students had a normal BMI, 19.83% had a high BMI, and 9.53% had a low BMI [18].

The differences in dietary intake assessments and BMI in medical university students may be due to regional differences in the training, nutrition, and fitness of this group. These differences may also be due to different study designs (such as the number of participants, tools, and statistical methods) and require further study.

A study of the body composition of medical students at the Far Eastern Federal University showed that 26.0% of students had a high body fat percentage and 46.2% had a high fat mass in kilograms. Age-related changes were also observed [20]. The same study found that the students were physically inactive, which is confirmed by other Russian studies [21, 22].

Eating behavior of university students is important for the entire healthcare system and the individual prevention of nutritional and metabolic disorders, which are gradually increasing in the Russian Federation.[4] Eating behavior is one of the triggers promoting metabolic and eating disorders. Thus, it is a relevant and informative indicator of a person's nutritional status. The assessment of eating behavior helps identify motivational factors affecting dietary intake, build a nutritional model, and manage the identified disorders. Research conducted on university students shows that nearly half (45.58%) of participants have specific eating behaviors. The most common type is mixed with one in three participants (33.32%) has a combination of restrictive and external or emotiogenic types [19]. Each eating behavior poses specific long-term risks. The emotiogenic type may lead to stress-induced overeating, resulting in excessive caloric intake. Consequently, this may result in overweight and related disorders. The external type leads to a diet dominated by quick snacks with high organoleptic qualities and low nutritional value and bioavailability, especially confectionery and fast food, if there is not enough time for a full meal. Restrictive eating behavior is characterized by tight dietary restrictions followed by periods of emotional eating, which affects body weight and quality of life. However, the correlation between different eating behaviors and BMI is not consistently observed in all studies. This inconsistency may be explained by the influence of other factors on the results, such as anxiety disorders, general health status, and hormonal status [19, 23, 24].

CONCLUSION

The study showed an unfavorable nutritional status in medical university students.

The analysis of dietary intake revealed nutritional deficiencies in the basic product groups and macronutrient deficiency in the diet (protein deficiency with an excess of carbohydrates and fats), which leads to excessive caloric intake. Medical students often disregard their dietary routines due to their demanding academic schedules and limited time, resulting in the consumption of fast food and confectionery snacks.

Additionally, the imbalanced diet is exacerbated by low physical activity in students, which positively correlates with BMI.

The relationship between BMI and eating behavior was revealed; students without a specific eating behavior had a normal body weight; students with external or emotiogenic eating behaviors had a high average BMI; and students with the restrictive eating behavior had a low BMI. The external eating behavior was also observed in most students who consumed confectionery on a daily basis.

A comparison of the results with data from recent Russian studies showed that, despite the generally unfavorable dietary patterns of medical students, there are regional differences in nutritional status.

Due to the high prevalence of diseases associated with eating and metabolic disorders in the Russian Federation, as well as the global pandemic of overweight and obesity, this study emphasize the need for preventive programs aimed at ensuring a healthy lifestyle for students. Educational institutions, where students spend most of their time, play a key role in this process. A comprehensive solution is required that includes improving students' nutrition, creating conditions to encourage adequate physical activity, and providing psychological support to reduce overall stress and prevent eating disorders.

ADDITIONAL INFORMATION

Author contributions. O.V. Sazonova — concept and design of the study; R.V. Hamtsova — data collection, processing, and data analysis; M.Yu. Gavryushin — data analysis, writing the text, editing; S.R. Trubetskaya — statistical processing of the material, editing; S.Yu. Tokareva — data collection, synthesis, structuring, and processing. All authors confirm that their authorship meets the international ICMJE criteria (all authors have made a significant contribution to the development of the concept, research and preparation of the article, read and approved the final version before publication).

Ethics approval. The study was approved by the Ethics Committee of the Federal State Budgetary Educational Institution of Higher

[4] Federal State Statistics Service. Healthcare. Incidence of socially significant diseases among the population. Available at: https://rosstat.gov.ru/folder/13721 Date of access: 12/15/2024.

Education SamSMU of the Ministry of Health of the Russian Federation in accordance with Protocol No. 297 dated 11/20/2024.

Consent for publication. Written consent was obtained from all the study participants before the study screening in according to the study protocol approved by the local ethic committee.

Funding source. This study was not supported by any external sources of funding.

Disclosure of interests. The authors declare that they have no competing interests.

ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ

Вклад авторов. О.В. Сазонова — концепция и дизайн исследования, редактирование статьи; Р.В. Хамцова — сбор и обработка, анализ данных; М.Ю. Гаврюшин — анализ данных, написание текста, редактирование; С.Р. Трубецкая — статистическая обработка материала, редактирование; С.Ю. Токарева — сбор, обобщение, структурирование и обработка данных. Все авторы подтверждают соответствие своего авторства международным критериям ICMJE (все авторы внесли существенный вклад в разработку концепции, проведение исследования и подготовку статьи, прочли и одобрили финальную версию перед публикацией).

