Knowledge and Attitudes Towards Electronic Cigarette Use Among Students at Sulaimani Technical Institute, Iraq: A Cross-Sectional Study

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ABSTRACT

Background: Electronic cigarettes have recently become more popular among young people, despite the potential risks they pose to human health.

Aim: This study aimed to evaluate the knowledge and attitudes of e-cigarettes among students at Sulaimani Technical Institute and identify their motives for using e-cigarettes.

Methods: An online-based cross-sectional study was carried out between April 15 and June 30, 2025, among students at Sulaimani Technical Institute to assess their knowledge and attitudes towards e-cigarettes. Simple random sampling was used for selecting respondents. Data were gathered using an online structured questionnaire. Chi-square and Fisher's exact tests were used to assess the relationship between categorical variables. For comparing the means, an independent sample test was used. A P-value below 0.05 was used to determine statistical significance.

Results: A total of 343 students participated, 69.4% being female and 51% studying in the medical field. The prevalence of e-cigarette use was 16.6%; this prevalence was higher in males and non-medical students (64.9% and 61.4%, respectively, P <0.05). The main motives for using e-cigarettes were to reduce emotional tension, stress and anxiety, stop smoking, and enjoy flavors of e-cigarettes (31.5%, 29.8%, and 29.8%, respectively). Social media was used by most of the participants (63.6%) as a source of information. The majority of students (79.3%) demonstrated a good knowledge, and 57.1% of them showed opposing attitudes toward e-cigarettes.

Conclusions: The majority of the students had a good knowledge and negative attitudes toward e-cigarettes. The primary source for gaining information was social media. High prevalence of e-cigarette use was observed among students, especially among males and non-medical students; the primary motives for this practice were to reduce emotional tension and stress, stop smoking, and enjoy the flavors of e-cigarettes.

Keywords: Attitudes, E-cigarettes, Knowledge, Motives, Students.

المعرفة والاتجاهات نحو استخدام السجائر الإلكترونية لدى طلاب معهد السليمانية التقني، العراق: دراسة مسحية مقطعية

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الخلاصة

الخلفية: اكتسبت السجائر الإلكترونية قبولاً متزايداً بين الشباب في الآونة الأخيرة، على الرغم من المخاطر المحتملة التي تشكلها على صحة الإنسان.

الهدف من الدراسة: تهدف هذه الدراسة إلى تقييم مستوى المعرفة واتجاهات لدى طلاب المعهد السليمانية التقني نحو السجائر الإلكترونية و تحديد دوافعهم لاستخدام السجائر الإلكترونية.

الطرق: تم إجراء دراسة مسحية مقطعية عبر الإنترنت في الفترة من ١٥ نيسان إلى ٣٠ حزيران، ٢٠٢٥، على طلاب المعهد التقني السليمانية لتقييم معارفهم واتجاهاتهم نحو السجائر الإلكترونية. استُخدمت طريقة أخذ العينات العشوائية البسيطة لاختيار المشاركين. جُمعت البيانات باستخدام استبيان المنظم.
النتائج: شارك في هذه الدراسة ٣٤٣ طالبًا، ٦٩،٤٪ منهم إناث و٥١٪ يدرسون في المجال الطبي. بلغت نسبة انتشار استخدام السجائر الإلكترونية ١٦،٦٪ ؛ وكانت هذه النسبة أعلى بين الذكور والطلاب من غيرالطبيين (٦٤،٩٪ ، ٦١.٤٪ على التوالي، ب <٠،٠٥). كانت الدوافع الرئيسية لاستخدام السجائر الإلكترونية هي تقليل التوتر والقلق والضغط النفسي، الإقلاع عن التدخين، والاستمتاع بنكهات السجائر الإلكترونية (٣١،٥٪ و٢٩،٨٪ و ٢٩،٨٪ على التوالي). استخدم معظم المشاركين (٦٣،٦٪) وسائل التواصل الاجتماعي كمصدر للمعلومات. أظهر لدى غالبية الطلاب (٧٩،٣٪) معرفة جيدة بالسجائر الإلكترونية، ولدى ٥٧،١٪ منهم اتجاهات معارضه نحوها.
الاستنتاجات: تَبْيِين لدى غالبية الطلاب معرفة جيدة واتجاهات سلبيه نحو السجائر الإلكترونية. وكانت وسائل التواصل الاجتماعي المصدر اساسي للحصول على المعلومات. لوحظ انتشارمرتفع لاستخدام السجائر الإلكترونية بين الطلاب، لاسيما بين الذكورو الطلاب غير الطبيين. تمثلت الدوافع الرئيسية لهذه الممارسة في تخفيف التوتر والضغط النفسي، الإقلاع عن التدخين، والاستمتاع بنكهات.

