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Результаты пилотного этапа исследования «Распространенность курения и потребления никотинсодержащей продукции среди студентов медицинского и технического университетов (PROTECT)»

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АННОТАЦИЯ

Обоснование. Изучение распространенности потребления табака и никотинсодержащей продукции среди молодежи актуально и чрезвычайно важно. В статье представлен анализ данных пилотного этапа исследования «Распространенность курения и потребления никотинсодержащей продукции среди студентов медицинского и технического университетов» («Prevalence of smoking and consumption of nicotine-containing products among students of medical and technical universities», PROTECT), запланированного в 2023 г. в СЗГМУ им. И.И. Мечникова (Санкт-Петербург), Северном государственном медицинском университете (Архангельск) и Санкт-Петербургском государственном электротехническом университете «ЛЭТИ» им. В.И. Ульянова (Ленина) (Санкт-Петербург).

Цель исследования — изучить распространенность и структуру потребления табачной и никотинсодержащей продукции, отношение к курительному поведению, а также представление о курении, использовании никотинсодержащей продукции и их вреде среди студентов.

Материалы и методы. Дизайн исследования — одномоментное поперечное исследование. Основной метод исследования — анонимное анкетирование.

Результаты. В пилотном этапе приняли участие 118 респондентов из произвольно выбранных групп (средний возраст 20,9 ± 2,6 года, 54,2 % мужчин). В анализ включены демографические данные, вопросы об окружении респондента, отношении к курению / использованию никотинсодержащей продукции и представлении о них. Студенты медицинских вузов составили 70,3 % выборки, студенты технического вуза — 29,7 %. Не курили и не потребляли никотинсодержащую продукцию 73,7 % студентов. Некурящие студенты были младше, чем курильщики: их возраст составил 20,3 ± 2,2 против 24,8 ± 3,4 года ($p < 0,01$). Доля студентов, не использующих ни один табачный или никотинсодержащий продукт, была больше, чем доля курильщиков сигарет / вейпов / электронных сигарет / систем нагревания табака: 73,7 против 26,3 %. Среди курящих студентов преобладали потребители никотинсодержащей продукции (71,0 %), а 16,1 % — использовали комбинацию табачных и никотинсодержащих продуктов. В окружении курящих студентов друзья/подруги курили чаще, чем в окружении некурящих: в 90,3 против 56,3 % случаев ($p < 0,01$). Положительное или нейтральное отношение к курению (71,0 против 47,1 %; $p < 0,05$), вейпингу (74,2 против 45,9 %; $p < 0,05$), а также вейпингу родственников (45,2 против 18,4 %; $p < 0,01$) отмечали чаще среди курящих студентов, чем среди некурящих. Курильщики по сравнению с некурящими достоверно чаще видели положительные стороны курения (в 25,8 против 6,9 % случаев; $p < 0,05$), считали, что вейпы эффективны в качестве средства лечения никотиновой зависимости (в 29,0 против 9,2 % случаев; $p < 0,05$) и являются безопасной альтернативой курению (в 22,6 против 6,9 % случаев; $p < 0,01$).

Выводы. Разработанная онлайн-анкета проста и понятна респондентам, данные корректно сохраняются, что позволяет ее использовать в основном этапе исследования. Выявленные тенденции свидетельствуют о популярности применения никотинсодержащей продукции в студенческой среде и подлежат более подробному изучению.

Ключевые слова: табакокурение; вейпинг; никотинсодержащая продукция; потребление табака в Российской Федерации; потребление никотинсодержащей продукции в Российской Федерации; эпидемиологическое исследование.

Как цитировать

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Prevalence of smoking and consumption of nicotine-containing products among students of medical and technical universities (PROTECT)

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ABSTRACT

BACKGROUND: The study of the prevalence of the use of tobacco and nicotine-containing products among young people is an ongoing and critical area of research. This article presents the analysis of data from the pilot phase of the study "Prevalence of smoking and consumption of nicotine-containing products among students of medical and technical universities" (PROTECT), which was planned for 2023 among students of the North-Western State Medical University named after I.I. Mechnikov (Saint Petersburg), Northern State Medical University (Arkhangelsk), and Saint Petersburg State Electrotechnical University "LETI" named after V.I. Ulyanov (Lenin) (Saint Petersburg).

