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Assessment of Obesity Prevalence and Associated Factors in the Russian Federation Based on the 2024 Rosstat Sample Survey Data

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ABSTRACT

Aim. To assess the prevalence of obesity and identify the factors associated with it among the adult population in the Russian Federation in order to determine the main directions for the development of measures for obesity prevention.

Materials and methods. We carried out a secondary analysis of the data from the selective monitoring of the population health status by the Federal State Statistics Service for 2024. The study included data from 95,887 respondents from all regions of the Russian Federation. Descriptive statistics, χ^2 test, Mann – Whitney test, Kruskal – Wallis test, and multiple logistic regression analysis were used for statistical analysis.

Results. The prevalence of obesity among the adult population of the Russian Federation was 23.7% (class 1 – 17.9%, class 2 – 4.7%, and class 3 – 1.6%). Significant regional differences in the prevalence of obesity were revealed: from 6.6% in the Chukotka Autonomous Okrug to 34.3% in the Jewish Autonomous Oblast. The proportion of obese people was significantly higher among women (27.2% vs. 20.4% among men), rural residents (27.9% vs. 22.7% among urban residents), and respondents with low socioeconomic status. Multiple regression analysis revealed the most significant risk factors for obesity: lack of accessible sports infrastructure in the respondents' area of residence (odds ratio (OR) = 2.71; 95% confidence interval (95% CI): 1.608–4.471), retirement status (OR = 1.63; 95% CI: 1.548–1.707), low income (OR = 1.60; 95% CI: 1.014–2.477), and low awareness of balanced nutrition (OR = 1.44; 95% CI: 1.243–1.659).

Conclusion. Based on the results of the study, key areas for the development of measures for the prevention of obesity have been formulated: creating an environment that supports a healthy lifestyle; improving public health literacy; developing preventive healthcare; as well as developing and implementing measures taking into account regional specifics and the needs of various socio-demographic groups.

Keywords: obesity, prevalence, risk factors, body mass index, adult population, Russian Federation

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Оценка уровня распространенности ожирения и факторов, ассоциированных с ним, в Российской Федерации по данным выборочного исследования Росстата, 2024 г.

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РЕЗЮМЕ

Цель. Оценить уровень распространенности ожирения и выявить факторы, ассоциированные с ним, среди взрослого населения в Российской Федерации для формирования основных направлений разработки мероприятий по профилактике ожирения.

Материалы и методы. Проведен вторичный анализ данных выборочного наблюдения состояния здоровья населения Федеральной службы государственной статистики за 2024 г. В исследование включены данные 95 887 респондентов из всех субъектов РФ. Для статистического анализа использовались методы описательной статистики, критерии χ^2 , Манна – Уитни, Краскела – Уоллиса, множественный логистический регрессионный анализ.

Результаты. Распространенность ожирения среди взрослого населения Российской Федерации составляла 23,7% (1-й степени – 17,9%, 2-й степени – 4,7%, 3-й степени – 1,6%). Выявлены значительные региональные различия в распространенности ожирения: от 6,6% в Чукотском автономном округе до 34,3% в Еврейской автономной области. Доля лиц с ожирением была статистически значимо выше среди женщин (27,2 против 20,4% среди мужчин), сельских жителей (27,9 против 22,7% среди жителей города) и респондентов с низким социально-экономическим статусом. Множественный регрессионный анализ выявил наиболее значимые факторы риска наличия ожирения: отсутствие доступной спортивной инфраструктуры в зоне проживания респондентов (отношение шансов (ОШ) = 2,71; 95%-й доверительный интервал (95%ДИ): 1,608–4,471), пенсионный статус (ОШ = 1,63; 95%ДИ: 1,548–1,707), низкий уровень дохода (ОШ = 1,60; 95%ДИ: 1,014–2,477) и низкий уровень осведомленности о рациональном питании (ОШ = 1,44; 95%ДИ: 1,243–1,659).

Заключение. На основании результатов проведенного исследования сформулированы ключевые направления разработки мероприятий по профилактике ожирения: создание среды, поддерживающей здоровый образ жизни; повышение санитарной грамотности населения; развитие профилактического звена здравоохранения; а также разработка и реализация мероприятий с учетом региональной специфики и потребностей различных социально-демографических групп.

