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Cross-sectional cohort study on the use of electronic devices for smoking among students at the School of Medical Sciences of Minas Gerais

THALITA BAPTISTELI FERNANDES[1], ANA LUÍSA MENDES PINHEIRO COSTA[1], LEONARDO MEIRA DE FARIA[2]

[1]FACULTY OF MEDICAL SCIENCES OF MINAS GERAIS (FCMMG) – BELO HORIZONTE, MG, BRAZIL

CORRESPONDING AUTHOR: LEONARDO MEIRA DE FARIA – ALAMEDA EZEQUIEL DIAS, 275. CENTRO - CEP 30130-110 - BELO HORIZONTE, MG - BRASIL.
EMAIL: LEONARDOMEIRADEFARIA@GMAIL.COM

RESUMO

Introdução: Os cigarros eletrônicos (CE) são dispositivos que, por meio de uma bateria, são utilizados para aspiração de nicotina e outros aerossóis. Ao longo do tempo eles evoluíram e, atualmente, o tipo mais conhecido são os chamados “pods”. Dentre eles, o mais comum é o JUUL. O marketing e publicidade das empresas de cigarros eletrônicos fez com que jovens e adultos fossem atraídos e contribuíram para o aumento de seu uso, sendo utilizados como forma de lazer e alternativa de substituição dos cigarros convencionais por esses grupos. **Objetivo:** Conhecer a prevalência do uso de dispositivos eletrônicos em estudantes na Faculdade de Ciências Médicas de Minas Gerais e avaliar o perfil do usuário do cigarro eletrônico. **Método:** Estudo transversal dos estudantes na Faculdade de Ciências Médicas de Minas Gerais no período compreendido entre Maio de 2023 a Outubro de 2023. Com amostra de 94 voluntários que se enquadram nos critérios de inclusão e exclusão delimitados pela pesquisa. Estudo de prevalência com uso de inquérito e aplicação de formulário para reconhecimento do perfil da população usuária de cigarros eletrônicos em faculdade privada da área da saúde e o padrão regular de consumo. **Resultados:** A idade média observada foi de 22.71 anos e dentre os respondentes a este estudo, cerca de 66 (64%) são respondentes do sexo feminino. Observou-se que a maior concentração de respondentes está no nono período com 46 (45%), são do curso de Medicina com 77 (75%) e apresentam renda salarial familiar alta, sendo maior que 25 salários mínimos com 38 (37%). **Conclusão:** A subpopulação jovem apresenta a maior prevalência de uso de cigarro eletrônico, principalmente no curso de Medicina, com maior renda salarial familiar.

Palavras-chave: E-cigarettes. Smoking. Prevalence.

ABSTRACT

Introduction: Electronic cigarettes (EC) are devices that, through a battery, are used for the inhalation of nicotine and other aerosols. Over time, they have evolved, and currently, the most well-known type is the so-called “pods.” Among them, the most common is JUUL. The marketing and advertising by electronic cigarette companies have attracted both young people and adults, contributing to the increase in their usage. They are used for leisure and as an alternative to conventional cigarettes by these groups. **Objective:** To determine the prevalence of electronic device use among students at the Faculdade de Ciências Médicas de Minas Gerais and to assess the profile of electronic cigarette users. **Method:** A cross-sectional study of students at the Faculdade de Ciências Médicas de Minas Gerais was conducted between May 2023 and October 2023. The sample included 94 volunteers who met the inclusion and exclusion criteria defined by the research. A prevalence study using a survey and questionnaire will be used to recognize the profile of the population using electronic cigarettes in a private health-related college and the regular consumption pattern. **Results:** The observed mean age was 22.71 years, and among the respondents in this study, approximately 66 (64%) were female respondents. It was observed that the highest concentration of respondents was in the ninth semester, comprising 46 (45%), studying Medicine with 77 (75%), and having a high family income, exceeding 25 minimum wages, with 38 (37%). **Conclusion:** The younger subpopulation shows the highest prevalence of electronic cigarette use, especially in the Medicine course, with a higher family income.

Keywords: E-cigarettes. Smoking. Prevalence.