AIM: To examine the prevalence and patterns of the use of tobacco and nicotine-containing products, attitudes toward smoking behavior, perceptions of smoking, use of nicotine-containing products, and their effects among students.

MATERIALS AND METHODS: A cross-sectional study design was followed. An only anonymous questionnaire survey was used as the main method of research.

RESULTS: The pilot phase involved 118 respondents from randomly selected groups outside the main study sample (mean age, 20.9 ± 2.6 years, 54.2% men). The analysis included demographic data, questions about the respondent's environment, attitudes toward smoking/use of nicotine-containing products, and perceptions of smoking/use of nicotine-containing products. Students of medical universities and technical universities accounted for 70.3% and 29.7% of the sample, respectively. In total, 73.7% of the students did not smoke or consume nicotine-containing products. Nonsmoking students were younger than cigarette smokers and/or nicotine-containing product smokers: 20.3 ± 2 vs 24.8 ± 3.4 years ($p < 0.01$). The proportion of students who do not use any tobacco or nicotine-containing products was higher than that of smokers (cigarette/vaping/electronic cigarette/tobacco heating systems; 73.7% vs. 26.3%). Smokers included 71.0% predominantly nicotine-containing product users and 16.1% users that smoked a combination of tobacco and nicotine-containing products. Friends of smokers smoked more often than nonsmokers (90.3% vs. 56.3%; $p < 0.01$). Positive or neutral attitudes toward smoking (71.0% vs 47.1%; $p < 0.05$), vaping (74.2% vs 45.9%; $p < 0.05$), and vaping relatives (45.2% vs 18.4%; $p < 0.01$) were more observed among smokers than among nonsmokers. Compared with nonsmokers, smokers are more likely to attribute the benefits of smoking (25.8 vs 6.9%; $p < 0.05$) and believe that vapors are effective as a nicotine dependence treatment (29.0% vs 9.2%; $p < 0.05$) and are a safe alternative to smoking (22.6% vs 6.9%; $p < 0.01$).

CONCLUSIONS: The developed online questionnaire is simple and understandable to respondents, and the data are correctly stored, allowing it to be used in the main phase of the study. The identified trends indicate the popularity of nicotine-containing products among students, and more detailed studies are required.

Keywords: smoking, vaping, nicotine-containing products, tobacco consumption in the Russian Federation, consumption of nicotine-containing products in the Russian Federation, epidemiological study.

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BACKGROUND

Tobacco smoking is a leading cause of morbidity and mortality worldwide, particularly about chronic noncommunicable diseases such as cancer, cardiovascular disease, and respiratory disease [1]. Tobacco users inhale smoke from smoldering tobacco products, such as cigarettes. In recent years, a new type of smoker has emerged, i.e., a person who consumes nicotine-containing products (NCPs) instead of traditional cigarettes. NCPs contain nicotine or its derivatives and are intended for nicotine consumption and delivery through methods such as sucking, chewing, sniffing, or inhalation. NCPs include heated tobacco products, solutions, liquids, or gels that contain at least 0.1 mg/mL liquid nicotine [2]. Electronic tobacco heating systems and electronic nicotine delivery systems, commonly known as e-cigarettes, are popular NCPs. The harms of using these devices are comparable to those of smoking regular tobacco products because they also release many toxic substances. The inhalation of diacetyl, which is present in most smoking flavors, has been linked to lung damage known as "vaper's disease," E-cigarette and vaping use-associated lung injury syndrome, or "popcorn disease."