Ключевые слова: ожирение, распространенность, факторы риска, индекс массы тела, взрослое население, Российская Федерация

Конфликт интересов. Авторы заявляют об отсутствии явных и потенциальных конфликтов интересов, связанных с публикацией настоящей статьи.

Источник финансирования. Авторы декларируют отсутствие внешнего финансирования для проведения исследования и публикации статьи.

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INTRODUCTION

Obesity poses a grave challenge to global public health [1–4]. The prevalence of overweight and obesity is increasing worldwide. Based on the results of a meta-analysis conducted by S. Ibrahim et al. (2021), over the past three decades, the global prevalence of obesity among women has increased by 104.9% (95% confidence interval (95% CI): 100.9%–108.8%) from 10.2% (95% CI: 10.0%–10.3%) in 1990 to 20.8% (95% CI: 20.5%–21.1%) in 2021. Among men, it increased by 155.1% (95% CI: 149.8%–160.3%) from 5.8% (95% CI: 5.7%–5.9%) to 14.8% (95% CI: 14.6%–15.0%) [5]. According to M. Li et al. (2022), in 2017–2018, the prevalence of obesity among adults in the United States of America was 42.8% (95% CI: 39.5%–46.1%), which is more than 10% higher than in 2003–2004: 32.3% (95% CI: 29.9%–34.6%) [6].

Obesity prevention is crucial for combating chronic non-communicable diseases (NCDs), including type 2 diabetes mellitus, insulin resistance, metabolic syndrome with hyperinsulinemia, hyperlipidemia, hypertension, metabolic-associated fatty liver disease, coronary heart disease, etc. [7]. A prospective cohort study conducted by S. Ghosh et al. (2023) showed that obese adults had a 7-year shorter life expectancy compared to the rest of the population [8]. Similarly, according to S.T. Nyberg et al. (2018), people with class 2 obesity had a life expectancy of 8 years less than their peers with normal body weight, and people with class 1 obesity had a life expectancy of 4 years less [9].

There are several causes of overweight and obesity, including behavioral determinants (type of diet and level of physical activity), genetic (presence of obesity and related diseases in parents), as well as demographic (age, gender, place of residence, and levels of education and income) [10]. To develop measures aimed at combating obesity, it is necessary to have an insight into the prevalence of obesity and the factors associated with it.

The aim of the study was to assess the prevalence of obesity and identify factors associated with it among the adult population in the Russian Federation in order to determine the main directions for the development of measures for obesity prevention.

MATERIALS AND METHODS

The study used primary data from the sample observation of the health status of the population of

the Federal State Statistics Service (Rosstat) for 2024 (Order of the Federal State Statistics Service dated June 28, 2024 No. 266 “On Approval of Forms of Federal Statistical Observation with Guidelines for the Completion of Sample Observation of the Population Health Status in 2024”. URL: <https://normativ.kontur.ru/document?moduleId=1&documentId=475320>).

The monitoring unit was a private household and household members. The observation was conducted as personal interviews of household members (respondents) at their place of residence, as part of the household selected for observation. The number of households eligible for selection in the observational sample across Russia was 60,000 households in total. Selection of enumeration areas and households was centrally managed by Rosstat based on a territorial multi-purpose sampling frame. The number of households eligible for selection within an enumeration area was 54 households (including reserves), both in urban and rural areas. The respondents' body mass index (BMI) was calculated as the ratio of the body weight in kilograms (kg) to the square of height in meters (m²).

The Statistica for Windows version 10.0, Stata, and R-studio software packages were used for statistical processing of the research results. Qualitative data were represented as absolute or relative (%) frequencies, quantitative data were represented as $X \pm x$, where X is the arithmetic mean and x is the standard deviation. In the case of an abnormal data distribution, the median and interquartile range of variables were also calculated. When comparing the distributions of qualitative features, the Pearson's test was used. When comparing qualitative characteristics, the odds ratio (OR) was calculated. The Mann – Whitney and Kruskal – Wallis U -tests were used to evaluate differences in pairwise unrelated samples with abnormal distribution; Student's t -test was used for normal distribution. Multiple logistic regression analysis was used to determine the significant relationships between variables, as well as the directions of these relationships.

