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Original Article

E-cigarette smoking: Awareness, use, and perceptions of Vietnamese personnel

[Fumar cigarrillos electrónicos: Conocimiento, uso y percepciones del personal vietnamita]

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Abstract

Context: Electronic cigarettes (e-cigarettes) are considerably popular, particularly among young adults. Their effects have elicited strong interest in cigarette control and community health, but evidence on the knowledge, usage, and perceptions of e-cigarettes among the Vietnamese population remains limited.

Aims: To evaluate e-cigarette awareness, use, and perceptions among Vietnamese personnel.

Methods: A cross-sectional study through an online survey was administered to 368 participants in March 2022. The questionnaire comprised sections on socio-demographic characteristics and awareness, use, sources of information, and perceptions of e-cigarettes.

Results: Most of the participants were male (87.8%), married (65.2%), and living in urban areas (77.2%). Their average age was 34.6 ± 16.1 years. 56.8% had never smoked, 23.9% were smokers, and 19.3% used to smoke. There was low awareness of e-cigarettes with 26.1%, whereas 8.2% were using e-cigarettes. Most respondents (86.5%) accessed the Internet for e-cigarette information, followed by television or radio (54.2%). Although over half of the respondents who heard about e-cigarettes expressed positive attitudes toward the cost and safety of e-cigarettes compared with traditional equivalents, they remained uncertain concerning their effectiveness in advancing smoking cessation. Statistically significant differences ($p<0.05$) in e-cigarette awareness and use were found between the respondents depending on gender, marital status, residence, and education.

Conclusions: Our findings could guide the development of public health plans and national policies on e-cigarette control. Future studies should determine the permanent effects of e-cigarettes on community health and society.

Keywords: awareness; electronic cigarettes; perceptions; personnel; use; Vietnam.

Resumen

Contexto: Los cigarrillos electrónicos son considerablemente populares, particularmente entre los adultos jóvenes. Sus efectos han suscitado un gran interés en el control de los cigarrillos y la salud de la comunidad, pero la evidencia sobre el conocimiento, el uso y las percepciones de los cigarrillos electrónicos entre la población vietnamita sigue siendo limitada.

Objetivos: Evaluar la conciencia, el uso y las percepciones de los cigarrillos electrónicos entre el personal vietnamita.

Métodos: Se administró un estudio transversal a través de una encuesta en línea a 368 participantes en marzo de 2022. El cuestionario comprendía secciones sobre características sociodemográficas y conocimiento, uso, fuentes de información y percepciones de los cigarrillos electrónicos.

Resultados: La mayoría de los participantes eran del sexo masculino (87,8%), casados (65,2%) y residentes en áreas urbanas (77,2%). Su edad promedio fue de 34,6 ± 16,1 años. El 56,8% nunca había fumado, el 23,9% eran fumadores y el 19,3% fumaba. Hubo poca conciencia de los cigarrillos electrónicos con un 26,1 %, mientras que un 8,2 % usaba cigarrillos electrónicos. La mayoría de los encuestados (86,5 %) accedió a Internet para obtener información sobre cigarrillos electrónicos, seguido de la televisión o la radio (54,2 %). Aunque más de la mitad de los encuestados que escucharon sobre los cigarrillos electrónicos expresaron actitudes positivas hacia el costo y la seguridad de los cigarrillos electrónicos en comparación con los equivalentes tradicionales, seguían sin estar seguros de su eficacia para promover el abandono del hábito de fumar. Se encontraron diferencias estadísticamente significativas ($p<0.05$) en el conocimiento y uso de cigarrillos electrónicos entre los encuestados según el género, el estado civil, la residencia y la educación.

Conclusiones: Nuestros hallazgos podrían guiar el desarrollo de planes de salud pública y políticas nacionales sobre el control de los cigarrillos electrónicos. Los estudios futuros deberían determinar los efectos permanentes de los cigarrillos electrónicos en la salud de la comunidad y la sociedad.

Palabras Clave: cigarrillos electrónicos; conciencia; percepciones; personal; uso; Vietnam.

