



KNOWLEDGE, ATTITUDE AND PRACTICES OF E-CIGARETTES AND VAPING AMONG UNDERGRADUATE DENTAL STUDENTS OF AHMEDABAD CITY, GUJARAT: A CROSS SECTIONAL SURVEY

Dentistry

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ABSTRACT

Introduction: Nicotine dependence is a significant public health issue, with e-cigarettes gaining popularity as an alternative to traditional smoking. Despite having fewer harmful chemicals, e-cigarettes still pose health risks, including cancer, asthma, and chronic obstructive pulmonary disease (COPD). Many young users mistakenly perceive e-cigarettes as less harmful, leading to increased usage. Dental professionals, including students, play a crucial role in tobacco cessation. This study evaluates dental students' knowledge and attitudes toward e-cigarettes, proposing that informed students are less likely to use or promote them, emphasizing the need for education in future cessation programs. **Materials And Methods:** This cross-sectional study was conducted among 157 undergraduate dental students of Ahmedabad city, Gujarat, using a self-administered Google form questionnaire. A structured questionnaire was administered, consisting of 12 questions aimed to assess the knowledge, attitudes, and perceptions regarding e-cigarettes and vaping. Descriptive statistics was used to summarize the results. **Results:** The results showed that students demonstrated a strong understanding of e-cigarettes and vaping, with their knowledge, attitudes, and practices assessed as satisfactory. **Conclusion:** The survey shows that while dental students are aware of e-cigarettes, many remain uncertain about their health risks and nicotine content. This underscores the need for enhanced education on the health risks and regulations surrounding e-cigarettes and vaping.

KEYWORDS

Nicotine, E – cigarettes, Vaping

INTRODUCTION:

Nicotine dependence is classified as a chronic disease and is listed in the International Classification of Diseases (ICD-10) under mental and behavioral disorders related to tobacco use (ICD F17). Despite the well-established health risks of smoking, it continues to pose a significant public health concern¹. Nicotine, the primary addictive compound in tobacco, acts as a stimulant with numerous harmful effects, and tobacco products, including cigarettes and cigars, contain over 500 carcinogenic substances². In response to this issue, Chinese pharmacist Hon Lik invented the e-cigarette in 2003 as a tool to help smokers gradually quit tobacco³. The electronic cigarette (EC) was introduced as an alternative to traditional cigarettes and is commonly seen as a smoking cessation aid, though its effectiveness remains unproven¹.

A key distinction between traditional tobacco cigarettes and e-cigarettes is the absence of bad breath, flames, or carbon monoxide production in the latter². However, e-cigarettes mimic the act of smoking, making them attractive to many smokers. While e-cigarette vapor contains fewer toxins compared to conventional cigarette smoke, the World Health Organization (WHO) has expressed uncertainty regarding their safety, advising against the use of nicotine in any form². A study in China revealed that 62.5% of university students who use e-cigarettes believed them to be less addictive than traditional cigarettes, increasing their willingness to use them. Similarly, in Indonesia, 65% of students who currently use e-cigarettes perceived them as less harmful, fueling curiosity and experimentation⁴.

In recent years, the trend of e-smoking has gained considerable popularity among young people². Various factors contribute to this phenomenon; some individuals smoke to assert power and importance, while others are influenced by peers or wish to fit into social groups, expanding their social networks or alleviating stress. The availability of enticing flavors plays a significant role in the appeal of e-cigarettes, attracting young users in search of new experiences, sensations, and recreational activities⁵.

Electronic cigarettes, also known as vape pens or vaping devices, function as electronic nicotine delivery systems. These devices, powered by batteries, produce a nicotine-containing aerosol vapor, which is inhaled by the user. The vapor is created by heating a liquid, often referred to as e-liquid, typically composed of compounds such as

propylene glycol, vegetable glycerin, nicotine, and flavor additives. Although e-cigarettes were initially introduced to aid smoking cessation, concerns have emerged over whether they actually help individuals quit or contribute to nicotine dependence. Furthermore, research has revealed that e-cigarettes contain toxic substances. The liquid components, including propylene glycol (PG), diethylene glycol (DG), and nicotine, as well as metals found in the devices like chromium, nickel, and aluminum, have been linked to adverse effects on organs and tissues. These risks include chronic obstructive pulmonary disease (COPD), cancers, and asthma. Nicotine itself is highly addictive and disrupts brain development, especially in younger users, affecting synapse formation. Although e-cigarette vapor may contain fewer harmful substances than traditional cigarettes, the WHO has emphasized the difficulty in determining if vaping is safer and advises against the use of nicotine products. Additionally, some e-cigarettes have been reported to have batteries that explode, posing further risks, particularly as their use becomes more widespread among youth.