RESULTS

A total of 95,887 respondents aged 18 and over (40.4% of men and 58.2% of women) from all regions of the Russian Federation took part in the survey, the average age of participants was 51.1 (18–101) years. Table 1 provides detailed sociodemographic characteristics of the respondents.

Table 1

Characteristics		
Parameter	<i>n</i>	%
<i>Sex</i>		
Male	38,692	40.4
Female	55,849	58.2
Skipped the question	1,346	1.4
<i>Age, years</i>		
18–24	5,516	5.8
25–34	12,778	13.3
35–44	19,508	20.3
45–54	16,380	17.1
55–64	16,044	16.7
65+	25,661	26.8
<i>Type of Locality</i>		
Urban	65,010	67.8
Rural	30,877	32.2
<i>Education Level</i>		
Elementary general (elementary)	770	0.80
Basic general (incomplete secondary)	4,074	4.24
Secondary general (complete secondary)	12,061	12.58
Secondary vocational	43,401	45.26
Undergraduate (incomplete higher)	1,929	2.01
Higher	31,592	32.95
Highly qualified personnel (postgraduate, academic degrees, and doctoral programs)	555	0.58
No education	119	0.12
Refused to respond	40	0.04
Skipped the question	1,346	1.40
<i>Marital Status</i>		
Registered marriage	48,209	50.28
Common-law marriage	4,191	4.37
Widower/widow	15,828	16.51
Divorced	13,180	13.75
Separated	1,976	2.06
The respondent has never been in a registered or common-law marriage	10,898	11.37
Refused to respond	259	0.27
Skipped the question	1,346	1.40
<i>Employment Type</i>		
Employee of the state or public sector	25,274	26.36
Employee of a private enterprise	27,772	28.96
Self-employed/individual entrepreneur	3,863	4.03
The respondent does not have a permanent job, but occasionally engages in temporary work	2,789	2.90
Unpaid work (volunteering, subsistence production for family needs, and domestic work)	1,520	1.59
Unemployed and able to work	1,304	1.36
Unemployed and unable to work (due to disability)	633	0.66
Student	2,269	2.37
Retiree	28,866	30.10
Refused to respond	251	0.26
Skipped the question	1,346	1.40

According to the results of the analysis, 1.0% of the respondents ($n = 961$) were underweight, 42.9% ($n = 39,912$) were overweight and 23.7% ($n = 22,682$) were obese. At the same time, 17.9%

($n = 16,647$) had class 1 obesity, 4.7% ($n = 4,408$) had class 2, and 1.6% ($n = 1,483$) had class 3 according to the Classification of Obesity of the World Health Organization (1997) [11].

According to a sample study by Rosstat in 2024, the average BMI level was 27.34 ± 0.67 kg/m². According to the results of the analysis, less than 10% of respondents were obese in only two regions of the Russian Federation (the Chechen Republic and the Chukotka Autonomous Okrug). In two regions of the Russian Federation (Moscow and Astrakhan regions), the percent of obese respondents varied from 10 to 15%, in nine regions – from 15.1 to 20%, in 32 subjects – from 20.1 to 25%, and in 30 regions, over 25% of the respondents were obese. The largest proportion of obese respondents was registered in the Jewish Autonomous Oblast (34.3%), the smallest - in the Chukotka Autonomous Okrug (6.6%) (Fig. 1).

The proportion of obese people was significantly higher among women (27.2% vs. 20.4% among men ($p < 0.05$)), as well as among rural residents (27.9% vs. 22.7% among urban residents, $p < 0.05$). In addition, among the respondents who underwent medical examinations over the past two years, the proportion of obese people was also significantly higher compared to the rest (25.9 vs. 22.3%, $p < 0.05$). This may be due to the fact that people who have already been diagnosed with diseases or risk factors that often accompany obesity are more likely to seek medical examination at doctor's recommendation. Therefore, this group initially includes more people with health problems.

When analyzing socioeconomic parameters, a statistically significantly greater proportion of obese people was found among widows and widowers (36.0%), the unemployed and unable to work (disabled) (26.9%), respondents with basic general education (30.2%), the smallest - among the higher professional category (15.6%), who have never been in a registered marriage (10.6%), engaged in unpaid work (volunteering, domestic work, subsistence production for the needs of the family, 17.1%), $p < 0.05$ for all comparisons (Fig. 2–4).