INTRODUCTION

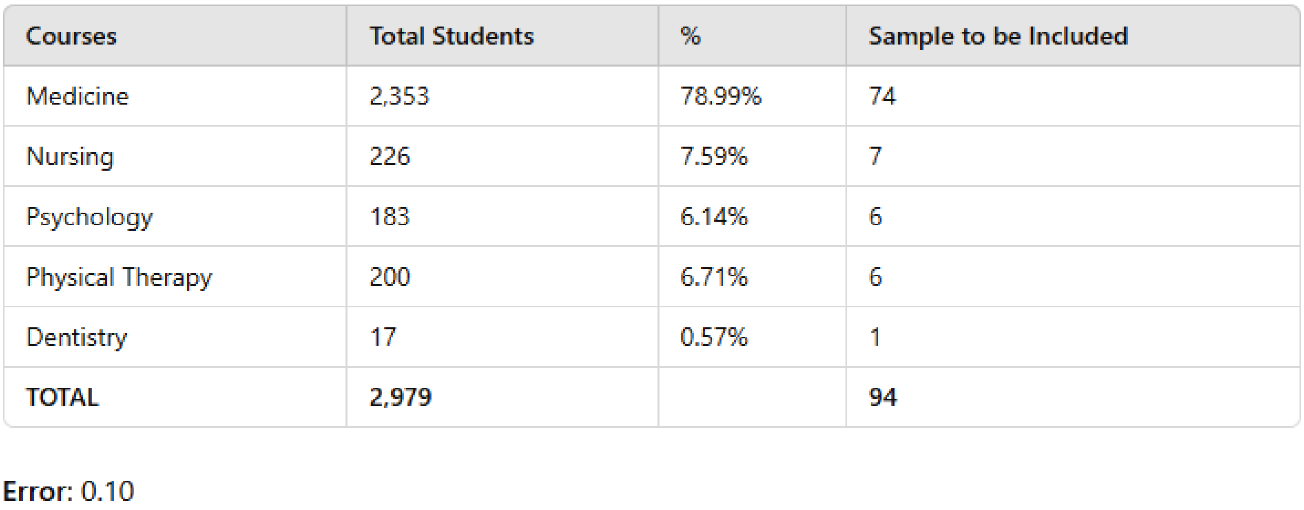
Electronic cigarettes (e-cigarettes) entered the U.S. market in 2006, hailed as a safer alternative and a smoking cessation tool (CAPONNETTO, 2013). These battery-powered devices deliver an inhaled aerosol that typically contains nicotine, flavorings, propylene glycol, and/or vegetable glycerin. They do not contain tobacco, do not require combustion, and do not produce smoke or carbon monoxide. While the prevalence of traditional tobacco cigarette use has declined over the last decade, the use of electronic cigarettes has increased (BUSCH et al., 2016). Since their introduction, e-cigarettes have evolved through four generations, with the latest generation, known as POD systems, becoming quite popular among users due to their compact size, USB charging capability, and ability to deliver high nicotine concentrations with reduced throat irritation (PINTO, 2020). As e-cigarettes have gained popularity, the number of users has grown significantly, particularly among young people and adolescents. Consequently, these devices have quickly become the most commonly used nicotine product among youth, largely driven by marketing and advertising by e-cigarette companies (WALLEY et al., 2019). Monitoring the presence and spread of these tobacco products in society can help identify gaps and threats in the nation's tobacco control policy, which has been highly successful over time (BERTONI et al., 2021). Therefore, this study aims to describe the prevalence of electronic device use among students at the Faculty of Medical Sciences of Minas Gerais, a private health education institution, and to examine the socioeconomic relationship with this use.

METHOD

This is a cross-sectional study of students at the Faculty of Medical Sciences of Minas Gerais, conducted from May 2023 to October 2023. Data collection began after CEP approval in May 2023. It is a prevalence study conducted through extensive direct observation using surveys and an electronic questionnaire, consisting of a series of questions answered without the researcher's presence, provided electronically to students of the institution. The data were collected using online forms chosen for their low cost, accessibility, availability, and convenience. This survey method is appropriate for this study profile, considering the project's efficiency and quick data collection process. Data were collected through a cross-sectional cohort, with responses gathered over time, as responses were submitted at different times. A sample calculation was conducted based on the total enrollment of 2,979 students, as provided by the course coordination on February 2, 2023. The sample calculation was performed using the finite data sampling equation, with a 5% confidence level and a maximum 10% error margin. The total sample size is 94 students, divided as follows: 74 from Medicine, seven from Nursing, six from Psychology and Physiotherapy, and one from Dentistry, as shown in Table 1 in section 4.4 of the data collection. The data obtained will be used for quantitative research based on the responses of students enrolled in undergraduate programs at the Faculty of Medical Sciences of Minas Gerais. Data analysis will utilize statistical analysis software, specifically the R programming language. Data will be presented descriptively for all independent and dependent study variables, with absolute and relative frequencies and measures of central tendency and variability. Results will be presented in tables and figures for better visualization. Eligible participants are students enrolled at the Faculty of Medical Sciences of Minas Gerais from May 2023 to October 2023, whether or not they use electronic cigarettes. The project data were obtained from the completion of a Google Forms questionnaire by students who smoke. Sample calculations were based on the total enrollment of 2,979 students, divided as previously stated (Table 1).