Another device, known as "heat-not-burn," is a new type of heated tobacco product marketed under the brand name IQOS (I Quit Ordinary Smoking). This device uses tobacco leaves instead of e-liquid, heating them at a temperature that prevents combustion and eliminates tar. However, this temperature is still sufficient to produce a nicotine-containing vapor, which consumers inhale⁴.

As a new product, e-cigarettes pose potential health risks that users may not fully comprehend. Informed dentists can play a crucial role in guiding patients and addressing their concerns, helping to prevent diseases such as oral cancer¹. Dental students, as future dentists, are expected to be key players in implementing tobacco cessation programs and educating patients about the dangers of smoking. It is essential to determine the prevalence of e-cigarette use within this group and assess their knowledge, beliefs, attitudes, and practices regarding e-cigarettes. However, there is currently a lack of comprehensive data on these factors among dental students. Based on the health belief model, this study aims to assess the knowledge, beliefs, attitudes, and practices regarding e-cigarette use among dental students.¹ We propose that students who are well-informed about the harmful effects of e-cigarettes are less likely to engage in this habit or promote their use. Therefore, the objective of this study was to evaluate the level of knowledge, attitude and practices about e-cigarettes among undergraduate dental students of Ahmedabad city,

Gujarat.

MATERIAL AND METHODS

This cross-sectional study was conducted among undergraduate dental students of Ahmedabad city, Gujarat, using a self-administered Google form questionnaire. Participation was voluntary, and the questionnaire was distributed electronically to all undergraduate students enrolled in the dental program. The responses were collected anonymously to ensure confidentiality. Ethical clearance was obtained from the Institutional Ethical Committee, College of Dental Sciences and Research Centre, Ahmedabad. A structured questionnaire was administered, consisting of 12 questions aimed to assess the knowledge, attitudes, and perceptions regarding e-cigarettes and vaping. The questionnaire was available in English. Each student took approximately 5 minutes.

Data analysis was conducted using SPSS version 20 software (IBM Corp. IBM SPSS Statistics for Windows, Armonk, NY, USA: IBM Corp; 2011). Descriptive statistics was used to summarize the results.

RESULTS

The study included 157 participants, of which 68.1% were female and 31.8% were male. (Table No. 1)

The study population comprised undergraduate dental students, with 34% in their third year, 24.1% being interns, 19.1% in their second year, 17.9% in their first year, and 4.9% in their final year. (Figure No. 1)

In response to the question, "Have you ever heard about E-cigarettes and vaping among your family and friends?" the majority of participants 71.3% answered "Yes." When asked, "Do you consider E-cigarettes and vaping less harmful to health than normal cigarettes?" most respondents 53.7% answered "No." Regarding whether "E-cigarettes and vaping can potentially trigger asthma attacks and allergies," the highest percentage 69.4% agreed, answering "Yes." For the question, "Are E-cigarettes and vaping nicotine-containing?" 52.8% of participants answered "Yes." When asked if the vapor released from E-cigarettes and vaping is dangerous to babies and children, the majority 77.7% responded "Yes." Similarly, when questioned, "Can E-cigarettes and vaping lead to addiction?" most respondents 78.3% also answered "Yes." When asked, "Can you use E-cigarettes and vaping in smoke-free places?" the highest percentage 48.4% answered "No." In response to, "Do you consider the use of E-cigarettes and vaping to be fun?" the majority 66.2% answered "No." Regarding whether "E-cigarettes and vaping make you fashionable," the majority 75.1% also answered "No." When asked, "Do you think E-cigarettes and vaping enhance your concentration and help relieve stress?" the largest group 50.9% responded "No." For the question, "Does the government have any regulations on the purchase of E-cigarettes and vaping?" most respondents 50.3% said they "Don't know." Lastly, when asked if "E-cigarettes and vaping are a successful cessation aid," the majority 43.3% answered "No." (Table No. 2)