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INTRODUCTION

Electronic cigarettes or e-cigarettes (also widely known as electronic nicotine delivery systems) were invented by Hon Lik, a Chinese pharmacist, in 2003 (Gravely et al., 2019) and were initially made available in the market by the Ruyan Group, a Hong Kong manufacturer, in 2004 (Mackay et al., 2013). Handheld devices deliver aerosol or vapor through a battery-operated system (Choi and Forster, 2013; Wang et al., 2019). This aerosol/vapor carries a liquid solution, whose main ingredients are either synthetic or natural and typically contains several compounds, such as propylene glycol, vegetable glycerol, flavorings, and nicotine (Farsalinos et al., 2014).

E-cigarettes have been promoted extensively over the Internet, especially on social media platforms, as safer products than traditional tobacco cigarettes. Studies have emphasized that these products not only help smokers switch to less detrimental sources of nicotine, given the absence of carcinogenic tar-like benzene or toluene, but also help them stop smoking (McRobbie et al., 2014). Many people agree that they have a better chance of fighting the habit of smoking conventional cigarettes by using e-cigarettes (Daniluk et al., 2018).

There are approximately 10 million e-cigarette users in Europe and the USA (Daniluk et al., 2018). A 2013 report by the Centers for Disease Control and Prevention indicated that the proportion of secondary and high school students who use e-cigarettes rose to nearly 4% from 2011 to 2012, with approximately 2 million of these adolescents had tried e-cigarettes (Singh et al., 2016). Profits from the sale of e-cigarettes have doubled yearly since 2008, stimulating predictions that income from e-cigarette sales will exceed tobacco cigarette revenue by 2021 (Abrams, 2014).

The rapid growth in the popularity and availability of e-cigarettes around the globe has given rise to concerns regarding the initiation of e-cigarette use and addiction among the youth, as well as their effects on community health. The nicotine solution and flavoring chemicals in e-cigarettes may cause devastating outcomes in respiratory systems, namely, pneumonia, asthma, chronic obstructive pulmonary disease (COPD), and lung cancer (Wang et al., 2016). Short-term effects on cardiovascular systems have also been reported (Wang et al., 2015). Finally, using e-cigarettes may lead to the consumption of higher nicotine concentrations and nicotine dependence among young individuals (Morean et al., 2016).

In recent years, the awareness and use of e-cigarettes among general populations worldwide, particularly among the youth, have remarkably grown. Individuals with good educational attainment are more knowledgeable about e-cigarettes and are more aware of these products than those with poor education (Abo-Elkheir and Sobh, 2016).

In Vietnam, tobacco consumption began using tobacco leaves for smoking, after which cigarette manufacturing emerged and rose dramatically in the late 20th century. Nowadays, people often have a taste for modern cigarette products, including e-cigarettes, heated tobacco products, and shisha. Vietnam is among the top 15 countries with the greatest tobacco consumption worldwide. Cigarettes tend to be popular among Vietnamese men, with 47.4% and 45.3% of them being smokers, according to a 2010 report by the World Health Organization (WHO) (Ministry of Health of Viet Nam et al., 2010) and the 2015 Global Adult Tobacco Survey (GATS), respectively (Van Minh et al., 2017). By contrast, only 1.1% of women in Vietnam were identified in the 2015 survey as tobacco smokers (Van Minh et al., 2017). Among the younger generation, new kinds of cigarettes have become more popular, alerting government agencies about the risk of harmful effects from other tobacco products (Minh Dao et al., 2019).