Этическая экспертиза. Исследование одобрено этическим комитетом ФГБОУ ВО СамГМУ Минздрава России в соответствии с протоколом № 297 от 20.11.2024.

Информированное согласие на участие в исследовании. Все участники до включения в исследование добровольно подписали форму информированного согласия, утверждённую в составе протокола исследования этическим комитетом

Источник финансирования. Авторы заявляют об отсутствии внешнего финансирования при проведении исследования.

Раскрытие интересов. Авторы декларируют отсутствие явных и потенциальных конфликтов интересов, связанных с публикацией настоящей статьи.

REFERENCES | СПИСОК ЛИТЕРАТУРЫ

1. Chudinin NV, Rakitina IS, Dementyev AA. Nutrient composition of the diet of junior students of a medical university. *Public Health and Life Environment — PH&LE*. 2020;(2):16–20. doi: 10.35627/2219-5238/2020-323-2-16-20 EDN: YHHAEL
2. Antonova AA, Yamanova GA, Musaeva AE, et al. An analysis of eating behaviour in college-age youth. *International Research Journal*. 2021;(8-2):64–66. doi: 10.23670/IRJ.2021.110.8.048 EDN: ROAUDT
3. Karyotaki E, Cuijpers P, Albor Y, et al. Sources of stress and their associations with mental disorders among college students: results of the world health organization world mental health surveys international college student initiative. *Front Psychol*. 2020;11:1759. doi: 10.3389/fpsyg.2020.01759
4. Makarova IO, Popov VI, Choporov ON. Assessment of the actual nutrition of students of Voronezh Medical University. *Russian Medicine*. 2024;30(2):122–131. doi: 10.17816/medjrf622923 EDN: MQGPSE
5. Podrigalo LV, Yermakov SS, Rovnaya OA, et. al. Features of students' nutrition as a factor influencing health. *Human. Sport. Medicine*. 2019;19(4):103–110. doi: 10.14529/hsm190412 EDN: WWFBHS
6. Gafurov SD, Gafurova SS, Jusufov SF, Ahmedova AR. The study of rational nutrition of students. *Science Problems*. 2023;(1):74–78. (In Russ.) doi: 10.24411/2413-2101-2023-10101 EDN: LPWMLF
7. Rozanov VA, Laskaja DA, Radionov DS, Ruzhenkova VV. Psychosocial stress and its consequences among modern university students: the megalopolis factor. *Ekologiya cheloveka (Human Ecology)*. 2023;30(11):805–820. doi: 10.17816/humeco622862 EDN: DQOUPY
8. Skoblina NA, Milushkina OYu, Tatarinchik AA, Fedotov DM. The hygienic problems of usage information and communication technology by schoolchildren and students. *Public Health and Life Environment — PH&LE*. 2017;9(294):49–51. doi: 10.35627/2219-5238/2017-294-9-52-55 EDN: ZJUBFT
9. Maksinev DV. Nutritional features of medical students and their awareness in the prevention of alimentary diseases. *The Scientific Heritage*. 2021;(73-2):15–22. doi: 10.24412/9215-0365-2021-73-2-15-22 EDN: LWSIBS
10. Devrishov RD, Dauletova LA, Gelachev MG. A hygienic assessment of the daily routine and diet of medical university students. *International Research Journal*. 2021;(12-2):156–159. doi: 10.23670/IRJ.2021.114.12.063 EDN: HXWIJO
11. Kazimov MA, Aliyeva RKh, Kazimova VM. Evaluation of physical development and nutrition of medical students. *The Siberian Medical Journal*. 2018;33(2):90–96. doi: 10.29001/2073-8552-2018-33-2-90-96 EDN: XTXQEH
12. De Jesus MJRM, Fabian LN, Javeluna JC, et al. Nutritional knowledge and dietary habits of student-athletes in a state university: towards a contextualized nutrition education plan. *IJMABER*. 2023;4(9):3141–3163. doi: 10.11594/ijmaber.04.09.08
13. Strien TV, Frijters JE, Bergers GP, Defares PB. The Dutch Eating Behavior Questionnaire (DEBQ) for assessment of restrained, emotional, and external eating behavior. *Int J Eating Disord*. 1986;5(2):295–315. doi: 10.1002/1098-108X(198602)5:2<295::AID-EAT2260050209>3.0.CO;2-T
14. Certificate of the Russian Federation on the state registration of a computer program N 2018616124. 05/23/2018. Byul. N 6. Baturin AK, Martinchik A N, Gorbachev DO, et al. *The software package for the assessment of actual nutrition "Nutri-prof"*. Available from: https://www1.fips.ru/fips_servl/fips_servlet?DB=EVM&DocNumber=2018616124&TypeFile=html (In Russ.) EDN: BOKVED
15. Norms of physiological energy and nutritional requirements for various population groups of the Russian Federation: methodological recommendations MP 2.3.1.0253-21. Moscow; 2021. 57 p. (In Russ.)
16. Chepel TV, Ladnaya AA. Bioimpedancemetry: achievements and clinical possibilities (literature review). *Far Eastern Medical Journal*. 2020;(2):87–96. doi: 10.35177/1994-5191-2020-2-86-95 EDN: QUAUBV
17. Rudnev SG, Soboleva NP, Sterlikov SA, et al. *Bioimpedance study of the body composition of the Russian population*. Moscow: RIO TSNIIOIZ; 2014. 493 p. (In Russ.) EDN: TDSYFP
18. Kitaeva LI, Chegodaeva IY, Chernova NN. Hygienic assessment of actual nutrition of medical students. *Ogarev-online*. 2020;(1):5. EDN: GGYPWN
19. Livzan MA, Ljaljukova EA, Halashte AA., et al. Eating behavior of young adults. *Lechaschi Vrach*. 2023;26(7-8):30–35. doi: 10.51793/OS.2023.26.8.005 EDN: XVCFYY
20. Khablova AA, Bondar' GN, Kiku PF. Assessment of the health of medical students. *Health Care of the Russian Federation*. 2020;64(3):132–138. doi: 10.46563/0044-197X-2020-64-3-132-138 EDN: MNGLXS
21. Zotova FR, Hamidullina GF, Bubyakina EV, et al. Motives and obstacles to physical activity in university students. *Science and Sprot: Modern Tendencies*. 2023;11(S):103–114. doi: 10.36028/2308-8826-2023-11-S-103-114 EDN: POPAST
22. Snigirev AS, Malkov MN, Nikolaev AYu, Loginov SI. Student physical activity depending on gender and age. *Teoriya i Pracktika Fizicheskoy Kultury*. 2020;(11):101–102. EDN: UZROOS
23. Konttinen H, Mdnnisto S, Sarlio-Ldhteenkorva S, et al. Emotional eating, depressive symptoms and self-reported food consumption. A population-based study. *Appetite*. 2010;54(3):473–479. doi: 10.1016/j.appet.2010.01.014
24. Ozier AD, Kendrick OW, Leeper JD, et al. Overweight and obesity are associated with emotion- and stress-related eating as measured by the eating and appraisal due to emotions and stress questionnaire. *J Am Diet Assoc*. 2008;108(1):49–56. doi: 10.1016/j.jada.2007.10.011

