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A study to assess the knowledge regarding e-cigarettes and their health effects among college students

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Abstract
E-cigarette use has become an emerging public health concern, particularly among young adults and college students. This study aimed to assess the knowledge regarding e-cigarettes and their health effects among male students in a selected Institution, Coimbatore. A descriptive research design was employed, and 100 male students were selected using a non-probability convenience sampling technique. Data were collected using a structured questionnaire consisting of demographic variables and 20 multiple-choice questions assessing knowledge levels. Ethical approval was obtained, and verbal consent was secured from participants before data collection. Descriptive statistics such as frequency and percentage were used to analyze demographic characteristics and knowledge levels, while the chi-square test was applied to assess the association between demographic variables and knowledge levels. The study findings revealed that the majority of students (64.0%) were below 20 years of age, and most (69.0%) were undergraduate students. In terms of knowledge assessment, 59.0% had an average level of knowledge, 32.0% had poor knowledge, and only 9.0% had good knowledge about e-cigarettes and their health effects. More than half of the students had poor knowledge in the aspects of risk factors (68.0%), components (49.0%), legal aspects (46.0%), and health effects (57.0%) of e-cigarettes. A significant association (P = 0.026) was found between family income and knowledge levels, suggesting that financial background influenced awareness. Also, prior use of e-cigarettes was significantly associated with knowledge levels (P = 0.009), indicating that students who had used e-cigarettes had a higher awareness of their effects. The study concludes that the majority of students had moderate knowledge about e-cigarettes, but a considerable lack of awareness regarding their risks, components, and legal aspects. These findings highlight the need for targeted educational interventions to enhance awareness about e-cigarettes and their health consequences.

Keywords: E-cigarette, college students, health consequences of e-cigarette

Introduction
Electronic cigarettes, commonly known as e-cigarettes, have emerged as a significant technological innovation in the realm of nicotine delivery systems. Designed to simulate the experience of smoking traditional tobacco products, e-cigarettes have gained substantial popularity worldwide, particularly among young adults and adolescents. This rise in usage has sparked a global discourse on their health implications, regulatory challenges, and the necessity for comprehensive public awareness.

S Pettigrew *et al.* (2023) [5] conducted a study on e-cigarettes: A continuing public health challenge in India despite comprehensive bans. Their study reported that, while India has introduced comprehensive e-cigarette bans focused on protecting youth from vaping-related harm, despite these bans, educated young people appear to be a relatively high user group. The study included 840 tertiary-educated young adults, who completed an online survey revealed that 8% were dual users of both e-cigarettes and tobacco, and another 8% were e-cigarette users. The results suggest that despite a complete ban, young people are still able to access e-cigarettes in India. Priyanka Sharma stated in the article 'E-cigarette ban, black market thrives' in the Mint e-paper on 28 July 2024 that, the Union Health and Family Ministry's tobacco cell has reported 350 vape-related violations since 2022. This data highlights a small part of a larger issue, despite the ban on e-cigarettes and vapes in India under the Prohibition of Electronic Cigarettes (Production, Manufacture, Import, Export,

Transport, Sale, Distribution, Storage, and Advertisement) Act, 2019. According to data from the ministry's tobacco cell, there were 263 violations in financial year 2024, and 33 in the financial year 2023, indicating the presence of vapes in the black market. Understanding public knowledge and perceptions of e-cigarettes is crucial.

N Salari *et al.*, (2024) conducted a comprehensive systematic review and meta-analysis on the global prevalence of E-cigarettes in youth. The findings revealed that the global prevalence of E-cigarettes in younger individuals was 16.8 (95% CI: 10.6-25.6) and 4.8 (95% CI: 3-7.6) in the Ever and Current modes of E-cigarette, respectively. In young boys, the prevalence of E-cigarettes was 18.8 (95% CI: 8.4-36.8) and 4.9 (95% CI: 3-8) in both modes of Ever and Current, respectively. In young girls, these factors were 9.9 (95% CI: 5-18.6) and 1.6 (95% CI: 1-3.1) in both modes of Ever and Current, respectively. The findings concluded that the global prevalence of e-cigarettes among young people, especially young boys, is increasing.