The significant rise in the global rate of e-cigarette consumption has also elicited interest among researchers (Sarfraz et al., 2018). Given urgent issues about the safety of e-cigarettes and their effectiveness in the reduction of harm and cessation of smoking, earlier studies examined these products as useful tools for helping people quit smoking (Wang et al., 2015; Abo-Elkheir and Sobh, 2016; Twyman et al., 2016; Sarfraz et al., 2018). E-cigarettes are also claimed to be less harmful than traditional cigarettes (Wang et al., 2015; Abo-Elkheir and Sobh, 2016; Twyman et al., 2016; Sarfraz et al., 2018). In particular, studies have emphasized that people in developed nations tend to use e-cigarettes more frequently because they consider these products helpful tools for smoking cessation (Hummel et al., 2015). However, research in developing countries has revealed fewer positive insights (Abo-Elkheir and Sobh, 2016). Because of the lack of evidence on the community use of e-cigarettes across Vietnam, the current study was conducted to assess the awareness, current use, and perceptions of e-cigarettes among Vietnamese personnel. This research also determined the sources that these individuals access when they want information on e-cigarettes. The findings could provide information related to the current e-cigarette situation in Vietnam, assisting policymakers in minimizing the negative impacts of e-cigarettes on the public.

MATERIAL AND METHODS

Study design

A cross-sectional survey was administered to respondents in the last two weeks of March 2022. The online questionnaire was created using Google Forms and distributed through several social media platforms, such as Facebook and LinkedIn. The online survey form consisted of two sheets for procedures and the questionnaire. The first sheet contained the project title, the objective of the study, the procedures involved, the rights of the participants, and the contact details of the researchers. The second sheet consisted of an informed consent form. Upon the voluntary enrolment of prospective participants, they were asked to sign the consent form before they were allowed to fill in the questionnaire. The questionnaire comprised two main sections. The first section was socio-demographic characteristics of participants, including age, marital status, living areas, education, job position, monthly income and working hours per week. The second section consisted of awareness, use, sources of information on e-cigarettes as well as perceptions regarding the safety and advantages of e-cigarettes as smoking cessation aids (Abo-Elkheir and Sobh, 2016; Sarfraz et al., 2018; Twyman et al., 2016; Wang et al., 2019). The instrument presented good overall reliability within the present study, Cronbach's $\alpha = 0.648$. This value indicates that the range of Cronbach alpha within 0.6 to 0.7 is considered acceptable and reliable (Azlan et al., 2020; Griethuijsen et al., 2014).

Ethical considerations

Approval was granted by the Ethics Committee of Pham Ngoc Thach University of Medicine in Ho Chi Minh City, Vietnam (No. 653/TĐHYKPNT-HĐĐĐ). Informed consent was obtained from all the participants prior to the completion of the survey. They were assured that they could withdraw from the study at any point without penalty and that the research did not in any way harm participants. They were informed that their personal data would be kept confidential and used only for scientific purposes.

Participants

The inclusion criteria were as follows: (1) employees of organizations, (2) individuals aged 18 years old and above, (3) individuals with no alcohol or drug consumption during the study period, and (4) voluntary completion of the questionnaire. Respondents who did not complete the questionnaire or chose only one type of answer, e.g., only A or B were excluded.

Data collection

The survey was of a self-administrated design and was created by summarizing information on the instruments used in previous studies (Abo-Elkheir and Sobh, 2016; Sarfraz et al., 2018; Twyman et al., 2016; Wang et al., 2019). The questionnaire was then translated into Vietnamese according to the steps of instrument translation and adaptation prescribed by the WHO. A pilot study involving a sample of 30 subjects was carried out to check the psychometric properties of the questionnaire and clarify its meanings. The final instrument consisted of two sections: one on socio-demographic characteristics and another regarding awareness, use, and perceptions of e-cigarettes and sources of information. Socio-demographic data included gender, age, marital status, education, job position, monthly income, residence, and work hours per week.

To assess current e-cigarette use, the respondents were asked to report on their smoking behaviors, the number of cigarettes that they smoke daily, smoking duration, attempts to quit smoking, their awareness and use of e-cigarettes, and the number of e-cigarettes consumed per day. The participants who knew about e-cigarettes were asked about the sources that they accessed when seeking information on e-cigarettes. For this question, the respondents could choose more than one response option. Perceptions or attitudes toward e-cigarettes among these respondents were measured on a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Statistical analysis

The recorded data were imported into the Statistical Package for the Social Sciences (version 22.0) for statistical analysis. Descriptive statistics were employed to describe the socio-demographic variables and e-cigarette awareness, use, and perceptions of the sample. Categorical variables were expressed in frequencies and percentages, while quantitative variables were indicated as means and standard deviations. The socio-demographic differences between the participants who knew about or used e-cigarettes and those who did not were explored using a chi-square test. $P<0.05$ was considered statistically significant.