الكلمات المفتاحية: الاتجاهات، السجائر الإلكترونية، المعرفة، الدوافع، الطلاب.

INTRODUCTION

Electronic cigarettes (e-cigarettes) are powered by batteries that evaporate a liquid solution of vegetable glycerin and propylene glycol, which may include dissolved nicotine or other fragrances. Herbert A. Gilbert created the first electronic cigarette in 1963, but Hon. Lik of China was the first to patent the commercial device [1]. E-cigarettes were introduced to the US market in 2007 and marketed as a harmless alternative to traditional cigarettes for existing smokers. Since they evaporate a heated liquid rather than combusting tobacco, they have become exceedingly popular among young people [2]. In 2021, the global estimate of vapers was 81.9 million [3]. According to several surveys, as many as 40% of undergraduates engage in e-cigarette use [4]. Cigarette smoking for a long period appears to be a significant contributor to premature mortality globally, resulting in 5 to 7 million fatalities per year [5]. An experimental study has shown that electronic cigarette usage might have negative consequences on the respiratory, cardiovascular, and immune systems [6]. A study displayed that the effects on serum cotinine levels after one hour of exposure to second-hand cigarette smoke or inhaled "second-hand" e-cigarette vapors were comparable [7].

E-cigarettes contain a liquid called electronic liquid. There are concerns about the safety of this liquid utilized in these types of cigarettes. Although not all electronic liquids include nicotine, the majority are composed of a variety of other potentially harmful chemicals, including o-methyl benzaldehyde, propanal, acetone, formaldehyde, acetaldehyde, acrolein, and carcinogenic nitrosamines, which are poisonous to cells [8]. Furthermore, carcinogenic elements, including manganese, cadmium, nickel, lead, and chromium, have been identified in e-liquid. Lung toxins such as diacetyl and diketones, which are linked to bronchiolitis obliterans, are also included in the e-liquid's flavorings, which are designed to appeal to customers. All flavorings are labeled as toxic. Nonetheless, fruit flavoring resulted in greater cell death compared to tobacco flavoring. Moreover, menthol induced a more significant reduction in the viability of middle ear cells and exacerbated otitis media [8]. There is limited data available about undergraduate students' knowledge and attitudes toward e-cigarettes in Sulaimani City; therefore, this study was conducted to evaluate the knowledge and attitudes regarding e-cigarettes among students at Sulaimani Technical Institute, and to evaluate the association between the knowledge and attitudes of respondents and their sociodemographic characteristics, as well as identify the motivations behind e-cigarette use.

Subjects and Methods

Study Site and Study Population

This study was conducted using a cross-sectional online survey from April 15 to June 30, 2025, among 343 students at Sulaimani Technical Institute. The study population consisted of all students of Sulaimani Technical Institute, regardless of gender, age, or medical conditions. According to the registration unit records at Sulaimani Technical Institute, the total number of students registered for the academic year 2024-2025 was 3,614. In which 2,405 (66.5%) were female, and 1,859 (51.4%) were studied in the medical field. Simple random sampling was used to select students to obtain the necessary sample size.