D Bahl *et al.*, (2024) [3] conducted a mixed study on Unveiling the Digital Landscape of E- Cigarette Marketing in India. The study findings revealed that out of 370 youth surveyed, with a mean age of 21.1±1.7 years, 66.6% of participants reported being aware of e-cigarettes through social media, Instagram (46%) was identified as the most popular social networking platform for promoting e-cigarettes. 189 influencers promoting e-cigarettes on Instagram were identified and their posts positively portrayed e-cigarettes (trendy/cool, flavours, hedonic value, features cessation aid, and cost-effective). Additionally, 83 e-stores (49 Indian and 34 international) were identified as selling e-cigarettes in India.

E-cigarette use among Indian college students is a growing concern, influenced by the rapid expansion of digital technology and global market trends. The widespread availability of e-cigarettes through online platforms, social media marketing, and influencer promotions has contributed to the rising prevalence of vaping among young adults. Accurate data on public awareness and usage patterns can guide governments in formulating effective regulations and public health interventions. Identifying gaps in knowledge allows for the development of educational campaigns tailored to address misconceptions and inform the public about potential risks associated with e-cigarette use. This research is designed to assess the knowledge regarding e-cigarettes and their health effects among college students, which will help in designing digital health interventions, including awareness campaigns and mobile-based counseling programs, to counteract misleading information and promote tobacco-free lifestyles. As nurses play a crucial role in preventive healthcare, equipping them with research-based insights will enhance their ability to advocate for stricter policies and lead community-level interventions.

Statement of the problem

A study to assess the knowledge regarding e-cigarettes and their health effects among college students in a selected college, Coimbatore.

AIM

The study aims to identify awareness levels and potential gaps regarding e-cigarette and their health effects among college students.

Objectives

- To assess the level of knowledge regarding e-cigarettes and its health effects among college students
- To associate the selected demographic variable with the level of knowledge regarding e-cigarettes and its health effects

Operational Definition

Knowledge

It refers to the awareness, understanding, and information possessed by college students regarding e-cigarettes and their health effects, measured using a structured questionnaire**.**

Assumption

- Usage of e-cigarette products is very common among young adults.
- Regular usage of e-cigarettes leads to addiction and health problems.
- Students may have misconceptions or incomplete information about e-cigarettes.
- Social media influences the awareness of e-cigarettes among young adults.

Delimitation

- The study is delimited to college students from a selected college in Coimbatore.
- The study is delimited to male students

Research Methodology

- **Research Approach:** Quantitative explorative approach
- **Research design:** Non-experimental Descriptive research design.

The setting of the study

The study was conducted at RVS Educational Institutions, a co-educational institution located in Sulur, Coimbatore. The institution's multicultural environment and diverse academic offerings make it a suitable setting for conducting research among college students.

- **Population:** The population of the study consisted of male college students aged between 18-30 years.
- **Sample Size:** The sample size consisted of 100 male students based on sampling criteria**.**
- **Sampling Technique:** Non-probability convenience sampling technique was adopted**.**

Sampling Criteria

- Inclusion Criteria
- Only male students
- Students aged 18 to 30 years
- Students willing to participate in the study

Exclusion Criteria

- Female students
- Students who were not available during the data collection

Description of the data collection tool and technique

Technique: A self-administered structured questionnaire

Tool: The tool was developed by reviewing and aligning the literature with the study's objectives. The tool included structured questions to gather information about demographic variables, and a structured questionnaire to assess knowledge. The tool used in the study comprised two sections. Section I included personal information such as age in years, type of program, and family income per month; parents-related information such as the education and occupation of both father and mother, and information related to smoking and e-cigarettes such as smoking status, history of smoking in the family, ever used e-cigarettes, heard about e-cigarette, seeing the use of e-cigarette, and sources of information about e-cigarette. Section II was designed to assess the knowledge regarding e-cigarettes and their health effects. A structured questionnaire consisting of 20 multiple-choice questions on various aspects such as general information about e-cigarettes, risk factors and components present in the e-cigarettes, and legal aspects of e-cigarettes was used to collect information about the knowledge regarding e-cigarettes and their health effects. Participants had four options for each question and had to choose one correct answer.