RESULTS

Table 1 presents the socio-demographic characteristics of the respondents. Among the 368 participants, the majority were male (87.8%), married (65.2%), and living in urban regions (77.2%). They had an average age of 34.6 ± 16.1 years. More than 60% completed

Table 1. Socio-demographic characteristics of the respondents (N = 368).

Characteristics	Frequency (n)	Percentage (%)
Age (years)	34.6 ± 16.1	
Gender		
Male	323	87.8
Female	45	12.2
Marital status		
Single	95	25.8
Married	240	65.2
Divorced/ Widowed	33	9.0
Living areas		
Urban	284	77.2
Rural	84	22.8
Education		
Primary school	77	20.9
Secondary school	145	39.4
High school	45	12.2
College	40	10.9
University	35	9.5
Postgraduate education	26	7.1
Positions		
Staff	315	85.6
Managers	41	11.1
Directors	12	3.3
Monthly income (million VND Dong)*		
<5	129	35.3
5- <10	147	39.9
10 - <15	56	15.2
≥15	36	9.6
Working hours per week (hours)	43.7 ± 12.3	

*1 USD = 23,113 VND Dong (Source: Vietnamese Ministry of Finance-exchange rate for foreign currencies in March 2022, number: 800/TB-KBNN).

primary and secondary education, and nearly 20% obtained bachelor's degrees or pursued graduate education. The largest proportion of the respondents were staff members, accounting for 85.6% of the sample, followed by managers (11.1%) and directors (3.3%). Most of them earned incomes under 5 million VND (35.3%) and from 5 to less than 10 million VND (39.9%) per month. They typically worked for 43.7 ± 12.3 hours weekly.

The use and awareness of tobacco products, especially e-cigarettes, among the participants are shown in Table 2. More than half (56.8%) reported that they had never smoked, 23.9% stated that they were smokers, and 19.3% indicated that they used to smoke. The current smokers consumed about 13 cigarettes per day, and 64.8% of them have attempted to quit this habit. Other interesting features were that the proportion of individuals exposed to second-hand smoke was 45.1%, of which 42.4% lived with smokers. Moreover, e-cigarette awareness was moderately low at 26.1%. Although only 8.2% of the participants had used e-cigarettes, the number of cigarettes smoked daily was still high at an average of 10.3.

Of the 96 participants who knew about e-cigarettes, the most common source of information was the Internet (86.5%), followed by television or radio (54.2%). Among the respondents, 30.2% acquired information relating to e-cigarettes from friends, and 17.8% obtained such information from their family members. Only 6.3% accessed infor-

Table 2. Use and awareness of e-cigarettes among respondents (N = 368).

Respond	Frequency (n)	Percentage (%)
Smoking behaviors		
Never smoking	209	56.8
Current smoking	88	23.9
Prior smoking	71	19.3
Number of cigarettes smoked daily	12.7 ± 4.2	
Trying to quit smoking		
Yes	58	64.8
No	30	35.2
Exposure to second-hand smoke		
Yes	166	45.1
No	202	54.9
Living with smokers		
Yes	156	42.4
No	212	57.6
Know e-cigarettes		
Yes	96	26.1
No	272	73.9
Use of e-cigarettes		
Yes	30	8.2
No	338	91.8
Number of e-cigarettes used daily	10.3 ± 3.8	

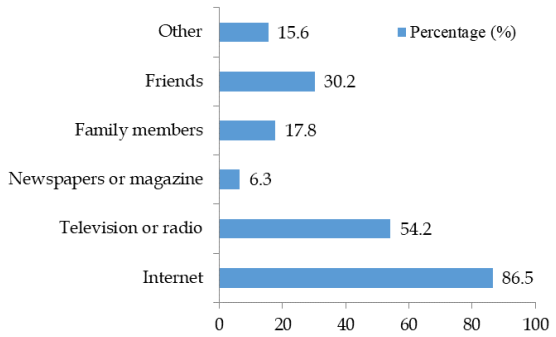

Figure 1. Sources of information about electronic cigarettes. "Other" includes cigarette shops and public signages.