Following Russia's accession to the World Health Organization Framework Convention on Tobacco Control and the implementation of state antitobacco measures (Federal Law No. 15 dated February 23, 2013, version of July 24, 2023, on "Protecting the Health of Citizens from the Effects of Second Hand Tobacco Smoke and the Consequences of Consuming Tobacco and Nicotine-Containing Products"), representative national studies were conducted in the Russian Federation to monitor the consumption of tobacco and NSPs [2, 3]. The Global Adult Tobacco Survey, conducted under the auspices of the World Health Organization, reported a relative decrease of 21.5% in tobacco smoking in our country between 2009 and 2016, with rates dropping from 39.4% to 30.9% [4]. In 2016, 91.2% of young people aged 15–24 years were aware of e-cigarettes, and 9.7% were regular users. In subsequent years, smoking prevalence trends among adults can be assessed using the official statistics from the Russian Federation's Ministry of Health and local population surveys, although the data may vary slightly. According to Rosstat data, the proportion of young people who smoke daily or occasionally has consistently decreased from 2018 to 2021. In 2018, 11% of smokers were 15–19 years old and 32.3% were 20–24 years old. In 2021, these figures decreased to 5.56% and 17.19%, respectively [5, 6].

Based on the results of annual internet surveys conducted between 2019 and 2021 among social media users aged 19–59 years, the general trend to reduce the use of tobacco products and/or NSPs in the Russian Federation was also confirmed. The percentage of respondents who reported using tobacco and/or NCPs decreased from 33.4% in 2019 to 27.6% in 2020 and 26.8% in 2021 [7].

Based on telephone interviews conducted by the All-Russian Center for Public Opinion Research on July 3, 2022, 33% of the 1,604 randomly selected Russian adults surveyed were smokers [8]. Representatives aged 18–24 years (71%) and ≥65 years (81%) were more common among nonsmokers. Between 2009 and 2022, the proportion of smokers aged 18–24 years decreased by 1.7 times, i.e., from 48% to 29%. In addition, the proportion of young people smoking more than one pack of cigarettes per day decreased from 22% to 12%.

The data presented demonstrate a steady decline in the prevalence of traditional smoking among the adult population, particularly among young people, despite some differences in the organization and results of the studies. It is possible to cautiously predict that young people aged 18–24 years could become agents of the nonsmoking behavior model. However, a recent analysis of the structure of tobacco and NSP users of different types indicates a concerning new trend in smoking behavior. The 2019–2020 online public opinion survey indicated an increase in the use of e-cigarettes among individuals aged <18 years and an increase in the combined use of tobacco products and NCPs among those aged <30 years. The survey found that 20.6% of participants aged <18 years used nearly all types of tobacco products and NCPs available on the market [9].

Studying the prevalence of tobacco and NCP use among adolescents is crucial for predicting future trends. In 2021, the World Health Organization conducted the Global Youth Tobacco Survey, which was a nationwide epidemiological monitoring study in the Russian Federation [10]. Based on published data, 12,610 schoolchildren aged 13–15 years were surveyed, revealing that 12.1% of adolescents use tobacco products. In addition, both boys and girls smoked tobacco (smoked and smokeless) at the same frequency (12.0% and 11.9%, respectively). In the study, 5.7% of adolescents reported smoking cigarettes, and slightly more boys (5.5%) than girls (5.7%) reported smoking. Of the boys who smoked, 50.2% reported that age did not prevent them from purchasing cigarettes. In addition, 16.7% of the adolescents reported using e-cigarettes, and slightly more girls (17.4%) than boys (15.5%) reported use. Finally, 3.5% of schoolchildren reported using heated tobacco products.

The data indicate multidirectional trends, with a steady decline in the prevalence of traditional smoking among adults, particularly young people, and an increase in NCP use among adolescents and young adults.

Smoking cessation is now recognized as a preventive measure for avoiding the development of chronic noncommunicable diseases and as a crucial component of effective treatment and rehabilitation of chronic diseases. The antismoking behavior of physicians increases patients' trust in their recommendations to quit smoking. However,

the prevalence of smoking among physicians is practically the same as that in the general population [11]. Based on a survey conducted by SuperJob in May 2022, it nearly one in five male physicians smoke (18%), whereas female physicians smoke at a lower rate (6%) [12].