In addition, among the participants who lived alone (widower/widow, divorced, separated, and never been in a registered / common-law marriage), there were slightly more obese people (24.3%) compared to those who lived with a partner (in a registered marriage and is in a common-law marriage) – 23.8%, $p > 0.05$.

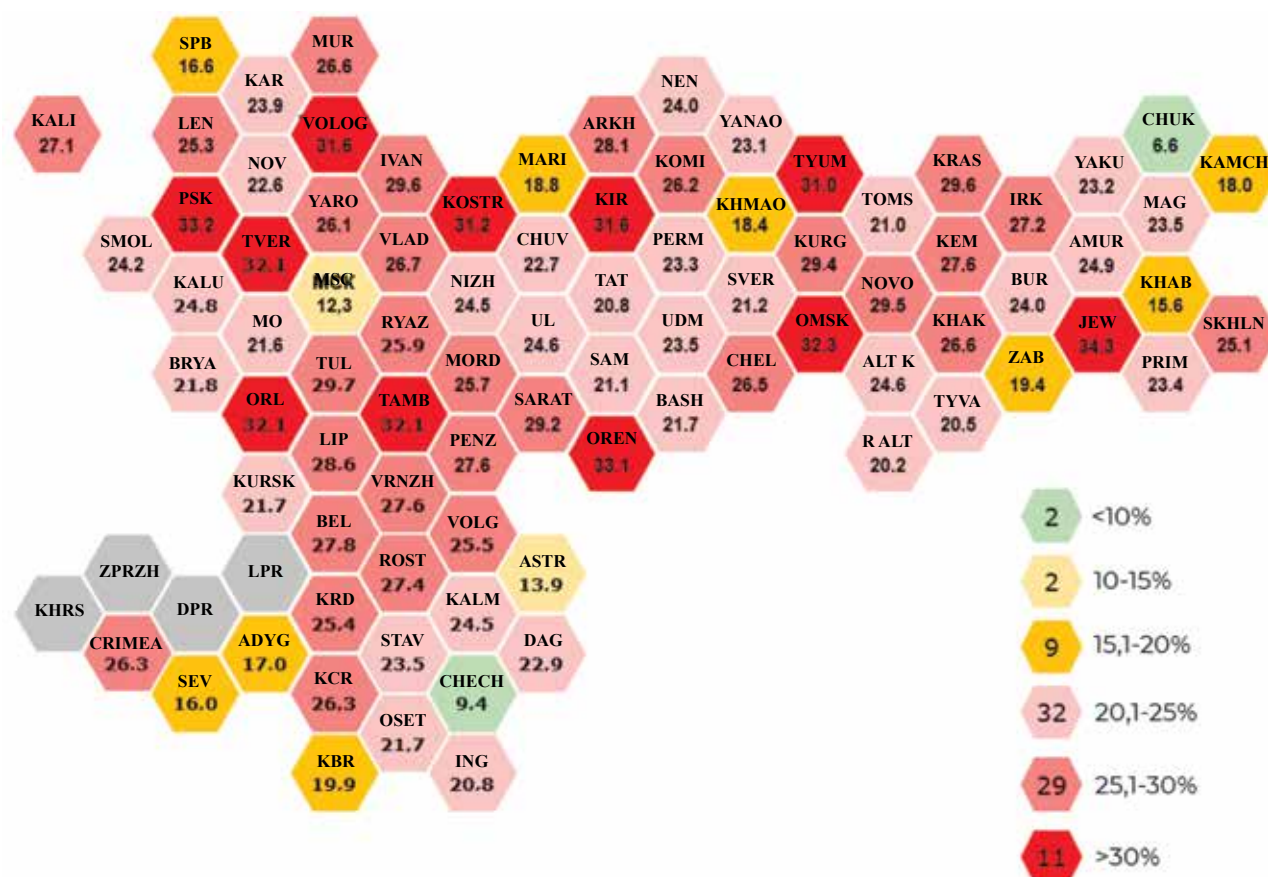


Fig. 1. The number of obese respondents in the regions of the Russian Federation, %