Data Collection and Measures

For collecting data, the researchers used a self-administered questionnaire, which was sent to students' university email addresses through Google Forms. Five parts formed the questionnaire. Sociodemographic details, including gender, age, field of study, and place of residence, were covered in the first portion of the questionnaire. The second part included 10 questions to assess knowledge of e-cigarettes. In the third part, there were 10 questions about attitudes toward e-cigarettes. The fourth part was about sources of information on e-cigarettes, and the final section related to reasons for starting e-cigarette usage. The knowledge and attitudes questions derived from previous studies [1, 8, 9]. Each correct answer was worth one point, while an incorrect answer gave zero. In the knowledge and attitudes sections, scores range from 0 to 10. The participants were categorized into three categories based on their knowledge: good, medium, and poor. A good knowledge score ranged from 7 to 10 points; a medium knowledge score ranged from 6 to 5, while a score of less than 5 points was considered poor knowledge. Concerning attitudes towards e-cigarettes, the participants were divided into three categories: negative (opposing) attitudes, neutral attitudes, and positive (supportive) attitudes. A negative attitude ranged from 7 to 10 points, a neutral attitude was between 5 and 6, while a score from 0 to 4 was considered a positive attitude. Before starting the main research, A pilot study was carried out involving twelve students to evaluate the reliability of the questionnaire.

Statistical Analysis

The data were input and processed with SPSS, version 27, IBM Statistics Inc. Frequencies and percentages were used to display categorical variables. Means ± standard deviation were used to report continuous variables. Chi-square and Fisher's exact tests were used to determine the association between knowledge and attitudes toward e-cigarettes and demographic characteristics. The means of knowledge and attitudes of participants were compared with their backgrounds using an independent samples test. A P-value less than 0.05 was used for calculating statistical significance.

RESULTS

In this study, 343 students participated, with 69.4% (238) identified as female, 64.7% (222) living in urban areas, and 51% (175) enrolled in medical fields. The mean age of students was 21 years. Exactly 16.6% (57) of respondents were using e-cigarettes. Among these users, 64.9% were males and 35.1% were females. Additionally, 61.4% of the users were non-medical students, while 38.6% were medical students. These observed differences are highly significant (P<0.05) (Table 1).

Table 1. Association between participants' characteristics and e-cigarette smoking (n=343)

Characteristics	Use e-cigarettes		P value*
	Yes	No	
	No. (%)	No. (%)	
Gender			
Female	20 (35.1)	218 (76.2)	<0.001
Male	37 (64.9)	68 (23.8)	
Study fields			
Medical	22 (38.6)	153 (53.5)	0.04
Non-medical	35 (61.4)	133 (46.5)	
Residency			
Urban	37 (64.9)	185 (64.7)	0.974
Rural	20 (35.1)	101 (35.3)	
Total	57 (100.0)	286 (100.0)	

*Chi-square test.

Reasons for Using E-Cigarettes

The individuals had multiple motives for smoking e-cigarettes. The primary motivations included reducing emotional tension, stress and anxiety, quitting smoking, and enjoying the flavor of e-cigarettes, with percentages of 31.5%, 29.8% and 29.8%, respectively. Additionally, 12.3% of participants mentioned other motivations, including peer encouragement and easy accessibility (Fig. 1).

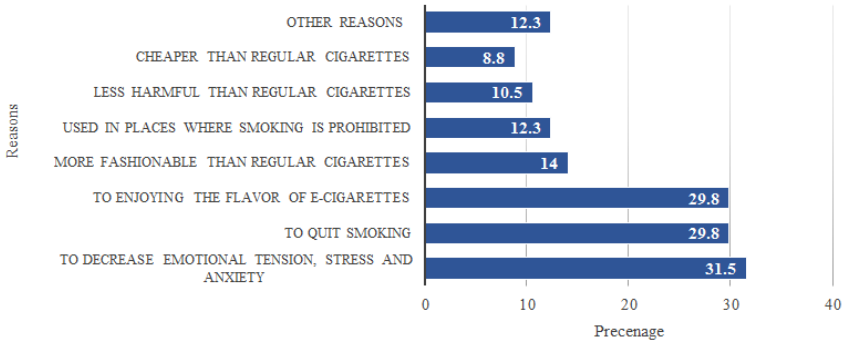

Figure 1. Reasons for using e-cigarettes (n=57)