DISCUSSION

Approximately 1.3 billion people worldwide are smokers, with tobacco smoking being the most prevalent form⁵. E-cigarettes, often promoted as a harm-reduction alternative to traditional tobacco smoking, have raised concerns about their safety and effectiveness, as there is limited understanding of their health impacts⁷. With the growing use of e-cigarettes among young undergraduate dental students, this study aimed to examine the knowledge, attitudes, and practices related to e-cigarettes.

The study revealed that a significant majority of respondents, 71.33%, had heard about e-cigarettes and vaping from their family and friends, while 18.47% had not, and 10.19% were unsure. No earlier studies related to this was found. When asked if they believed e-cigarettes and vaping were less harmful to health than regular cigarettes, 53.77% responded "No," 26.11% were unsure, and only 19.10% thought they were less harmful. In contrast, a study by Guckert E.C. et al. 2021¹ found that the majority of students perceived e-cigarettes as either less harmful (37.7%) or equally harmful (43.9%) compared to conventional cigarettes. Regarding the potential for e-cigarettes and vaping to trigger asthma attacks and allergies, 69.42% agreed they could, 26.11% were unsure, and 3.82% disagreed. No earlier studies related to this was found. In terms of nicotine content, 52.86% of participants believed that e-cigarettes and vaping contain nicotine, while 40.12% were unsure, and 7.00% thought they did not.

Comparatively, in a study by Fang J. et al. 2020⁷, 42.6% answered "Yes," 20.1% said "No," and 37.3% were uncertain when asked if e-cigarettes contain nicotine. When asked if vapor released from e-cigarettes and vaping was dangerous to babies and children, 77.70% agreed, 19.10% were uncertain, and only 3.18% disagreed. No similar study has been conducted. Similarly, a significant majority of 78.3% believed that e-cigarettes and vaping could cause addiction, 16.5% were uncertain, and 5.09% disagreed. In comparison, a study by Fang J. et al. 2020⁷ found that 66.1% responded "Yes," 8.3% said "No," and 25.6% were unsure when asked if e-cigarettes are addictive. When asked whether e-cigarettes and vaping could be used in smoke-free places, 48.40% of respondents said "No," 35.66% were uncertain, and 15.92% believed it was allowed. In comparison, a study by Guckert E.C. et al. 2021¹ reported that 50% of G3 students, 39% of G2, and 34.5% of G1 correctly answered "False" to the statement that e-cigarettes would be permitted where conventional smoking is banned (in closed and public spaces). When asked if using e-cigarettes and vaping was enjoyable, 66.2% disagreed, 17.1% were unsure, and 16.5% found it fun. In comparison, a study by Hartono R. et al. 2024⁴ revealed that 18.9% in China agreed and 81.1% disagreed, while in Indonesia, 3.8% agreed and 96.2% disagreed when asked if e-cigarettes provide pleasure. When asked if e-cigarettes and vaping made users appear fashionable, 75.1% disagreed, 10.1% were unsure, and 14.6% believed they did. In comparison, a study by Hartono R. et al. 2024⁴ found that in China, 17% agreed and 83% disagreed, while in Indonesia, 8.1% agreed and 91.9% disagreed when asked if e-cigarettes made them feel fit and cool. When asked whether e-cigarettes and vaping improve concentration and relieve stress, 50.95% disagreed, 34.39% were unsure, and 14.64% agreed. In contrast, a study by Hartono R. et al. 2024⁴ found that in China, 21.4% agreed and 78.6% disagreed, while in Indonesia, 11.4% agreed and 88.6% disagreed when asked if e-cigarettes help relieve stress. When asked whether the government has regulations on the purchase of e-cigarettes and vaping, 50.31% were unsure, while 24.84% responded "Yes" and 24.84% said "No." In a similar study by Hartono R. (2024), 25.4% of participants from China agreed and 74.6% disagreed, while in Indonesia, 2.4% agreed and 96.2% disagreed when asked if the government should avoid regulating e-cigarette use. Lastly, when asked if e-cigarettes and vaping were effective as a cessation aid, 43.31% disagreed, 38.21% were uncertain, and 18.47% believed they were helpful. A study by Alhaji M.N. et al. 2022² reported a significant difference in smoking cessation success with the use of e-cigarettes.