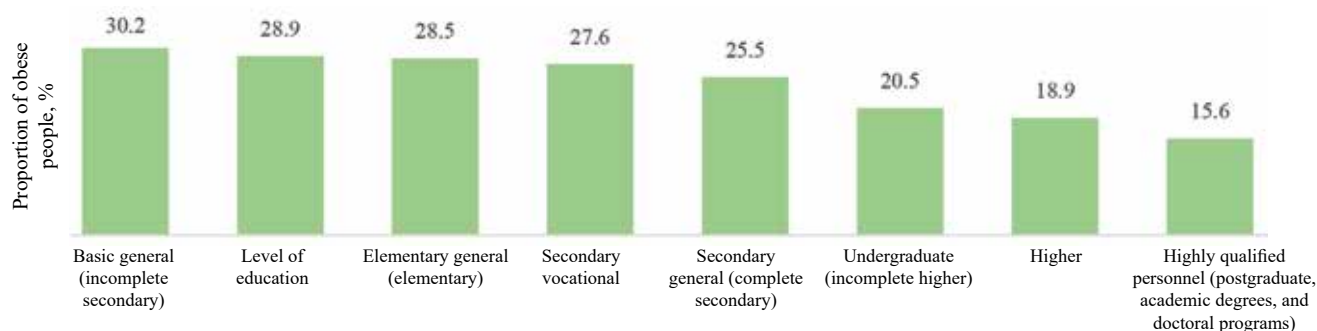


Fig. 2. The proportion of obese people depending on the level of education, %: $p < 0.05$ when comparing the group of basic general (incomplete secondary) education with highly qualified personnel

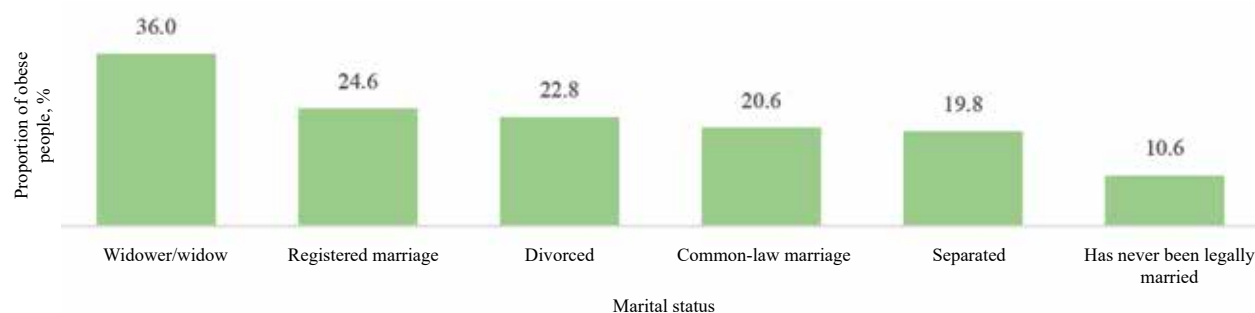


Fig. 3. The proportion of obese people depending on marital status, %: $p < 0.05$ when comparing groups with each other

