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Assessing the knowledge, attitude and practice of electronic cigarettes and their associated factors among undergraduate students of Institute of Medicine, Nepal: a cross-sectional study

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Abstract

Background Electronic cigarettes (e-cigarettes) are gaining popularity globally and becoming popular among young people, including in Nepal. Easy accessibility, appealing ads, and the misconception that e-cigarettes are safer than traditional cigarettes have fueled their rising popularity among university students in Nepal. The lack of comprehensive data on the prevalence and determinants of e-cigarette use among university students in Nepal underscores the urgent need for targeted research in this area. This study aimed to examine the knowledge, attitudes, and practices regarding e-cigarettes, as well as their influencing factors, among undergraduate students at the Institute of Medicine in Kathmandu, Nepal.

Methods We conducted a cross-sectional study with 302 undergraduate students. A self-administered questionnaire assessed their knowledge, attitudes, and practices related to e-cigarettes. Descriptive statistics were reported, and chi-square tests and multivariate logistic regression analyses were performed to determine the statistical association among variables using STATA 14.

Results The mean age of participants was 21.4 ± 2.1 years. Of the 302 respondents, 214 (70.9%) had heard of e-cigarettes. Among them, 71.5% had good knowledge, 62.2% held supportive attitudes, and 79.0% had never used e-cigarettes. Males were more likely to smoke e-cigarettes than females (AOR: 2.27; 95% CI: 1.01–5.01; $p=0.046$). Students with friends who smoke were nearly three times more likely to use e-cigarettes (AOR: 3.00; 95% CI: 1.12–7.99; $p=0.028$). Supportive attitudes towards e-cigarettes also doubled the likelihood of smoking them (AOR: 2.10; 95% CI: 1.02–4.35; $p=0.045$).

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Conclusion The study highlights important implications for interventions, policy, and education within Nepal's medical system. With a notable percentage of students holding supportive attitudes toward e-cigarettes, there is a clear need for targeted behavior change campaigns that educate about the health risks associated with e-cigarettes.

Keywords E-cigarettes, Knowledge, Attitude, Practice, Undergraduate students, Nepal

Introduction

Electronic cigarettes (e-cigarettes), commonly referred to as vapes, are battery-operated devices that deliver nicotine by heating a liquid solution, typically composed of nicotine, flavorings, and other chemicals, without combustion [1, 2]. Marketed as a safer alternative to traditional cigarettes, e-cigarettes have rapidly gained global popularity, especially among young people. Their appeal lies in the belief that they offer a reduced-risk smoking experience by eliminating harmful byproducts associated with tobacco combustion [3]. However, contrary to this perception, e-cigarette emissions contain a range of harmful substances, including formaldehyde, acrolein, volatile organic compounds, and heavy metals like lead, which pose significant health risks to users and those exposed to secondhand aerosols [4]. The nicotine in e-cigarettes, although non-combustible, remains highly addictive, with particularly harmful effects on youth and adolescents, as it can impair brain development and cognitive functions [5]. Furthermore, studies suggest that toxicants in e-cigarette vapors may contribute to the development of cancers, cardiovascular diseases, and respiratory conditions, raising concerns about the long-term health implications of widespread e-cigarette use [6, 7].

E-cigarettes are now used predominantly by individuals who have never smoked before, particularly among adolescents and young adults [8]. Recent systematic reviews estimate that the global lifetime prevalence of e-cigarette use among young people stands at 15.3%, while current use is 7.7%, and dual-use (both e-cigarettes and traditional cigarettes) remains around 4% [9]. In Asia, e-cigarette use is somewhat lower, with lifetime and current use reported at 16% and 11%, respectively [10]. Although these figures are lower than those seen in Western countries, the rapid increase of e-cigarette markets in countries like Nepal makes the country vulnerable to an unprecedented rise in usage [10, 11].