Validity of the tool

The tool was submitted for validation to four experts from esteemed nursing institutions, who had more than 10 years of experience, to establish content validity. Each expert reviewed the tool thoroughly, providing feedback and suggestions for improvement. Modifications were made based on their recommendations to enhance the tool's accuracy and relevance.

Ethical consideration

The study was conducted after obtaining written permission from the Principal of the institution. The nature and purpose of the study were clearly explained to the participants, and verbal consent was obtained. Adequate explanations were provided whenever clarification was needed. Participants were treated with respect and dignity, ensuring their well-being throughout the study. The privacy of the data was maintained, and participants were assured of the confidentiality and anonymity of their information.

Data collection procedure

Formal written permission was obtained from the Principal after explaining the purpose of the study. The study involved 100 participants who met the inclusion criteria, selected using a non-probability convenience sampling technique. Before the data collection, the researchers sat together with other researchers of the study and discussed the data collection method to maintain uniformity before data collection. The researchers met the participants directly, gave a self-introduction, and obtained oral consent, after explaining the purpose and objectives of the study. Once rapport was established, the researchers collected demographic information and data on knowledge regarding e-cigarettes and their health effects, using a structured questionnaire. The participants take approximately 10 minutes to complete the questionnaire. At the end of the data collection, the researcher thanked each participant individually and assured them of their data privacy. Throughout the study, participants were treated with respect. The participants co-operated well and there was no refusal or unwillingness.

Plan for data analysis

The collected data were analyzed based on the study's objectives using both descriptive and inferential statistics. Descriptive statistics, including frequencies, and percentages, were used to analyze the demographic variables and assess the levels of knowledge regarding e-cigarettes and their health effects. Inferential statistics, such as the chi-square test was used to identify associations between variables. A p-value of less than 0.05 was considered statistically significant. The data were organized and presented in tables and graphs to summarize the findings. Statistical analysis was conducted using SPSS software.

Result

The findings revealed that the majority of students (64.0%) were below 20 years of age, and most (69.0%) were enrolled in undergraduate programs. In terms of family income, a significant proportion (41.0%) had a monthly income between ₹10,000 and ₹20,000. Regarding parental education, 27.0% of fathers had completed high school, while 24.0% of mothers had completed primary school. Occupationally, more than one-third of fathers (36.0%) were daily wage laborers, while 40.0% of mothers were homemakers. Smoking-related data showed that 62.0% of students had no smoking habits, while 35.0% reported that their fathers smoked. Additionally, 39.0% of students had used e-cigarettes, and 50.0% had heard of the concept, though only 49.0% had seen an e-cigarette being used. Social media was the most common source of information about e-cigarettes (30.0%).

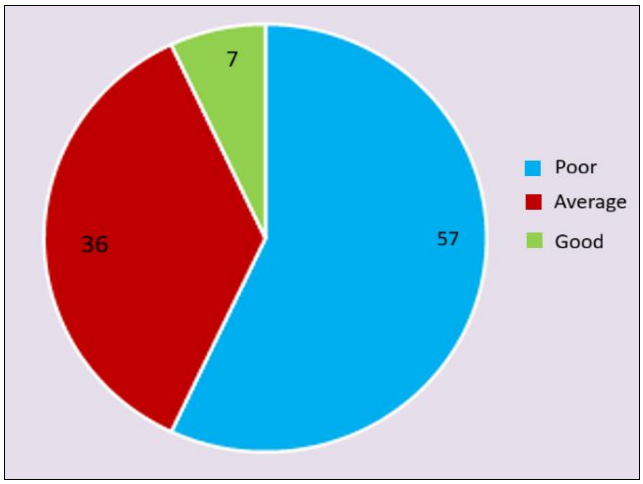

Fig 1: Presents the percentage distribution of the overall level of knowledge regarding e- cigarettes and their health effects among college students