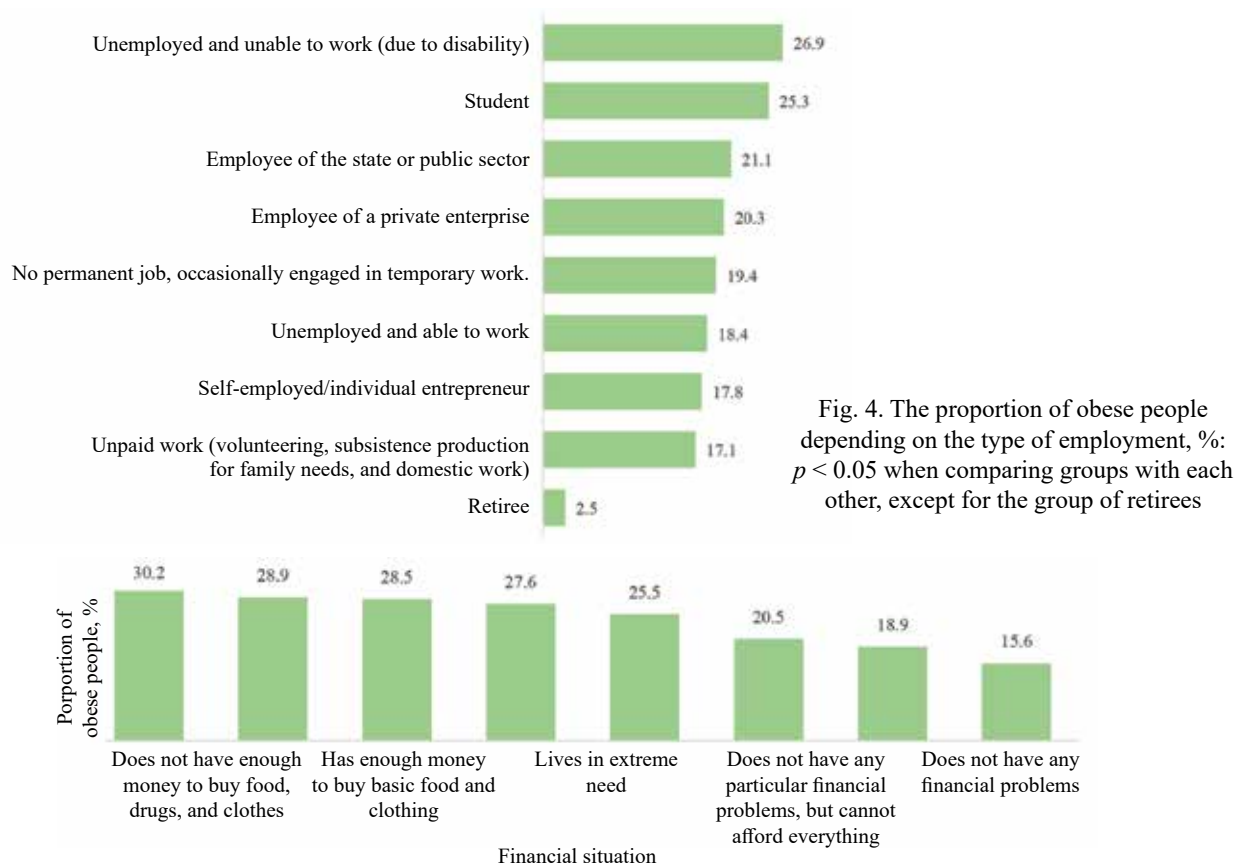


Fig. 5. The proportion of obese people depending on their financial situation, %: $p < 0.05$ when comparing all groups with each other, except for those respondents who chose the option "I live in extreme need"

A statistically significantly greater proportion of obese people (33.5%) was registered among participants with low income, while the lowest proportion was registered among citizens with high income (20.2%, $p < 0.05$). No statistically significant difference was found in other socioeconomic characteristics of the respondents, including age ($p > 0.05$), Fig. 5.

A statistically significantly bigger proportions of obese respondents were registered in the group of people who experienced severe anxiety or depression (32.9%), loneliness (30.9%), and a sense of uncertainty about the future (29.2%). Conversely, the smallest proportions were found among those not experiencing anxiety or depression (20.6%), loneliness (22.9%), and anxiety about the uncertain future (20.9%). No statistically significant difference was found in the proportion of obese people in terms of other personal characteristics of the respondents ($p > 0.05$).

The level of awareness of respondents about balanced nutrition was also associated with the presence of obesity. The biggest proportion of

obese participants was registered among those who reported that they did not know anything about a balanced diet and eating regime (28.3%), while the smallest proportion was well-informed about these aspects of nutrition (20.5%, $p < 0.05$). In addition, among the respondents who always consumed foods with a high salt content, the greatest proportion of obese people (26.3%) was noted compared with those who had never done so ($p < 0.05$).

When analyzing the parameters characterizing the respondents' physical activity, it was revealed that a statistically significantly bigger proportion of obese participants was registered among those who spent less than one hour a week on physical activity (21.9%), and the smallest proportion was observed among those who spent more than two hours a week on physical activities (9.8%, $p < 0.05$).