Despite the existence of Nepal's Tobacco Product Control and Regulatory Directive of 2014, which prohibits the promotion, advertising, and sponsorship of tobacco products, including e-cigarettes, the implementation and enforcement of these regulations have been laid back [12]. As a result, e-cigarette businesses have flourished, particularly in urban centers, with retailers, parlors, and online stores targeting young consumers. In fiscal year 2022/2023 alone, over 18 million Nepalese rupees worth of e-cigarettes, amounting to 426,372 units, were

imported into the country, demonstrating the growing demand for these products [13]. E-cigarettes, often marketed in youth-friendly flavors such as mint, fruit, candy, and chocolate, and designed to resemble pens, tech gadgets, or other everyday items, appeal strongly to adolescents and young adults [14, 15]. The combination of easy accessibility, appealing advertisements, and the misconception that e-cigarettes are a safer alternative to traditional cigarettes has driven their rising popularity, particularly among university students in Nepal [3].

While comprehensive data on the prevalence of e-cigarette use among university students in Nepal is limited, studies from other regions provide insight into the growing concern [16–19]. Similarly, studies from other regions have found that up to 40% of university students are using e-cigarettes, with use associated with poorer academic performance, cognitive difficulties, and higher rates of mental health conditions, including anxiety and depression [17, 20, 21]. These findings suggest that e-cigarette use may not only affect students' health but also their academic success and overall well-being [22].

In Nepal, where medical university students represent a critical demographic—many of whom will go on to become healthcare professionals—understanding their knowledge, attitudes, and practices (KAP) related to e-cigarettes is essential. These future health professionals will play a key role in shaping public health policies and educating communities about the risks of e-cigarettes. However, existing research indicates that their understanding of the health implications of e-cigarette use is often suboptimal, with many students misinformed about the risks or holding favorable attitudes towards e-cigarettes as a less harmful alternative to smoking. Furthermore, recent literature highlights several factors influencing e-cigarette use among university students, including age, gender, academic performance, peer influence, family background, and the number of friends who use e-cigarettes [19, 23, 24]. The lack of comprehensive data on the prevalence and determinants of e-cigarette use among university students in Nepal underscores the urgent need for targeted research in this area. Hence, this cross-sectional study aims to fill this research gap by assessing the knowledge, attitudes, and practices related to e-cigarettes among undergraduate students at medical institutions in Kathmandu, Nepal. By examining the factors influencing e-cigarette use within this population, the study seeks to provide critical insights that can

inform public health interventions and community education campaigns.

Methods

Study design and settings

A descriptive cross-sectional study was conducted among undergraduate medical, paramedical, and public health students across four campuses/departments at the Institute of Medicine (IOM), Tribhuvan University in Kathmandu, Nepal: Maharajgunj Medical Campus, Maharajgunj Nursing Campus, Ayurveda Campus, and the Central Department of Public Health. Each campus offers a comprehensive 4-year undergraduate program in their respective fields.

Sample size and participant recruitment technique

The sample size calculation was performed using the formula for a finite population, $n = \frac{(N \cdot Z^2 p q)}{d^2 (N - 1) + Z^2 p q}$ [25]. Using the formula, the calculated sample size was 304, with a total population of 1365 students on the campus, considering a 66% prevalence (p) of ever heard about e-cigarettes among the adult population in Malaysia [26] with a margin of error set at 5%, a CI of 95% and a nonresponse rate of 10%. We carried out a simple random sampling technique to recruit participants for the study. The data were collected through web-based Google Forms from February 2022 to May 2022 following ethical approval from the institutional review committee. Participant recruitment was conducted in two steps. First, we approached the college authority of IOM-TUTH to inform them about the study's purpose and objectives. Next, we contacted a class representative to share details about the study. With the class representatives' assistance, we arranged 15-minute discussion sessions with each class group. During these sessions, we explained the study's purpose and objectives and addressed any queries. We then obtained a consensus from the groups to collect their contact details (email addresses) through the class representative. The acquired contact details from the class representatives were listed in an Excel sheet, and consecutive numbers from 1 to 1365 were assigned. A random sample of 304 students was selected from this list using a random number generator.