Duration of Using E-Cigarettes

E-cigarette users have varied durations of use; 41% of students used e-cigarettes between one and two years, and 16% of participants used them for more than two years. Thus, approximately three-fifths of them have been using e-cigarettes for more than one year (Fig. 2).

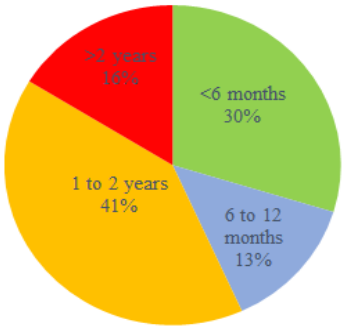

Figure 2. Duration of e-cigarette use (n=57)

Sources of E-Cigarette Information

The students gathered information about e-cigarettes from multiple sources. The most prominent source was social media, used by 63.6% of the students (Fig. 3).

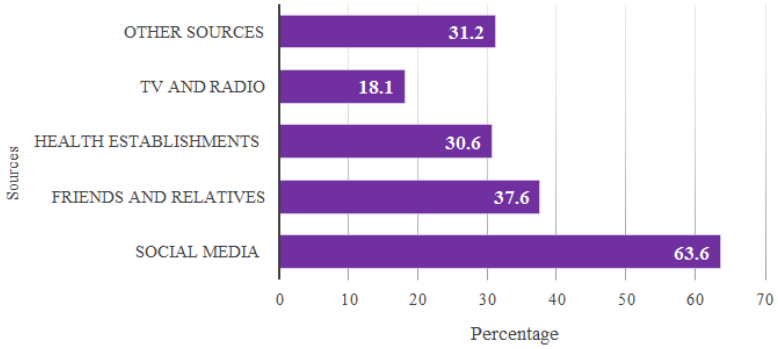

Figure 3. Sources of e-cigarette information (n=343)

Students' Knowledge about E-Cigarettes

The levels of students' knowledge of e-cigarettes were categorized as good, medium, and poor, with percentages of 79.3%, 13.7%, and 7%, respectively. The average knowledge score among participants was 7.78 (± 2.10). Medical students demonstrated higher knowledge scores compared to non-medical students, with mean scores of 8.26 (± 1.71) and 7.29 (± 2.36), respectively (P<0.001). Additionally, non-e-cigarette users reported greater knowledge than e-cigarette users, scoring 8.10 (± 1.92) and 6.19 (± 2.27), respectively (P<0.001). Entirely, medical students and non-e-cigarette users exhibited good knowledge (Table 2).

Table 2. Comparison of students' knowledge of e-cigarettes with their background (n=343)