mation published in newspapers or magazines (Fig. 1). Data on the perceptions of the respondents regarding e-cigarettes are presented in Table 3. Among 96 people who had an awareness of these products, around 60% reported that they agreed and strongly agreed with three statements on the cost of e-cigarettes (36.5% and 21.9%, respectively), their safety compared with tobacco-based cigarettes (39.6% and 24.0%, respectively), and the association of such products with several respiratory diseases, namely, asthma, COPD, and lung cancer (37.5% and 22.9%, respectively). Concerning the benefits of e-cigarettes on smoking cessation, 32.3% of the respondents had a neutral answer, which is a proportion larger than those reflecting the remaining responses. Furthermore, 26.0% agreed and 16.7% strongly agreed that e-cigarettes could assist people in stopping smoking tobacco.

Statistically significant differences in the awareness and use of e-cigarettes were found between genders, marital statuses, residences, and educational levels ($p<0.05$). In particular, higher awareness was observed among the male participants than among their female counterparts. Additionally, urban residents had greater awareness than individuals living in rural areas. The same patterns were seen in the use of e-cigarettes. No statistically significant differences according to the job position and monthly income were discovered between the respondents who were aware and unaware of e-cigarettes and between e-cigarette users and non-users ($p>0.05$) (Table 4).

Table 3. Perceptions of respondents who knew about e-cigarettes (N = 96).

Perceptions	Strongly disagree		Disagree		Neutral		Agree		Strongly agree	
	N	%	N	%	N	%	N	%	N	%
E-cigarettes possibly help tobacco users quit smoking	6	6.2	18	18.8	31	32.3	25	26.0	16	16.7
E-cigarettes are more affordable than tobacco cigarettes	14	14.6	17	17.8	13	13.5	35	36.5	21	21.9
E-cigarettes are safer to use than tobacco cigarettes	15	15.6	10	10.4	10	10.4	38	39.6	23	24.0
E-cigarettes may cause acute lung injury, asthma, COPD or lung cancer	12	12.5	11	11.5	15	15.6	36	37.5	22	22.9

Table 4. Awareness and use of e-cigarettes according to socio-demographic characteristics.

Characteristics	Awareness of E-cigarettes			Use E-cigarettes		
	Yes	No	P-value	Yes	No	P-value
Gender						
Male	80	243	**<0.01**	26	297	**<0.01**
Female	16	29		4	41	
Marital status						
Single	22	73		6	89	
Married	67	173	**0.02**	20	220	**0.03**
Divorced/Widowed	7	26		4	29	
Living areas						
Urban	72	212	**<0.01**	23	261	**<0.01**
Rural	24	60		7	77	
Education						
Primary school	9	68		1	76	
Secondary school	18	127		2	143	
High school	20	25	**<0.01**	10	35	**<0.01**
College	25	15		5	35	
University	12	23		8	27	
Postgraduate education	10	16		4	22	
Positions						
Staff	65	250		17	298	
Managers	24	17	0.63	7	34	0.12
Directors	7	5		6	6	
Monthly income (million VND Dong)						
<5	30	99		9	120	
5- <10	39	108	0.55	14	133	0.78
10 - <15	15	41		4	52	
≥15	12	24		3	33	

DISCUSSION

Evidence on awareness, usage, and attitudes toward e-cigarettes is limited to certain developing countries, including Vietnam, and extant studies were devoted predominantly to traditional cigarettes. An essential requirement, therefore, is to investigate the knowledge and attitudes of the general population about e-cigarettes. The objective of the present study was to determine the awareness, use, and perceptions of e-cigarettes among Vietnamese personnel.