In the second step, a Google Forms survey, accompanied by a mandatory informed consent form, was sent to the selected participants via their provided contact information. To restrict responses to only eligible participants, the Google Forms were sent exclusively to potential participants among IOM-TUTH students. Participants were encouraged to complete the survey at their convenience. Following regular follow-ups, 302 out of 304 respondents completed the questionnaire and were included in the final analysis, while 2 participants were excluded due

to incomplete responses. Figure 1 shows the sampling schema of our study.

Data collection tools and measures

The questionnaire for this study was adapted from a tool used in a previous survey conducted in Malaysia [26]. We obtained permission from the author of the original study to use the tool in English. To ensure the reliability of the survey instrument, pretesting was done on 30 respondents of a similar population, which were not incorporated in the final sample. The Cronbach's alpha for the tool-measuring knowledge and the tool-measuring attitude were 0.66 and 0.68 respectively. Also, necessary corrections and improvements were made per the supervisor's guidance.

The questionnaire consisted of 4 sections: 'Sociodemographic characteristics', 'Knowledge assessment of e-cigarettes', and 'attitudes' and 'practice of e-cigarettes' (Annex 1). Regarding the assessment of knowledge, attitudes, and practices, only participants who responded "Yes" to the question "Have you ever heard about e-cigarettes?" were evaluated and further asked about their knowledge, attitudes and practices. Those who answered "No" to this question were only asked about their sociodemographic characteristics.

Part A consisted of questions concerning the participants' sociodemographic information, including age, sex, ethnicity, present/current residence, faculty, parental history of tobacco smoking, friends with smoking habits, and sources of information about e-cigarettes.

Part B consisted of 9 questions regarding the knowledge assessment of e-cigarettes with the response options "Yes", "No" and "Don't know". Each of the correct responses was given a score of 1, and answers with the wrong option or 'I don't know' were assigned a score of 0. The sum of correct answers from each question yielded the knowledge level of the participants with a 9 maximum attainable score. The median value served as a cut-off, categorizing participants into poor and good knowledge based on whether their scores were below or above the median.

Part C included the participants' attitudes towards e-cigarettes, which were assessed with 10 statements evaluated on a Likert scale, with the response options "Strongly disagree", "Disagree", "Neutral", "Agree", "Strongly agree" and "Don't know" score from 1 to 6. The responses were then recategorized as "agree", "1- Disagree" for "Strongly disagree and Disagree", "2- uncertain" for "Neutral and Don't know" and "3- Agree" for "Strongly agree and Agree." The sum of the agreed responses was used to determine the attitude score (max 30). The median value served as the cut-off, categorizing participants into supportive or opposing attitudes based