Knowledge items	Study field		P value (χ^2-test)	Use e-cigarettes		P value*
	Medical	Non-medical		Yes	No	
	No (%)	No (%)		No. (%)	No. (%)	
E-cigarettes are useful for quitting smoking. (False)						
Ture	13 (7.4)	19 (11.3)	0.333	9 (15.8)	23 (8.0)	0.114
False	124 (70.9)	108 (64.3)		33 (57.9)	199 (69.6)	
Do not know	38 (21.7)	41 (24.4)		15 (26.3)	64 (22.4)	
E-cigarettes create addiction. (True)						
Ture	148 (84.6)	131 (78.0)	0.176	40 (70.2)	239 (83.6)	**<0.001**
False	5 (2.9)	11 (6.5)		8 (14.0)	8 (2.8)	
Do not know	22 (12.6)	26 (15.5)		9 (15.8)	39 (13.6)	
Most e-cigarettes contain nicotine. (True)						
Ture	122 (69.7)	105 (62.5)	0.052	36 (63.2)	191 (66.8)	**0.002**
False	4 (2.3)	13 (7.7)		8 (14.0)	9 (3.1)	
Do not know	49 (28.0)	50 (29.8)		13 (22.8)	86 (30.1)	
Flavorings like diacetyl, a compound associated with a severe pulmonary illness. (True)						
Ture	142 (81.1)	116 (69.0)	**0.007**	29 (50.9)	229 (80.1)	**<0.001**
False	4 (2.3)	15 (8.9)		7 (12.3)	12 (4.2)	
Do not know	29 (16.6)	37 (22.0)		21 (36.8)	45 (15.7)	
The vapor from e-cigarettes poses a risk to infants and children. (True)						
Ture	145 (82.9)	121 (72.0)	**0.004**	21 (36.8)	245 (85.7)	**<0.001**
False	3 (1.7)	16 (9.5)		12 (21.1)	7 (2.4)	
Do not know	27 (15.4)	31 (18.5)		24 (42.1)	34 (11.9)	
E-cigarettes impair lung and heart functions. (True)						
Ture	156 (89.1)	124 (73.8)	**<0.001**	32 (56.1)	248 (86.7)	**<0.001**
False	1 (0.6)	12 (7.1)		5 (8.8)	8 (2.8)	
Do not know	18 (10.3)	32 (19.0)		20 (35.1)	30 (10.5)	
Using e-cigarettes enhances the likelihood of lung cancer. (True)						
Ture	136 (77.7)	112 (66.7)	0.034	29 (50.9)	219 (76.6)	**<0.001**
False	5 (2.9)	13 (7.7)		7 (12.3)	11 (3.8)	
Do not know	34 (19.4)	43 (25.6)		21 (36.8)	56 (19.6)	
E-cigarettes can affect fetal development. (True)						
Ture	161 (92.0)	133 (79.2)	**0.001**	38 (66.7)	256 (89.5)	**<0.001**
False	1 (0.6)	9 (5.4)		7 (12.3)	3 (1.0)	
Do not know	13 (7.4)	26 (15.5)		12 (12.1)	27 (9.4)	
E-cigarettes are safe for pregnant women. (False)						
Ture	5 (2.9)	9 (5.4)	**0.002**	3 (5.3)	11 (3.8)	0.297
False	168 (96.0)	144 (85.7)		49 (86.0)	263 (92.0)	
Do not know	2 (1.1)	15 (8.9)		5 (8.8)	12 (4.2)	
Second-hand smoke is not produced by e-cigarettes. (False)						
Ture	14 (8.0)	12 (7.1)	0.264	9 (15.8)	17 (5.9)	0.264
False	138 (78.9)	123 (73.2)		37 (64.9)	224 (78.3)	
Do not know	23 (13.1)	33 (19.6)		11 (19.3)	45 (15.7)	
Total	175 (100.0)	168 (100.0)		57 (100.0)	286 (100.0)	

*Chi-square test and Fisher's exact test.

Attitudes Toward E-Cigarettes

The levels of students' attitudes toward e-cigarettes were categorized as negative (opposing), neutral, and positive, with percentages of 57.1%, 23.1%, and 19.8%, respectively. The average score for opposing attitudes among respondents was 6.55 (±2.44). Medical students demonstrated a notably greater mean score for opposing attitudes than non-medical students, with scores of 6.82 (±2.24) and 6.26 (±2.61), respectively (P = 0.03). Students who had never used e-cigarettes displayed a greater mean score of opposing attitudes than users, with means of 7.05 (±2.139) and 4.04 (±2.345), respectively (P <0.001). Both medical students and non-e-cigarette users exhibited negative attitudes toward e-cigarettes (Table 3).