Awareness and use of e-cigarettes

The GATS carried out in Vietnam in 2015 among people aged 15 years and older indicated that 18.6% of the target population had heard about e-cigarettes, 1.1% had used these products, and 0.2% were current users (Van Minh et al., 2017). In comparison, the present work uncovered that 26.1% of the sample were aware of e-cigarettes and that only 8.2% had used them. The reasons for the extensive awareness and use of e-cigarettes among the general population have not been explained. The results in this work were lower than estimates in previous studies on other countries worldwide. Substantial percentages of individuals know about e-cigarettes in Australia (77%) (Twyman et al., 2016), Hong Kong (82.6%) (Wang et al., 2015), and Italy (91.1%) (Gallus et al., 2014). Previous studies performed in Pakistan, Egypt, and Japan reported a moderately high proportion of respondents who have heard about e-cigarettes (64.3%, 57.5%, and 48%, respectively). In the current work, the proportion of respondents who had used e-cigarettes amounted to only 8.2%, which is far lower than the findings of Twyman et al. (2016) in Australia, with 37% of the respondents using e-cigarettes during the past year; a study in the USA found that 24.2% of 853 students were reported as e-cigarette ever-users (Franks et al., 2017). According to Sarfraz et al., 39 of 387 adult smoker respondents use e-cigarettes in Pakistan, accounting for 10.1% (Sarfraz et al., 2018). The same pattern was observed in Hong Kong, with approximately 13% of smokers having used e-cigarettes (Wang et al., 2015). The present research had slightly higher values compared with research carried out in Italy and Japan (Gallus et al., 2014; Tabuchi et al., 2016). Generally, because of differences in study samples and study periods, geographical features, and the local regulation of cigarette use in general and e-cigarettes in particular across countries and regions, public awareness and use of e-cigarettes vary among studies.

Sources of knowledge about e-cigarettes

The major sources of knowledge about e-cigarettes in the present study were the Internet (86.5%), television or radio (54.2%), friends (30.2%), and family members (17.8%). Similar findings were found among medical students at Qassim University (Almutham et al., 2019), which underscored that most of the students receive information about e-cigarettes from social media (74.7%), followed by online advertisements (9.2%) and television programs (4.4%). The most popular sources found in other studies were the Internet, friends, and advertisements on social media (Dawkins et al., 2013; McQueen et al., 2011; Sarfraz et al., 2018). In Egypt, Abo-Elkheir and Sobh (2016) found that 13.7% of the sample acquire information about e-cigarettes from the Internet and 11.5% from friends. In addition, Zhu et al. (2013) highlighted that the elderly and people with low education are highly likely to access information about e-cigarettes from television, whereas the youth and individuals with high-level educational degrees commonly access the Internet. A different pattern emerged in a study in Australia, which reflected that the respondents first try e-cigarettes given recommendations from friends or family (Twyman et al., 2016). Similarly, more than half (62%) of the smokers in Daniluk et al. (2018) research obtain knowledge regarding e-cigarettes from friends. In a previous national survey in Vietnam, 65.3% of adults derived information on cigarette smoking from television or radio, whereas 16.6% acquired such information from cigarette advertisements, sponsorships, or promotions (Van Minh et al., 2017). Another study indicated that social networking, a popular internet-based form of communication, is positively oriented towards e-cigarette users. The three most popular e-cigarette advertising contents through social media were advantages, negative effects on health and entertainment (Trang et al., 2021).

Perceptions of e-cigarettes

This study found that approximately 60% of the respondents who knew about e-cigarettes believed that switching from tobacco cigarettes to e-cigarettes is cheaper. They also regarded e-cigarettes as safer than traditional tobacco products. However, e-cigarettes were considered to be associated with several respiratory diseases, such as asthma, COPD, and lung cancer. This finding is consistent with a study performed in Italy, with 65% of the sample assuming that e-cigarettes are less harmful than traditional ones because the former present lower risks of burning (Gallus et al., 2014). Similar findings were obtained in the contexts of Egypt and Pakistan (Abo-Elkheir and Sobh, 2016; Sarfraz et al., 2018). An increasing number of people perceive e-cigarettes to be less poisonous than traditional cigarettes because of marketing efforts that highlight the advantages of the former over conventional products. Furthermore, nearly half of the participants in an Australian study reported mis-

information or uncertainty with respect to the safety of e-cigarettes (Twyman et al., 2016). Hence, data on the long-term safety and hazards of e-cigarettes are lacking, and further research should be carried out to determine the effects of e-cigarettes on human health and the environment.