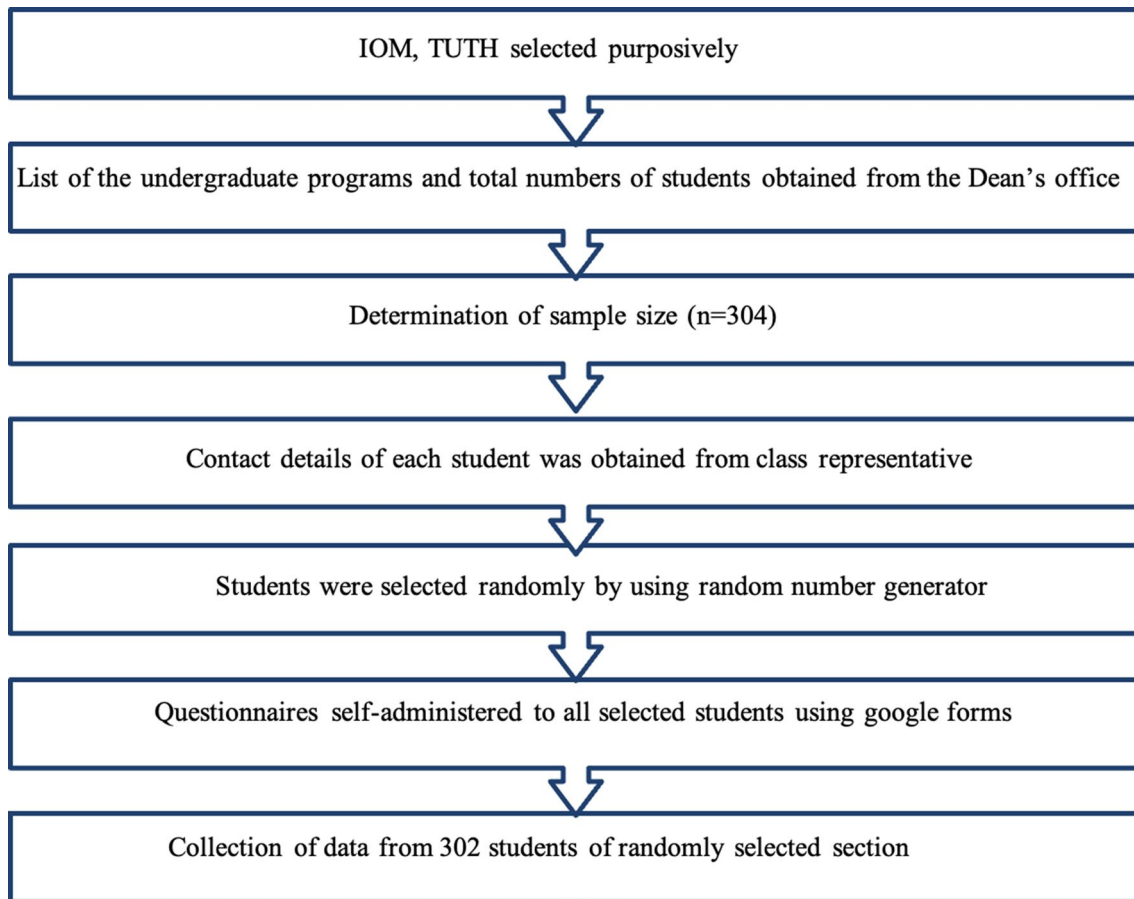


Fig. 1 Sampling Schema

on whether their scores were above or below the median [26].

Part D consisted of questions regarding the current practice of e-cigarettes. The first question concerned whether respondents had ever used an e-cigarette. If the answer was yes, 0 points were given for practice, and 1 point was given if the respondent answered no. In this section, we also assessed the reason for using e-cigarettes, how respondents obtained an e-cigarette for the first time, the reason for containing use of e-cigarettes, and how frequently they used e-cigarettes.

Statistical analysis

We used MS Excel 2013 to extract web-based data from the Google spreadsheet, where cleaning, storing, and coding were performed to simplify the data analysis. Statistical analysis was performed using STATA 14. A total of 302 responses were included in the analysis. Descriptive analysis was performed by calculating the frequency and percentage of the categorical variables and the mean and standard deviation of continuous variables. Chi-square tests and multivariate logistic regression analyses were performed to determine the statistical association

among variables. A p-value < 0.05 indicated a statistically significant difference.

Results

Of the 304 invited students, 302 provided consent and completed the questionnaire (response rate 99.34%).

Sociodemographic characteristics

Table 1 describes the sociodemographic characteristics of the study participants. A total of 302 participants were enrolled in our study. The mean age was 21.4 ± 2.1 years, with a range of 18–29 years. Among the students, 52.3% were females, and the majority of the students (61.9%) were either Brahmin or Chhetri. Nearly half of the students (46%) were staying with family, followed by staying with friends (36.1%). Similarly, more than two-thirds (67.2%) of the students belonged to the nuclear family. One-third of the total students (33.8%) were from public health faculties, followed by MBBS/BDS (29.1%). More than one-third of the students were first-year students (34.8%).