Table 3. Comparison of students' attitudes towards e-cigarettes with their background(n=343)

Attitudes items	Study field		P value (χ^2-test)	Use e-cigarettes		P value*
	Medical	Non-medical		Yes	No	
	No (%)	No (%)		No. (%)	No. (%)	
E-cigarettes are safe cigarettes. (Disagree)						
Agree	8 (4.6)	30 (17.9)	**<0.001**	25 (43.9)	13 (4.5)	**<0.001**
Disagree	153 (87.4)	123 (73.2)		20 (35.1)	256 (89.5)	
Do not sure	14 (8.0)	15 (8.9)		12 (21.1)	17 (5.9)	
E-cigarettes help reduce or quit smoking. (Disagree)						
Agree	20 (11.4)	36 (21.4)	**0.037**	22 (38.6)	34 (11.9)	**<0.001**
Disagree	114 (65.1)	93 (55.4)		20 (35.1)	187 (65.4)	
Do not sure	41(23.4)	39 (23.2)		15 (26.3)	65 (22.7)	
E-cigarette usage may encourage conventional smoking. (Agree)						
Agree	91 (52.0)	84 (50.0)	**<0.001**	23 (40.4)	152 (53.1)	**<0.001**
Disagree	26 (14.9)	52 (31.0)		24 (42.1)	54 (18.9)	
Do not sure	58 (33.1)	32 (19.0)		10 (17.5)	80 (28.0)	
There is a worry about the impact of e-cigarette usage on public health. (Agree)						
Agree	151 (86.3)	130 (77.4)	0.095	35 (61.4)	246 (86.0)	**<0.001**
Disagree	9 (5.1)	16 (9.5)		16 (28.1)	9 (3.1)	
Do not sure	15 (8.6)	22 (13.1)		6 (10.5)	31 (10.8)	
Places that prohibit smoking should permit the use of e-cigarettes. (Disagree)						
Agree	16 (9.1)	11 (6.5)	0.62	9 (15.8)	18 (6.3)	**<0.001**
Disagree	150 (85.7)	137 (81.5)		37 (64.9)	250 (87.4)	
Do not sure	9 (5.1)	20 (11.9)		11 (19.3)	18 (6.3)	
E-cigarettes relieve one's stress. (Disagree)						
Agree	27 (15.4)	36 (21.4)	0.337	34 (59.6)	29 (10.1)	**<0.001**
Disagree	107 (61.1)	93 (55.4)		11 (19.3)	189 (66.1)	
Do not sure	41 (23.4)	39 (23.2)		12 (21.1)	68 (23.8)	
E-cigarettes enhance one's performance. (Disagree)						
Agree	15 (8.6)	32 (19.0)	**0.018**	20 (35.1)	27 (9.4)	**<0.001**
Disagree	112 (64.0)	97 (57.7)		22 (38.6)	187 (65.4)	
Do not sure	48 (27.4)	39 (23.2)		15 (26.3)	72 (25.2)	
E-cigarettes increase one's concentration. (Disagree)						
Agree	30 (17.1)	33 (19.6)	0.489	16 (28.1)	47 (16.4)	**0.002**
Disagree	110 (62.9)	95 (56.5)		22 (38.6)	183 (64.0)	
Do not sure	35 (20.0)	40 (23.8)		19 (33.3)	56 (19.6)	
E-cigarettes have greater social acceptability compared to traditional cigarettes. (Disagree)						
Agree	43 (24.6)	41 (24.4)	0.663	33 (57.9)	51 (17.8)	**<0.001**
Disagree	78 (44.6)	82 (48.8)		16 (28.1)	144 (50.3)	
Do not sure	54 (30.9)	45 (26.8)		8 (14.0)	91 (31.8)	
Users of e-cigarettes should be classified as smokers. (Agree)						
Agree	114 (65.1)	97 (57.7)	**0.006**	16 (28.1)	195 (68.2)	**<0.001**
Disagree	16 (9.1)	36 (21.4)		25 (43.9)	27 (9.4)	
Not sure	45 (25.7)	35 (20.8)		16 (28.1)	64 (22.4)	
Total	175 (100.0)	168 (100.0)		57 (100.0)	286 (100.0)	

*Chi-square test and Fisher's exact test.