The method of multiple logistic analysis was used to determine the factors associated with the presence of obesity. According to the regression results, it was revealed that if a respondent assessed their state of health as poor, the chance of being obese was almost five times higher than for those who considered

their health as excellent ($p < 0.05$). In addition, if a respondent assessed their health status worse than people of the same age, then the chance of being obese was 45.5% higher ($p < 0.05$). If there were no facilities for physical education and sports near the respondent's place of residence, or they did not use them, the chance of being obese was almost three times higher than for those who engaged in physical activity in specially designated public spaces ($p < 0.05$).

Other factors associated with obesity included higher education, belonging to a group of students and divorced people, lack of loneliness, and

considering an interesting job as one of the most important values in life ($p < 0.05$). In addition, if a respondent stopped using non-smoking tobacco products, the chance of being obese decreased by 54.0% compared to the rest of the participants. If they did not use non-smoking tobacco products every day, the chance of being obese compared to those who consumed them daily was 85.7% lower. And if a respondent felt cheerful and in a good mood, it was 37.7% lower, and if a respondent has never been married, it would decrease by 43.3% ($p < 0.05$). All the factors associated with the respondent's obesity are listed in Table 2.

Table 2

Factors Associated with the Presence of Obesity in Respondents		
Factor	Effect	OR (95% CI)
Evaluate their state of health as poor	↑ by 4.9 times	4.924 (4.406–5.511)
There are no suitable facilities for physical education and sports at the place of residence	↑ by 2.7 times	2.707 (1.608–4.471)
There are suitable facilities for physical education and sports at the place of residence, but the respondent does not use them	↑ by 81.4%	1.814 (1.165–2.798)
Children are the most important value in life (compared to material well-being)	↑ by 65.4%	1.654 (1.387–1.983)
Retiree	↑ by 62.5%	1.626 (1.548–1.707)
Lives in extreme need	↑ by 60.3%	1.603 (1.014–2.477)
The respondent thinks their health status is worse compared to people of the same age.	↑ by 45.5%	1.455 (1.355–1.562)
The respondent does not know anything about what a diet and eating regime are and what they should be like	↑ by 43.6%	1.436 (1.243–1.659)
The respondent is not worried about losing their current job	↑ by 40.3%	1.403 (1.263–1.561)
Almost the entire family's income is usually spent on food	↑ by 36.7%	1.367 (1.098–1.700)
Unemployed and able to work	↑ by 30.8%	1.308 (1.131–1.509)
The respondent is concerned by the feeling of uncertainty about the future	↑ by 29.4%	1.294 (1.232–1.359)
Widower or widow	↑ by 8.4%	1.084 (1.035–1.042)
With an increase in the portions of bread and bakery products consumed in one day	↑ by 4.0%	1.040 (1.018–1.062)
Does not consume non-smoking tobacco products every day (compared to daily consumption)	↓ by 85.7%	0.149 (0.048–0.418)
Student	↓ by 80.5%	0.195 (0.143–0.260)
Stopped using non-smoking tobacco products	↓ by 54.0%	0.460 (0.219–0.996)
Has never been in a registered marriage	↓ by 43.3%	0.567 (0.525–0.612)
Feels cheerful and in a good mood	↓ by 37.7%	0.623 (0.488–0.798)
No feeling of loneliness	↓ by 35.7%	0.643 (0.426–0.945)
An interesting job is the most important value in life (compared to material well-being)	↓ by 35.2%	0.648 (0.581–0.723)
Higher education	↓ by 32.0%	0.680 (0.651–0.710)
Never adds salt, salty seasonings, or salty sauce to prepared food immediately before eating it	↓ by 31.2%	0.688 (0.578–0.820)
A high level of education is the most important value in life (compared to material well-being)	↓ by 20.8%	0.792 (0.721–0.870)
Employee of a private enterprise (compared to a state-owned organization)	↓ by 16.7%	0.833 (0.794–0.874)
Separated	↓ by 16.2%	0.838 (0.735–0.952)
The respondent does not have a permanent job, but occasionally engages in temporary work	↓ by 12.6%	0.874 (0.769–0.991)
Never underwent a medical check-up in the last two years	↓ by 7.3%	0.927 (0.896–0.960)

Note. ↑ – increase, ↓ – decrease.