Table 1 Sociodemographic characteristics (n = 302)

Characteristics	Frequency (%)
Age (In Years) Mean ± SD	21.4 ± 2.1
< 21 years	118(39.1)
≥ 21 years	184(60.9)
Sex	
Male	144(47.7)
Female	158(52.3)
Ethnicity	
Brahmin	187(61.9)
Madheshi	53(17.5)
Janajati	51(16.9)
Others	11(3.7)
Present/Current Residence	
Staying alone	54(17.9)
Staying with family	139(46.0)
Staying with friends	109(36.1)
Family Type	
Nuclear	203(67.2)
Joint/Extended	99(32.8)
Faculty Studying	
BPH	102(33.8)
MBBS/BDS	88(29.1)
Others (B.Sc. Nursing-13.5%; B. Pharmacy-7.0%; BMIT-4.0%; BMLT-3.3%; B.Optomety-3.0%; BASLP-2.3%; B. Perfusion-2.0%; BAMS-2.0%)	112(37.1)
Academic Year	
First Year	105(34.8)
Second Year	63(20.9)
Third Year	53(17.5)
Fourth Year	81(26.8)

Smoking-related characteristics and information about e-cigarettes

Approximately one-third (33.8%) of the students had a parental history of smoking. Additionally, more than half (53.6%) of the students had friends who smoked. Nearly all of the students (98.7%) knew that smoking is a risk factor for non-communicable diseases. Among the total 302 respondents, 214 (70.9%) had heard about e-cigarettes. More than half (59.3%) of them had heard about e-cigarettes from videos and images of e-cigarettes (including adverts) on YouTube, Facebook, Tumblr, and Snapchat. (Table 2)

Knowledge and attitude of e-cigarettes

Among 214 students who had heard about e-cigarettes, more than two-thirds (71.5%) had good knowledge about them. (Table 3) More than two-thirds of the 214 students (71.5%) gave correct responses about e-cigarettes containing nicotine. However, 82.0% of the respondents correctly answered that e-cigarettes are addictive, and 75.2% of the students responded that e-cigarettes are

Table 2 Smoking-related characteristics and information about e-cigarettes

Characteristics (n = 302)	Frequency (%)
Parental History of Tobacco Smoking	
Yes	102(33.8)
No	200(66.2)
Do you have friends with smoking habits?	
Yes	162(53.6)
No	140(46.4)
Do you think smoking is a risk factor for NCDs?	
Yes	298(98.7)
No	4(1.3)
Have you ever heard about e-cigarette?	
Yes	214(70.9)
No	88(29.1)
Sources of information** (n = 214)	
Adverts for e-cigarettes in Newspapers or magazines.	70(32.7)
Adverts for e-cigarettes outdoors (e.g. posters, Billboards, bus stops, etc.)	29(13.6)
E-cigarettes displayed for sale (e.g. in shops, shopping centers, stalls)	38(17.8)
Videos and images of e cigarettes (including adverts) on YouTube, Facebook, Tumblr, Snapchat	127(59.3)
Famous people with e cigarettes (e.g. in films, music, videos, on TV or pictured in magazines)	80(37.4)
Sports or live music events sponsored by e-cigarette brands	15(7.0)

**multiple responses

Table 3 Knowledge and attitude level of students (n = 214)

Knowledge level of students(Median = 5)	Frequency (%)
Poor knowledge(< median)	61(28.5)
Good knowledge (≥ median)	153(71.5)
Attitude level of students (Median = 21)	Frequency (%)
Supportive attitude(< Median)	133(62.2)
Opposing attitude (≥ Median)	81(37.8)

more likely to cause asthma and allergies. The majority of the students (84.1%) responded that e-cigarettes are harmful to health. On the other hand, only 12.6% of the respondents were aware of the government regulations on e-cigarettes. Additionally, half of the students (50%) responded that e-cigarettes cannot be used in smoke-free places. (Supplementary Table 1)

Regarding the attitudes of students toward e-cigarettes, more than half (62.2%) of them had supportive attitudes toward the use of e-cigarettes. (Table 3) The percentage of students who disagreed about using e-cigarettes as fun was 44.9%. More than half of the students (56.1%) agreed that e-cigarette advertisements made e-cigarettes look cooler. Similarly, 59.8% of the students disagreed that e-cigarettes can have a problem-solving effect, and 44.8% of the students were not sure whether an e-cigarette helps reduce tobacco smoking. Half of the respondents were not sure whether e-cigarettes relieved their stress.