DISCUSSION

This study was conducted among undergraduates at Sulaimani Technical Institute to examine their knowledge and attitudes regarding e-cigarettes. In the current study, 16.6% of students indicated using e-cigarettes; this finding aligns with a survey conducted among college students in Hangzhou, China [10].

The increased proportion of e-cigarette users observed in the present study could be linked to a stronger belief among these users that this type of cigarette poses fewer health risks compared to traditional cigarettes.

Consistent with previous studies in Iraq, the United States, China, Bahrain, and Nepal, this study finds that e-cigarette usage is far more common among males than females [11-15].

Our results highlight the stigmatization of e-cigarette use among females in our society. Both genders use e-cigarettes. For males, using e-cigarettes is often considered normal and acceptable.

However, in certain cultures, females who smoke any type of cigarette face stigma, as such behavior is associated with immorality or mischievous behavior. Consequently, they may be ridiculed or insulted [16].

In the present study, e-cigarette usage was more common among students in non-medical fields compared to those in medical fields. This discrepancy can be attributed to the non-medical students possessing less knowledge about e-cigarettes and exhibiting a more favourable attitude towards their use than their medical counterparts. According to a study, individuals with a positive outlook towards e-cigarettes were more likely to use them [17]. E-cigarette use has been associated with the Theory of Planned Behaviour (TPB). According to the TPB, an individual's purpose in engaging in an activity is related to their customs, attitudes, and perceived behavioural control over that action [18]. Concerning the duration of using e-cigarettes, almost three-fifths of the respondents who use e-cigarettes have used them for more than one year, which is mostly due to their attitudes towards e-cigarettes; they believed that they were less hazardous than regular smoking.

The students have various reasons for using e-cigarettes, with the primary motive being to reduce emotional tension, stress, and anxiety. However, this reason does not justify their use. The participants who smoke e-cigarettes often lack sufficient knowledge about their health impacts. Increased anxiety tends to heighten the likelihood of nicotine dependency [19]. Alternatively, persistent smoking may result in anxiety or depression due to its effects on the brain's mood-regulating pathways [20].

Furthermore, a study conducted among undergraduates in the United Arab Emirates (UAE) described a significant correlation between vaping and anxiety, as well as depression [21]. In addition, most e-cigarettes include nicotine, which can impair brain development in individuals under the age of 25 [22]. The second motive for vaping is to stop smoking tobacco; this finding aligns with that of previous studies carried out on university students in the UAE, Saudi Arabia, and China. [12, 23, 24]. Using e-cigarettes for cessation of regular smoking has no proven benefits, because most e-cigarettes include nicotine, which is extremely addictive [22]. Moreover, Evidence indicates that the use of e-cigarettes may elevate the danger of cancer and other conditions, including cardiopulmonary diseases [25]. In the present study, another common motivation for vaping was the enjoyment of their flavors; the wide variety of flavors available has been recognized as a significant factor driving young people to start vaping [23]. Since 2021, at a minimum, 65 different e-liquid or e-cigarette aerosol flavors have been shown to cause toxic reactions in various organ systems [26]. Evidence indicates that the flavors present in e-cigarette use could elevate the risk of cancer [22].