The questionnaire responses were entirely anonymous, with participants providing Informed Consent. The questionnaire covered socioeconomic profiles, demographics, age, gender, course, family income, whether a family member smokes, prior use of e-cigarettes, frequency of use, the number of packs, and whether they have considered quitting. After data collection, a descriptive statistical analysis was performed to determine the best metrics for analyzing the data obtained, identifying which groups are more susceptible to e-cigarette use. From an ethical perspective, as clinical data are involved, this study was submitted for approval by the National Research Ethics Commission (Conep). The collected data were used solely for research purposes. Additionally, the data are anonymized in the outcome evaluation, with the presentation of an Informed Consent Form.

Table 1. Sample Calculation by Course from the Faculty of Medical Sciences



Courses	Total Students	%	Sample to be Included
Medicine	2,353	78.99%	74
Nursing	226	7.59%	7
Psychology	183	6.14%	6
Physical Therapy	200	6.71%	6
Dentistry	17	0.57%	1
TOTAL	**2,979**		**94**

Error: 0.10

RESULTS

In this cross-sectional cohort study, participants' demographic profiles and characteristics were analyzed in detail through key variable analysis, including age, gender, academic period, and course, to understand the use of electronic smoking devices among students at the Faculty of Medical Sciences of Minas Gerais. Key findings include:

Age: The mean age was observed to be 22.71 years, with a standard deviation of 2.71 years. The median was 22 years, indicating that most participants are close to this age. The first quartile was 22 years, and the third quartile was 23 years, suggesting that most students fall within a narrow age range of 22 to 23 years.

Gender: Among the respondents, 66 (64%) were female. This gender distribution is relevant as it may influence associations between e-cigarette use and individual characteristics.

Academic Period: A detailed analysis of academic periods showed the highest concentration of respondents in the ninth period, totaling 46 participants (45%). This concentration may have implications for electronic smoking patterns among students at this specific stage of training.

Course: Regarding course distribution, about 77 students (75%) were enrolled in the Medicine course. This predominance may influence observed associations due to the particularities of this field concerning smoking and electronic device use.

These findings contribute to a better understanding of e-smoking device use patterns among students at this institution, and a thorough analysis of these variables will enable a more holistic and informed approach to exploring associations and behaviors related to these devices in this specific population.

Moreover, the statistical analysis, with a significance level of 0.05, revealed significant associations between key variables, providing a detailed view of students' behaviors regarding the use of these devices.

Thus, initial results indicate a statistically significant association ($p < 0.05$) between e-cigarette use and students' gender, with women showing a higher likelihood of using e-cigarettes than men. Additionally, a significant association ($p < 0.05$) was observed between the history of traditional cigarette use and e-cigarette use. This suggests that students who do not use traditional cigarettes are more likely not to adopt e-cigarettes and vice versa.

Among students who use e-cigarettes, a significant association ($p < 0.05$) was found between device use and the preference for disposable electronic devices, known as DISPOSABLE PODS. This suggests that students who choose e-cigarettes are also more likely to select disposable models, possibly due to factors like convenience or personal preferences.

Notably, no statistically significant association ($p > 0.05$) was found between e-cigarette use and the specific POD device type chosen. This suggests that, in the analyzed sample, e-cigarette use patterns are not strongly related to the specific POD device type selected.

These findings highlight significant associations between e-cigarette use, student gender, and history of traditional cigarette use. Additionally, among students who use e-cigarettes, a preference for disposable electronic devices was identified. However, no significant association was found between e-cigarette use and the specific POD device type. These findings contribute to a deeper understanding of electronic smoking behaviors among this student population.

DISCUSSION

This article presents a cross-sectional cohort study to investigate the use of electronic smoking devices among students at the Faculty of Medical Sciences of Minas Gerais. This study aimed to gather information on the prevalence and patterns of electronic smoking device use among the student population and its possible public health implications. The study employed a cohort design, allowing researchers to observe and analyze participant behavior over a specific period. By conducting a cross-sectional analysis, researchers collected data from multiple time points, providing a more comprehensive picture of e-smoking device use trends among students. The study results may have significant implications for both the academic community and public health authorities. Understanding the prevalence of e-smoking device use among medical students can shed light on possible factors influencing smoking behavior in this specific population. Additionally, the findings may help design targeted interventions to address health issues related to smoking and promote healthier habits among young adults. One limitation of the study may be the reliance on self-reported data, which can introduce recall or underreporting biases regarding smoking behavior. However, efforts were likely made to maintain participant confidentiality and anonymity to minimize these biases.

CONCLUSION

In conclusion, younger subpopulations, particularly in the Medicine course, with higher family income, exhibit the highest prevalence of e-cigarette use. These findings may contribute to existing knowledge about smoking behavior and potentially inform the development of preventive strategies and health promotion initiatives in educational settings. Further research and follow-up studies may be necessary to assess the long-term effects of e-smoking device use in this population.

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THE AUTHORS DECLARE THAT THERE IS NO CONFLICT OF INTERESTS IN RELATION TO THIS ARTICLE.