More than half of the students disagreed that e-cigarettes enhance their performance or concentration. Additionally, more than two-thirds of the students (77.6%) disagreed that e-cigarettes improve one’s image. However, half of the students disagreed that e-cigarettes should be banned in Nepal. (Supplementary Table 1)

Respondent’s practice of e-cigarettes

Most of the respondents (79%) had never used e-cigarettes, while only 21% had ever used e-cigarettes. Among the ever users of e-cigarettes, 11.1% were daily users, and 77.8% of them had used them sometimes. Regarding the reason for trying e-cigarettes for the first time, more than three-fourths of the respondents (84.44%) responded that they saw a friend/family member/famous person trying e-cigarettes, so they wanted to try e-cigarettes. Additionally, 68.89% of the respondents who had ever used e-cigarettes said that they just wanted to try it for taste. (Table 4).

Inferential statistics

The associations between the sociodemographic characteristics of the respondents and their knowledge and attitudes toward e-cigarette use were assessed by chi-square tests. A significant association was found between knowledge level and education level, with p-values of 0.049. Additionally, factors like family type and parental history of smoking were significantly associated with the level of attitudes toward e-cigarettes. (Supplementary Table 2).

The association between the practice of e-cigarettes and exposure variables was assessed by multivariate logistic regression analysis to adjust for potential confounders (age, gender, academic year, family type, current residence, friends with smoking habit, and parental history of smoking). Using the multivariate logistic regression analysis, we found that attitude, gender, and having friends with smoking habits were associated with the practice of e-cigarettes. In terms of attitude, students with supportive attitudes towards e-cigarettes were two times more likely to engage in e-cigarette smoking practices. (AOR: 2.10; 95% CI: 1.02–4.35; $p=0.045$). Compared with females, males were more involved in e-cigarette smoking practices (AOR: 2.27; 95% CI: 1.01–5.01; $p=0.046$). Similarly, students who had friends with a smoking habit were nearly three times more likely to engage in e-cigarette smoking than those who did not have such friends (AOR: 3.00; 95% CI: 1.12–7.99; $p=0.028$). (Table 5)

Discussion

Among 302 undergraduate students, only 214 students had heard about e-cigarettes. Among 214 students, only 71.5% of respondents had a good level of knowledge of e-cigarettes, and 62.2% had a supportive attitude toward e-cigarette use. Among those students who had heard

Table 4 Respondents’ practices of e-cigarettes

Use of e-cigarettes/vape? (n = 214)	Frequency (%)
Never used e-cigarettes	169(79.0)
Ever used e-cigarettes	45(21.0)
Frequency of e-cigarette use (n = 45)	
I use it every day	5(11.1)
I use it often(more than once a week)	5(11.1)
I used it sometimes(more than once a month)	35(77.8)
Reasons for trying e-cigarettes/vape**	
Influenced by seeing a friend/family member/famous person trying an e-cigarette	38(84.4)
Trying for taste	31(68.9)
To reduce normal cigarette habit	8(17.7)

**multiple responses

Table 5 Factors associated with the practice of e-cigarettes (multivariate logistic regression)

Domain	AOR	95% CI	P-value
Knowledge of e-cigarettes			
Poor knowledge	Ref.		
Good Knowledge	1.51	0.64–3.59	0.350
Attitude towards e-cigarettes			
Opposing attitude	Ref.		
Supportive attitude	2.10	1.02–4.35	0.045*
Gender			
Female	Ref.		
Male	2.27	1.01–5.01	0.046*
Friends with smoking habit			
Not having friends with smoking habit	Ref.		
Having friends with smoking habit	3.00	1.12–7.99	0.028*
Parental history of smoking			
No parental history of smoking	Ref.		
Parental history of smoking	1.60	0.001–8.28	0.318
Age in years			
	0.88	0.69–1.11	0.287
Academic year			
First & second year	Ref.		
Third to fifth year	1.71	0.69–4.20	0.242
Family Type			
Nuclear Family type	Ref.		
Joint Family Type	0.87	0.38–1.95	0.731
Current Residence			
Staying alone	Ref.		
Staying with family	0.49	0.18–1.3	0.154
Staying with friends	0.45	0.16–1.26	0.131