In the present study, the primary source of getting information on e-cigarettes was social media. This aligns with findings from previous studies conducted among undergraduates [23, 27]. According to a multinational study, social media was the most often cited source by participants for knowledge on e-cigarette usage [28]. The Internet has progressively emerged as a recognized source of health information, facilitating connections between individuals and health materials, professionals, and support networks. Moreover, physicians and healthcare experts provide online health information and advice [29]. In addition, a study reported that students who read social media messages were more knowledgeable about e-cigarettes than those who did not read any messages [30]. Social media can have both positive and negative effects. While it can provide an opportunity to educate the community about the potential health effects related to e-cigarettes, it can also serve as a powerful tool that promotes their use. For instance, companies that sell e-cigarettes or run vape shops often post appealing images of their products on social media. They also use visuals that associate vaping with trendy lifestyles, discounts, product giveaways, and special promotions [31].

In the current study, the majority of students were knowledgeable about e-cigarettes, aligning with the findings of a study conducted among college students in India [32].

Likewise, a scoping review study reported that young people were aware of e-cigarettes [33]. Our result may be attributed to the fact that undergraduates are inherently predisposed to pursue information on novel subjects, such as e-cigarettes, as the internet enables students to effortlessly search for facts, health impacts, or products associated with e-cigarettes. Additionally, over half of the participants studied in medical fields, and they are familiar with subjects related to tobacco. In the present study, medical students demonstrated markedly higher knowledge compared to non-medical students. This finding is similar to the findings of a survey conducted in Jourdan [34]. Likewise, research from Cairo University indicated that medical students possessed extensive knowledge regarding e-cigarettes [35]. When comparing the knowledge of e-cigarette users and non-users, non-users demonstrated a greater understanding than users. This finding is consistent with results from two earlier studies carried out in Saudi Arabia and the USA [24, 36].

Regarding attitudes toward e-cigarettes, most students expressed negative attitudes towards e-cigarettes. This finding aligns with the results of a study carried out among undergraduates in the Philippines [37]. Our result might be attributed to the health consciousness of participants and prevailing social norms towards e-cigarettes. In this study, non-users of e-cigarettes exhibited significantly negative attitudes toward e-cigarettes than the users. Similarly, studies conducted in the USA, and the Philippines revealed that non-users had significantly more unfavourable attitudes toward e-cigarettes compared to users [36, 37].

Limitations and Strengths

The present study has several limitations. First, students without internet access may have been excluded from the research due to the reliance on an online recruiting process and an online self-administered questionnaire. Second, the use of a self-administered questionnaire introduces the risk of social desirability bias and recall bias. Third, females constitute the majority of the study's population, which may affect the proportion of e-cigarette use. Finally, since the findings are based on data from a single institution, they may not be representative of other institutions and universities. The study also has strengths; to the best of the researchers' knowledge, it is the first study evaluating undergraduates' knowledge and attitudes regarding e-cigarettes in Sulaimani City. Additionally, the study had a relatively large sample size, encompassing approximately 10% of the students at Sulaimani Technical Institute.

Conclusions and Recommendations

The majority of them had good knowledge and opposing attitudes toward e-cigarettes. The primary source for obtaining information was social media. The prevalence of e-cigarette use among undergraduates was high, particularly among males and non-medical students; the primary motives for this practice were to reduce emotional tension, stress and anxiety, stop smoking, and enjoy the flavor of e-cigarettes. Such findings demonstrate the importance of conducting health education campaigns about the dangers of e-cigarettes, particularly for e-cigarette users. It can concentrate on social media platforms as an effective e-cigarette instructional approach to directly engage university students. University students should avoid triggers and focus their attention on other pursuits to improve mood, relaxation, and enjoyment. All flavored tobacco products ought to be prohibited by law.

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Conflict of Interest

The authors declare no conflicts of interest.

Ethical Consideration

This study was carried out in alignment with the ethical guidelines established in the Helsinki Declaration [38], and it was approved by the ethics committee of Sulaimani Polytechnic University (reference number 101/245). We informed the individuals who participated in this study about its objectives. They were free to participate, and participation was voluntary.

Author's Contribution

All authors actively contributed to the conception, design, data analysis, and preparation of the manuscript for this study. Additionally, all authors have reviewed and approved the final version of the manuscript.

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