CONCLUSION

In conclusion, the survey on E-cigarettes and vaping among undergraduate dental students highlights a significant level of awareness about these products, with the majority having heard about them from their family and friends. However, a notable portion of respondents expressed uncertainty regarding the health implications, nicotine content, and the risks associated with vaping. While most participants recognized the potential harm to babies and children and the likelihood of addiction, there was mixed understanding about the use of E-cigarettes in smoke-free areas and the effectiveness of vaping as a cessation aid. These findings suggest the need for better education on the health risks and regulatory aspects of E-cigarettes and vaping within this demographic to address knowledge gaps and misconceptions.

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Table No. 1

GENDER	
MALE	50 (31.8)%
FEMALE	107 (68.1)%

Table No. 2

S.N o.	Questions	Options	Frequency (%)
1.	Have you ever heard about E-cigarettes and vaping among your family and friends?	Yes	112 (71.3%)
		No	29 (18.4%)
		Don't Know	16 (10.1%)

2.	Do you consider E-cigarettes and vaping are less harmful to health than normal cigarettes?	Yes	30 (19.1%)
		No	86(53.7%)
		Don't Know	41(26.1%)
3.	E-cigarettes and vaping can potentially trigger asthma attacks and allergies?	Yes	109 (69.4%)
		No	6 (3.8%)
		Don't Know	41 (26.1%)
4.	Are E-cigarettes and vaping nicotine containing?	Yes	83 (52.8%)
		No	11 (7%)
		Don't Know	63 (40.1%)
5.	Do you think vapor released from E-cigarettes and vaping are considered to be dangerous to babies and children?	Yes	122 (77.7%)
		No	5 (3.1%)
		Don't Know	30 (19.1%)
6.	Can E-cigarettes and vaping lead to addiction?	Yes	123 (78.3%)
		No	8 (5%)
		Don't Know	26 (16.5%)
7.	Can you use E-cigarettes and vaping in smoke free places?	Yes	25 (15.9%)
		No	76 (48.4%)
		Don't Know	56 (35.6%)
8.	Do you consider use of E-cigarettes and vaping to be fun?	Yes	26 (16.5%)
		No	104 (66.2%)
		Don't Know	27 (17.1%)
9.	Do you think E-cigarettes and vaping makes you fashionable?	Yes	23 (14.6%)
		No	118 (75.1%)
		Don't Know	16 (10.1%)
10.	Do you think that e cigarettes and vaping enhance your concentration and helps relieve stress?	Yes	23 (14.6%)
		No	80 (50.9%)
		Don't Know	54 (34.3%)
11.	Does the government have any regulations on purchase of e cigarettes and vaping?	Yes	39 (24.8%)
		No	39 (24.8%)
		Don't Know	79 (50.3%)
12.	And lastly do you feel that e cigarettes and vaping are a successful cessation aid?	Yes	29 (18.4%)
		No	68 (43.3%)
		Don't Know	60 (38.2%)

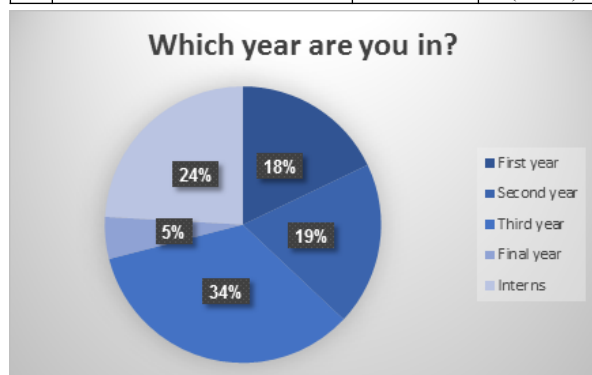


Figure No. 1

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