Accurate data on the usage and prevalence of tobacco products and NCPs among specific sociodemographic groups, particularly young people, are necessary to analyze smoking behavior trends. This analysis will enable the timely development of measures to protect young people from tobacco and NCPs and the aggressive policies of tobacco companies.

This article presents an analysis of data from the pilot phase of the "Prevalence of Smoking and Consumption of Nicotine-Containing Products Among Students of Medical and Technical Universities" (PROTECT) study, which was planned for 2023 among students of medical faculties at the North-Western State Medical University named after I.I. Mechnikov (SZGMU, St. Petersburg), Northern State Medical University (SGMU, Arkhangelsk), and St. Petersburg State Electrotechnical University named after V.I. Ulyanov (Lenin) (SPbGETU "LETI," St. Petersburg)

The **PROTECT study aimed** to investigate the prevalence and patterns of tobacco and NCP consumption, attitudes toward smoking behavior, and perceptions of smoking, NCP use, and harm among medical and technical university students.

MATERIALS AND METHODS

The one-stage cross-sectional study sampled groups of students selected using a random number generator from common group lists.

An anonymous online survey was used as the primary method. The questionnaire was developed with the participation of staff from the Department of Family Medicine at SZGMU, Department of Family Medicine and Internal Medicine at SGMU, and Departments of Computer Science and Biotechnological Systems at SPbGETU "LETI." The questionnaire comprised six blocks. Block 1 consisted of six questions that reflected the demographic data of the respondents. Block 2 included nine questions about smoking status and NCP use. Block 3 contained five questions about age and reasons for smoking and/or NCP use. Block 4 contained three questions that provided information about the respondent's environment. Block 5 assessed students' attitudes toward smoking and vaping with six questions. Block 6 included questions that reflected respondents' perceptions of smoking and vaping and their associated harms. For medical students, the questionnaire includes additional questions to evaluate future medical strategies for treating patients who smoke. The staff at SPbGETU "LETI" created an online form for completing and saving the collected data. To reduce the completion time for students with varying smoking statuses, four scenarios were developed that reflect their current smoking status. The survey participant only answered the questions corresponding to the selected scenario by following the link. Mandatory answers to all questions of the selected scenario were provided when completing the questionnaire, preventing respondents from skipping any part of the answers. Blocks 1, 4, 5, and 6 were common to all scenarios.

The study adhered to the international and ethical standards outlined in the Declaration of Helsinki of the World Medical Association "Recommendations for Physicians Engaged in Biomedical Research Involving Human Subjects" and regulatory documents of the Russian Federation on clinical trials, as per protocol No. 5 dated May 10, 2023, of the local ethical committee of SZGMU.

The pilot phase, which took place in September and October 2023, involved the use of the online questionnaire and correct data saving. Informed consent was obtained from all participants in the pilot study. The analysis included calculating the frequency of tobacco and NCP use. Pearson's χ^2 test was used to assess the reliability of the differences between categorical variables. A value of $p < 0.05$ was considered a criterion for the statistical significance of the obtained data.

RESULTS AND DISCUSSION

The pilot phase enrolled 118 participants randomly selected from groups outside the main study sample. The mean age of the participants was 20.9 ± 2.6 years, and 54.2% were male. Demographic data, questions about the respondents' environment, attitudes toward smoking and using NCPs, and perceptions of smoking and using NCPs were analyzed. All participants provided answers regardless of their smoking status. The sample consisted of 41 students from SZGMU and 27 students from SGMU, making up 70.3% of the total. The remaining 29.7% (50 students) were from technical universities. Most students (56.8%) were nonresidents. Of the respondents, 73.7% lived in apartments, 18.6% in dormitory rooms, and 1.7% in communal apartments.

Moreover, 73.7% of the respondents did not smoke or consume NCPs. Nonsmoking students were significantly younger than smoking ones (20.3 ± 2.2 vs 24.8 ± 3.4 years; $p < 0.01$).