On various aspects of e-cigarettes, the majority (68.0%) had poor knowledge about the risk factors of using e-cigarettes, and nearly half (49.0%) had poor knowledge regarding their components, 46.0% had a poor understanding of the legal aspects of e-cigarettes, and 57.0% had a poor level of knowledge regarding the health effects of e-cigarettes.

The associations between selected demographic variables and knowledge levels indicated that age, type of program, parental education, and occupation did not significantly impact students' knowledge. Whereas, family income showed a statistically significant association with knowledge levels (P = 0.026), suggesting that students from

different income groups had varying levels of awareness. Also, smoking status, family history of smoking, and exposure to e-cigarettes were not significantly associated with knowledge levels, but a significant association (P = 0.009) was found between having ever used an e-cigarette and knowledge levels. This implied that students who had personally used e-cigarettes had greater awareness of their health effects compared to those who had never used them.

Conclusion

The study concluded that a majority of students had an average level of knowledge regarding e-cigarettes and their health effects, there was a considerable lack of awareness about the risk factors, components, and legal aspects of e-cigarette use. Socio-demographic factors such as age, education, and parental occupation did not significantly influence knowledge levels, but family income played a role in determining awareness. Additionally, students who had previously used e-cigarettes demonstrated a higher level of knowledge compared to those who had not. These findings highlight the need for targeted educational interventions to improve awareness regarding e-cigarettes, their health risks, and legal regulations, particularly among students who have not been directly exposed to their use.

Nursing implication

Nursing Practice

The findings of this study emphasize the need for nurses to take an active role in educating individuals, particularly students, about e-cigarettes and their health effects. Nurses should integrate tobacco and e-cigarette cessation counselling into routine health assessments and provide evidence-based information on the associated risks. Community health nurses and school health nurses should collaborate with educational institutions to conduct awareness programs and promote healthy lifestyle choices.

Nursing Education

The study underscores the importance of incorporating comprehensive education on e- cigarettes and their health effects into the nursing curriculum. Nursing students should be equipped with up-to-date knowledge on tobacco alternatives, their risks, and legal implications, which can provide accurate health education to the public. Faculty members should also ensure that nursing students are well-prepared to counsel patients and advocate for preventive measures related to tobacco and e-cigarette use.

Nursing Administration

Nursing administrators play a crucial role in developing and implementing policies that address e-cigarette use and its health effects. Healthcare institutions should integrate e-cigarette awareness programs into hospital-based health promotion initiatives. Nursing administrators should facilitate training programs for nurses to enhance their ability to educate individuals about the risks of e-cigarettes. Additionally, policies should be established within healthcare settings and educational institutions to restrict the use of e-cigarettes and promote tobacco-free environments.

Nursing Research

The study highlights the need for further research on e-cigarette use, its long-term health effects, and the effectiveness of various educational interventions. Future studies should explore the impact of targeted awareness programs on improving knowledge levels among students and the general population. Nurse researchers should disseminate research findings through conferences, seminars, and publications.

Limitation

- The sample size was small, limiting the generalizability of the results.
- The samples were selected using a non-probability convenience sampling technique.
- The study was conducted in a specific educational institution, which may not reflect the diversity of knowledge.

Recommendation

- The study can be replicated on a large sample for generalization of the findings.
- A comparative study can be conducted to assess the awareness and perception of e-cigarette use among medical and non-medical students in selected colleges.
- An interventional study can be conducted to evaluate the effectiveness of an educational program on knowledge regarding e-cigarettes among students.
- A qualitative study can be conducted to explore the perceptions and influencing factors of e-cigarette use among young adults in urban and rural settings

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