DISCUSSION

The results of the study revealed a high prevalence of obesity among the adult population of the Russian Federation, including in the context of its federal

subjects. It is important to note that the morbidity index used in the framework of the federal project “Health for Everyone” and formed on the basis of data from citizens' visits to medical organizations was used to collect official statistics. Morbidity is

not similar to prevalence. Prevalence is a broader epidemiological indicator that makes it possible to identify cases of “hidden” obesity, when patients live with the disease but do not seek medical care and are not included in official reports.

We revealed some differences when comparing the results obtained with similar foreign studies. So, according to the results of an American study by D. Kim et al. (2019, $n = 4,118$), 44% of men and 66% of women had abdominal obesity, which is higher than in the Russian Federation [12]. In a nationwide survey conducted in South Korea in 2020, 48.0% of men and 27.3% of women aged 19 and over were obese [13].

According to S. Kaboré et al. (2020, $n = 4,800$), the prevalence of overweight and obesity in Burkina Faso (West Africa) was 13.8% and 4.8%, respectively, which is lower than in Russia. Among men, the chances of being overweight (obese) increased with living in a city ($p < 0.001$), older age ($p < 0.002$), and marital status other than single ($p < 0.007$), and decreased with smoking ($p = 0.009$). Among women, the chances of being overweight (obese) increased with living in a city ($p < 0.001$) and having elementary education ($p = 0.01$), and decreased with smoking ($p < 0.001$) [14].

According to the study, the main socioeconomic factors associated with obesity include female gender, living in rural areas, marital status other than single, and lack of higher education. Marital status other than single is a risk factor due to changes in the profile of consumption, the regularity of meals, as well as due to a reduction in time devoted to personal health and physical activity, especially after the birth of children, when priorities shift towards caring for the family.

The lack of higher education as a factor associated with obesity is explained by lower awareness of proper nutrition and professional employment in areas that are usually characterized by either high physical but monotonous work, or, conversely, low mobility. Low income was also associated with obesity, which can be explained by the fact that the diet of this group of respondents is based on cheaper but high-calorie foods, which include fast carbohydrates.

The personal and behavioral factors identified include the habit of salting food, eating baked goods, smoking, anxiety about job loss and uncertainty of the future, low awareness of the regime and diet,

and low self-assessment of health status. The above factors are consistent with the data obtained in foreign studies.

So, in the Korean study conducted by G. Kim et al. (2024; $n = 5,262$), 38.3% of the respondents were obese. At the same time, the factors associated with obesity were as follows: male gender (OR = 2.318; 95% CI: 2.311–2.326), marital status (OR = 1.273; 95% CI: 1.269–1.277), rural residence (OR = 1.830; 95% CI: 1.813–1.847), sleep problems (OR = 1.310; 95% CI: 1.305–1.314), anxiety (OR = 1.217; 95% CI: 1.211–1.223), alcohol consumption (OR = 1.445; 95% CI: 1.433–1.458), and smoking (1.194; 95% CI: 1.192–1.197) [15].

Similar data was obtained by S. Shabu et al. (2019; $n = 1,480$) who revealed using a multifactorial analysis that age (OR = 2.36; 95% CI: 1.60–3.49), female gender (OR = 2.17; 95% CI: 1.53–3.08), and marital status (OR = 1.87; 95% CI: 1.20–2.90) were statistically significant factors associated with overweight and obesity [16].

CONCLUSION

Thus, the data obtained during the study not only confirm the high prevalence of obesity among the adult population of the Russian Federation, but also reveal a complex set of interrelated factors associated with it. The development of targeted prevention programs should take into account regional specifics and be aimed at the most vulnerable groups of the population (rural residents, people with low incomes and lack of higher education, and retirees).

Strategic directions for the development of preventive measures should include creating an environment that supports a healthy lifestyle, including the development of accessible infrastructure for physical activity and providing conditions for rational nutrition; improving public health literacy, including the implementation of information and communication campaigns on the principles of healthy eating and the importance of regular physical activity; development of preventive health care (strengthening the role of primary health care in the early detection, counseling and support of patients with risk factors, including the integration of psychological support); implementation of targeted programs (development and implementation of measures taking into account regional specifics and the needs of various socio-demographic groups).

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Author Contribution

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