The percentage of students who refrained from using tobacco or NCPs was significantly higher than that of cigarette, vape, e-cigarette, or tobacco heating system smokers (73.7% vs. 26.3%). Table 1 presents the distribution of the pilot study participants according to their use of tobacco products and/or NCPs. Merely 3.4% of the respondents used cigarettes, 18.6% used NCPs, and 4.2% used a combination of cigarettes and NCPs.

Of the smoking students (n = 31), NCP users were predominant (71%), followed by those who used a combination of tobacco products and NCPs (16.1%), and those who smoked cigarettes (12.9%).

The study showed that young people are moving away from traditional tobacco smoking toward other NCPs, which agrees with previous research [7–9].

As shown in Table 2, friends of smoking students smoked significantly more often than those of nonsmoking students (90.3% vs. 56.3%, $p < 0.01$).

Table 3 presents the distribution of respondents based on their attitudes toward smoking and vaping. Positive or neutral attitudes toward smoking were reported in 71.0% and 47.1% of cases, respectively ($p < 0.05$). Similarly, positive or neutral attitudes toward vaping were reported in 74.2% and 45.9% of cases, respectively ($p < 0.05$). Smoking students reported significantly higher rates of positive or neutral attitudes toward vaping of relatives than nonsmoking students, with rates of 45.2% and 18.4%, respectively ($p < 0.01$).

In general, 12.7% of the students mentioned positive aspects of smoking, such as psychological relief from stress, image, pleasure, and making new acquaintances. Table 4 shows that smoking students were significantly more likely than nonsmokers to view smoking positively (25.8% vs. 6.9% of cases; $p < 0.05$), believe that vape devices are an effective treatment for nicotine addiction (29.0% vs. 9.2% of cases; $p < 0.05$), and consider them a safe alternative to smoking (22.6% vs. 6.9% of cases; $p < 0.01$).

According to a 2023 online survey, 22.6% of e-cigarette users and 30.1% of e-cigarette users agreed with the statement that e-cigarettes are less harmful than conventional tobacco products, which correlates with the findings [13].

Table 1. Distribution of participants in the pilot study according to tobacco and/or nicotine-containing products (n = 118)

Таблица 1. Распределение участников пилотного исследования в зависимости от потребления табачной и/или никотинсодержащей продукции (n = 118)

Parameter	Number of respondents, n (%)
Smoking cigarettes	4 (3.4)
Using vapes and/or e-cigarettes and/or tobacco heating systems	22 (18.6)
Using cigarettes, vapes, and/or e-cigarettes and/or tobacco heating systems	5 (4.2)

Table 2. Smoking in the immediate circle of respondents

Таблица 2. Курение в кругу ближайшего окружения респондентов

Parameter	Number of respondents who do not smoke or consume nicotine-containing products (n = 87), n (%)	Number of respondents who smoke and/or consume nicotine-containing products (n = 31), n (%)	Statistical significance (Pearson's χ^2 test)
Smoking within the family, including parents and siblings	28 (32.2)	11 (35.5)	$p = 0.91$
Smoking friend	49 (56.3)	28 (90.3)	$p < 0.01$
Smoking by individuals nearby, such as classmates or dorm neighbors+	62 (71.3)	25 (80.6)	$p = 0.44$

Table 3. Attitude of respondents toward smoking and vaping depending on smoking/vaping status

Таблица 3. Отношение участников опроса к курению и вейпингу в зависимости от принадлежности к курению/вейпингу

Parameters inducing a positive or neutral attitude	Number of respondents who do not smoke or consume nicotine-containing products (n = 87), n (%)	Number of respondents who smoke and/or consume nicotine-containing products (n = 31), n (%)	Statistical significance (Pearson's χ^2 test)
Smoking relatives	28 (32.2)	14 (45.2)	$p = 0.28$
Smoking close friends	52 (59.7)	25 (80.7)	$p = 0.05$
Smoking in general	41 (47.1)	22 (71.0)	$p < 0.05$
Vaping relatives	16 (18.4)	14 (45.2)	$p < 0.01$
Vaping close friends	53 (60.9)	25 (80.7)	$p = 0.07$
Vaping in general	40 (45.9)	23 (74.2)	$p < 0.05$