* P-value < 0.05- significant association

about e-cigarettes, 21% used e-cigarettes, which is less than the study conducted among Polish university students [27]. Another study on health professional students in the US confirmed that 24.2% of the participants had tried e-cigarettes [28]. This might be due to policies because, in Europe, it is strictly prohibited to smoke inside the home, which is also criminalized however, in Nepal, such strict rules have not been implemented so

far. Additionally, 62.2% of the participants had a supportive attitude toward e-cigarettes. Factors such as gender, education level, family type, smoking habits with friends, and parental history of smoking significantly influenced knowledge, attitudes, and e-cigarette use.

In our study, among the total participating students, 70.9% had ever heard about e-cigarettes, similar to findings among teenagers in Pakistan (68.7%) and the adult population in Malaysia (66%) [26, 29]. Among those who had ever heard about e-cigarettes, more than two-thirds of the students (71.5%) had a good level of knowledge, contrasting with studies in Malaysia, where 56% of students and 54.3% of adults had good knowledge [26, 30]. Our study also revealed that a remarkable percentage (84.10%) of students believed that e-cigarettes are harmful to health, which is much greater than that reported in a study of adults in Malaysia [26]. Only half of the respondents believed that e-cigarettes should not be used in smoke-free places, and only 12.6% of participants were aware of the regulations. This could be attributed to a lack of awareness about the regulations and weak enforcement of smoke-free laws. The Tobacco Products (Control and Regulatory) Act 2011, which has been in effect for 13 years, prohibits smoking and consuming tobacco products in public places. However, weak enforcement has led to the belief that e-cigarettes can be used in such places [31, 32].

More than half of the students in our study had a supportive attitude toward e-cigarette use, which was much greater than the 19.4% found among adolescents and adults in Saudi Arabia [33]. The marketing tactics employed by e-cigarette companies, especially those targeting adolescents—such as social media campaigns, sponsorships, and celebrity endorsements—might have significantly contributed to this phenomenon. These strategies are meticulously designed to target young individuals, normalize e-cigarette use, and enhance the appeal of these products [34, 35]. In this context, schools, educational institutions, and universities can play a crucial role in preventing nicotine and tobacco use among students. Therefore, it is imperative to develop tailored educational interventions/approaches that can correct/guide misperceptions about e-cigarettes and increase the level of knowledge regarding these products [36]. Policymakers and educational institutions need to prioritize raising awareness about the dangers of e-cigarettes, especially among adolescent students, as they are a primary target of the tobacco industry's marketing efforts [37].

Participants whose friends smoked have used e-cigarettes. This might be due to peer influence, which is considered a strong indicator of using e-cigarettes among students [38]. Additionally, wanted to try the taste, and some of them responded that they initiated e-cigarette use to eliminate normal cigarettes. However, studies have

raised concerns about vaping potentially creating new nicotine addicts rather than helping smokers quit. Additionally, although the participants responded correctly that e-cigarette use might cause asthma or allergies, there are numerous health harms associated with e-cigarette use, such as nicotine addiction, respiratory problems, cardiovascular problems, mental health issues, and increased risk of substance abuse, which are generally not considered by users [39]. To address these misperceptions, we need to raise public awareness and strengthen advocacy efforts about the risks associated with e-cigarette use, especially among young adults. Additionally, individuals who smoke should be offered effective cessation therapy or counselling sessions to prevent them from relying on e-cigarettes as the only option to quit smoking [40].