Confusion over the benefits of e-cigarettes in improving smoking cessation persisted among the current respondents. Wang et al. (2016) suggested that e-cigarettes are viewed by smokers and non-smokers living in Hong Kong as ineffective in helping individuals give up smoking, even though e-cigarette use is expected to be strongly associated with such effectiveness. About a quarter of study subjects in the USA deems e-cigarettes a form of therapy for smoking cessation (Franks et al., 2017). Meanwhile, recent studies have illustrated that young adults have negative attitudes toward the effectiveness of e-cigarettes in contributing to successful tobacco cessation (Camenga et al., 2015; Sutfin et al., 2013).

Awareness and use based on socio-demographic characteristics

The knowledge and use of e-cigarettes in the present study were affected by gender, marital status, residence, and educational level. Awareness and usage among males were greater than among their female counterparts. This result aligns with a study in Egypt, which determined that men are highly more likely to be aware of e-cigarettes than women (Abo-Elkheir and Sobh, 2016). Participants with higher educational degrees seem to gain better knowledge about e-cigarettes in Pakistan (Sarfraz et al., 2018). This phenomenon is supported by studies conducted in Hong Kong and Egypt (Abo-Elkheir and Sobh, 2016; Wang et al., 2016). This situation may be attributed to the fact that educated people have access to quality information and possess the skills necessary to use communication technology.

Moreover, youth is associated with more substantial knowledge of e-cigarettes (Abo-Elkheir and Sobh, 2016; Gallus et al., 2014; Sarfraz et al., 2018; Wang et al., 2016). This situation can be explained by the curiosity of young adults regarding novel devices and their active use of the Internet and social networks. Studies have also suggested that the youth are the main target of the e-cigarette industry, and investments in e-cigarette advertising have grown significantly (Duke et al., 2014). Both the increasing awareness of e-cigarettes among the youth and their desire to try trendy products may lead to the initiation of e-cigarette use and nicotine addiction (Goniewicz and Zielinska-Danch, 2012).

The cross-sectional design does not establish causal inferences because of without longitudinal data. Being simultaneously assessed, the causal relationship between smoking-associated factors and e-cigarette use and the association between the use and perceptions of these products could not be determined precisely. Therefore, it is difficult to draw predictive conclusions based on observable results. Additionally, this study did not examine factors including frequency of use, reasons for use, and smoking cessation. It is impractical to fully grasp the potential studying aspects, so these gaps in the current research could be filled by future research.

CONCLUSION

The awareness and use of e-cigarettes among the participants in this study were relatively low. The most common information sources were the Internet, television or radio, friends, and family members. There were positive attitudes toward e-cigarettes with appreciation about their affordability and safety. However, there was confusion about the effectiveness of e-cigarettes in contributing to cessation. High-quality evidence on the long-term effectiveness and the physical and mental risks posed by e-cigarettes is needed to improve understanding of their effects. The current research derived insights on aspects associated with e-cigarette awareness and use, such as gender and education. The findings have the potential to guide the establishment of public health strategies and the official regulation and management of e-cigarette use.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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AUTHOR CONTRIBUTION:

Contribution	Nguyen TD	Tran HTB	Nguyen HTT	Ha DT
Concepts or ideas	x	x	x	
Design	x	x	x	x
Definition of intellectual content	x	x		
Literature search	x	x	x	
Experimental studies	x	x		
Data acquisition	x	x		
Data analysis		x	x	x
Statistical analysis	x	x	x	
Manuscript preparation	x	x	x	
Manuscript editing	x	x		x
Manuscript review	x	x	x	x

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