Table 4. Participants' perceptions of smoking/vaping and its hazards

Таблица 4. Представления участников опроса о курении/вейпинге и их вреде

Respondents' perception	Number of respondents who do not smoke or consume nicotine-containing products (n = 87), n (%)	Number of respondents who smoke and/or consume nicotine-containing products (n = 31), n (%)	Statistical significance (Pearson's χ^2 test)
Smoking has positive aspects	6 (6.9)	8 (25.8)	$p < 0.05$
Smoking is hazardous to health	80 (92.0)	24 (77.4)	$p = 0.07$
Vapes are effective as a treatment for nicotine addiction	8 (9.2)	9 (29.0)	$p < 0.05$
Vapes are a safe alternative to traditional smoking	6 (6.9)	7 (22.6)	$p < 0.01$
Nicotine-free vapes are safe for health	9 (10.3)	4 (12.9)	$p = 0.95$
Smoking cessation is good for health	68 (78.2)	18 (58.1)	$p = 0.05$

When asked whether they would start smoking or using vapes/e-cigarettes if they knew everything they know now about smoking and/or vaping, most students (80.5%) answered, "I don't know."

During the online questionnaire survey, the participants did not report any difficulties. All questions were clear, and all possible answer options were provided.

CONCLUSIONS

1. The developed online questionnaire is comprehensible and user-friendly for respondents. The data are accurately saved, enabling its use in the primary research stage.
2. The study found that 3.4% of students smoked cigarettes, 18.6% used NCPs, and 4.2% used both cigarettes and NCPs. These results suggest a high prevalence of NCP use among students and require further investigation.

ADDITIONAL INFORMATION

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Competing interests. The authors declare that they have no competing interests.

Author contribution. Thereby, all authors confirm that their authorship complies with the international ICMJE criteria (all authors have made a significant contribution to the development of the concept, research, and preparation of the article, as well as read and approved the final version before its publication).

Personal contribution of the authors: *M.A. Pokhaznikova* — concept and design of the study, questionnaire development, literature review, organization of the study, surveying, analysis of the obtained data, and writing the text; *O.Yu. Kuznetsova* — concept and design of the research, questionnaire development, organization of the research, surveying, and making final revisions; *K.V. Ovakimyan* — preparation of the sample, processing of materials, and analysis of the obtained data; *R.R. Fatkieva* — development of the online questionnaire and information saving, sample preparation, and surveying; *A.Yu. Goriaeva* — organization of the study, surveying, and analysis of the obtained data; *E.A. Andreeva* — organization of the study, preparation of the sample, surveying, analysis of the obtained data, and making final revisions; *A.E. Sychev* — development of online questionnaire and information saving; *A.V. Litvinova, D.S. Mamonkina, M.S. Skornyakova* — surveying.

Ethics approval. Study protocol No. 5 dated May 10, 2023, was approved by the local ethical committee of the North-Western State Medical University named after I.I. Mechnikov.

ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ

Источник финансирования. Исследование проведено без финансирования сторонних организаций.

Конфликт интересов. Авторы заявляют об отсутствии потенциального конфликта интересов.

Вклад авторов. Все авторы подтверждают соответствие своего авторства, согласно международным критериям ICMJE (все авторы внесли существенный вклад в разработку концепции, проведение исследования и подготовку статьи, прочли и одобрили финальную версию перед публикацией).

Наибольший вклад распределен следующим образом: *М.А. Похазникова* — концепция и дизайн исследования, разработка анкеты, обзор литературы, организация исследования, анкетирование, анализ полученных данных, написание текста; *О.Ю. Кузнецова* — концепция и дизайн исследования, разработка анкеты, организация исследования, анкетирование, внесение окончательной правки; *К.В. Овакимян* — подготовка выборки, обработка материалов; анализ полученных данных; *Р.Р. Фаткиева* — разработка онлайн-анкеты и сохранения информации, подготовка выборки, анкетирование; *А.Ю. Горяева* — организация исследования, анкетирование, анализ полученных данных; *Е.А. Андреева* — организация исследования,

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