The education level of the students was significantly associated with their knowledge level. A number of studies have shown a significant correlation between smoking and education level; the higher the education level is, the lower the smoking rate is [41]. This may be because people with a higher level of education have a greater level of health awareness and a relatively greater level of awareness of the diseases caused by smoking and harmful results [42, 43]. Additionally, maturity, access to relevant information, and exposure to health-related topics in upper grades contribute to this awareness.

There was a significant association between parental history of smoking and attitudes towards e-cigarettes. Students with a family history of smoking are more likely to perceive smoking behaviours, including e-cigarette use, as normal or acceptable. This familiarity can lead to more favourable attitudes toward e-cigarettes. Males were more likely to use e-cigarettes than females. This might be because, in Nepal, smoking is considered acceptable for males but not for females. In addition, given that the safety of e-cigarettes is still uncertain, women may avoid using e-cigarettes because they are more concerned about their health being comparable to that of their male counterparts [44, 45]. The increasing prevalence of tobacco smoking among adolescent males is driven by thrill-seeking or risk-taking behaviour in this age group [46].

This study highlighted the knowledge, attitudes, and practices of e-cigarette usage, which is a pertinent concern among undergraduate students. It provides valuable insights into a topic that is gaining increasing attention. However, it is essential to acknowledge certain limitations inherent in the research methodology. First, the reliance on self-reported data introduces the possibility of social desirability bias, potentially skewing respondents' answers towards socially acceptable norms. Additionally, the study's cross-sectional design offers a snapshot of the surveyed population at a specific point in

time, precluding any assessment of how variables might evolve over time. Furthermore, the focus on a specific group of undergraduate students within a single institute raises questions about the generalizability of the findings. Hence, caution must be exercised in extrapolating these results to broader populations or different regions within the country. Despite these limitations, the study contributes to our understanding of e-cigarette usage among undergraduate students, highlighting areas for further research and potential interventions.

Conclusion

The study highlights important implications for interventions, policy, and education within Nepal's medical system. With a notable percentage of students holding supportive attitudes toward e-cigarettes, there is a clear need for targeted behaviour change campaigns that educate about the health risks associated with e-cigarettes. This can empower future healthcare professionals to better counsel patients. Additionally, involving families in educational initiatives and advocating for stricter policies on e-cigarette marketing will be crucial. Ongoing research and peer-led education programs can further promote health literacy among students, advancing a more informed generation of medical professionals.

Abbreviations

E-cigarette	Electronic Cigarette
ENDS	Electronic Nicotine Delivery System
IOM	Institute of Medicine
IRC	Institutional Review Committee
NCD	Noncommunicable disease
TUTH	Tribhuvan University Teaching Hospital
WHO	World Health Organization
BPH	Bachelor of Public Health
MBBS	Bachelor of Medicine, Bachelor of Surgery
BDS	Bachelor of Dental Surgery
B.Sc.	Bachelor's in science
BMIT	Bachelor in Imaging Technology
BMLT	Bachelor of Medical Laboratory Technology
BASLP	Bachelor of Audiology and Speech-Language Pathology
BAMS	Bachelor of Ayurvedic Medicine and Surgery

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12889-024-20583-w>.

Supplementary Material 1

Supplementary Material 2

Supplementary Material 3

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Author contributions

SP, BKS, and KP contributed substantially to the conception and design of the study. SP, BKS, PRB, and NP collected the data, and SP, BKS, SM and SS performed the statistical analysis and interpreted the data. SP, BKS, SM and UH wrote the original draft of the manuscript. SP, SS, SM, BKS and KP reviewed

and edited the manuscript. All authors reviewed and approved the final manuscript.

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Data availability

The questionnaire and datasets used and/or analysed during the current study are available from the corresponding authors upon reasonable request.

Declarations

Ethics approval and consent to participate

This study adheres to the principles outlined in the Declaration of Helsinki and has received ethical approval from the Institutional Review Board, Institute of Medicine (IRC-IOM), reference number 274(6-7)E2. We informed the participants about the study's nature, and digital written informed consent was obtained before the data were collected. Confidentiality was maintained at all stages of data handling. The data were anonymized using random identity numbers.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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