AUTHORS' INFO

*** Mikhail Yu. Gavryushin,** MD, Cand. Sci. (Medicine), Assistant Professor;
address: 89 Chapayevskaya st, Samara, Russia, 443099;
ORCID: 0000-0002-0897-7700;
eLibrary SPIN: 6636-4448;
e-mail: m.yu.gavryushin@samsmu.ru

Olga V. Sazonova, MD, Dr. Sci. (Medicine), professor;
ORCID: 0000-0002-4130-492X;
eLibrary SPIN: 1789-6104;
e-mail: o.v.sazonova@samsmu.ru

Regina V. Hamtsova;
ORCID: 0000-0002-6747-5954;
eLibrary SPIN: 2606-0123;
e-mail: r.v.hamtsova@samsmu.ru

Sabrina R. Trubetskaya;
ORCID: 0000-0003-4988-3441;
eLibrary SPIN: 2590-6158;
e-mail: s.r.trubeckaya@samsmu.ru

Sophia Yu. Tokareva;
ORCID: 0009-0004-9410-0738;
e-mail: tokareva_sofa002@mail.ru

ОБ АВТОРАХ

*** Гаврюшин Михаил Юрьевич,** канд. мед. наук, доцент;
адрес: Россия, 443099, Самара, ул. Чапаевская, д. 89;
ORCID: 0000-0002-0897-7700;
eLibrary SPIN: 6636-4448;
e-mail: m.yu.gavryushin@samsmu.ru

Сазонова Ольга Викторовна, д-р мед. наук, профессор;
ORCID: 0000-0002-4130-492X;
eLibrary SPIN: 1789-6104;
e-mail: o.v.sazonova@samsmu.ru

Хамцова Регина Викторовна;
ORCID: 0000-0002-6747-5954;
eLibrary SPIN: 2606-0123;
e-mail: r.v.hamtsova@samsmu.ru

Трубецкая Сабрина Рустамовна;
ORCID: 0000-0003-4988-3441;
eLibrary SPIN: 2590-6158;
e-mail: s.r.trubeckaya@samsmu.ru

Токарева София Юрьевна;
ORCID: 0009-0004-9410-0738;
e-mail: tokareva_sofa002@mail.ru

* Corresponding author / Автор, ответственный за переписку