


The Role of Media and Retailer Message Recall on Malaysian Male Perceptions of E-Cigarette Use: The 2016 National Study of E-Cigarettes Prevalence

INQUIRY: The Journal of Health Care Organization, Provision, and Financing
Volume 59: 1–11
© The Author(s) 2022
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/00469580221079683
journals.sagepub.com/home/inq


Lei Hum Wee¹, Guat Hiong Tee², Caryn Mei Hsien Chan¹, Samsul Draman³,
Ab Rahman Jamalludin³, Bee Kiau Ho⁴, Jane Miaw Yn Ling², Kuang Hock Lim⁵,
Muhammad Fadhli Mohd Yusoff², Nizam Baharom⁶, Noorzurani Robson⁷, Mira Kartiwi⁸,
Norny Syafinaz Ab Rahman⁹, Ching Sin Siau¹ , and Mohamad Haniki Nik Mohamed⁹

Abstract

This study examined the perceptions of current smokers on electronic cigarette (EC) use, after exposure to information on EC use and its potential harms from various media and retail outlets. This cross-sectional study is a sub-analysis of the National Study of Electronic Cigarettes Prevalence (N = 4289) using the multi-stage stratified sampling method. Respondents were interviewed face-to-face by a trained data collector using a structured questionnaire printed in both Bahasa Malaysia and English. The analysis included 376 males who smoked conventional cigarettes and/or used ECs and reported ever seeing messages on ECs/vape in various platforms were analyzed using weighted simple and multiple logistic regression. Our findings showed different media types resulted in differing perceptions among smokers towards EC use especially between social media and conventional media. Those exposed to messages promoting EC in social media had higher odds of believing that ECs help people quit smoking (OR: 2.28), the urge to smoke is reduced by ECs (OR: 1.86), ECs are more effective than medication for quitting smoking (OR: 1.96), breathing is improved after using ECs (OR: 2.85), the smell of EC is better than a tobacco cigarette (OR: 2.73), and ECs should be regulated rather than banned completely (OR: 3.08). Vape shops, social, and conventional media provided very different perceptions among smokers towards EC use. Beyond using traditional communication channels, EC promoters have successfully utilized social media to promote ECs among smokers.

Keywords

e-cigarettes, current smokers, social media, perception, Malaysia

¹Faculty of Health Sciences, Universiti Kebangsaan Malaysia, Kuala Lumpur, Wilayah Persekutuan, Malaysia

²Institute for Public Health, Ministry of Health Malaysia, Kuala Lumpur, Wilayah Persekutuan, Malaysia

³Kulliyah of Medicine, International Islamic University Malaysia, Kuala Lumpur, Wilayah Persekutuan, Malaysia

⁴Bandar Botanik Health Centre, Ministry of Health Malaysia, Putrajaya, Wilayah Persekutuan, Malaysia

⁵Institute for Medical Research, Ministry of Health Malaysia, Kuala Lumpur, Wilayah Persekutuan, Malaysia

⁶Faculty of Medicine and Health Science, Universiti Sains Islam Malaysia, Nilai, Negeri Sembilan, Malaysia

⁷Faculty of Medicine, Universiti Malaya, Kuala Lumpur, Wilayah Persekutuan, Malaysia

⁸Kulliyah of ICT, International Islamic University Malaysia, Kuala Lumpur, Wilayah Persekutuan, Malaysia

⁹Kulliyah of Pharmacy, International Islamic University Malaysia, Kuala Lumpur, Wilayah Persekutuan, Malaysia

Corresponding Author:

Caryn Mei Hsien Chan, Faculty of Health Sciences, Universiti Kebangsaan Malaysia, Jalan Raja Muda Abdul Aziz, 50300 Kuala Lumpur, Malaysia.

Email: caryn@ukm.edu.my



Creative Commons Non Commercial CC BY-NC: This article is distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 License (<https://creativecommons.org/licenses/by-nc/4.0/>) which permits non-commercial use, reproduction and distribution of the work without further permission provided the original work is attributed as specified on the SAGE and

Open Access pages (<https://us.sagepub.com/en-us/nam/open-access-at-sage>).

- **What do we already know about this topic?**
 - The prevalence of e-cigarette (EC) usage has been increasing worldwide, and this may be due to its promotion through media and retail outlets.
- **How does your research contribute to the field?**
 - Our results showed that social media played a pivotal role in influencing the perception of smokers into believing that ECs were safer alternatives and more effective than medication to help in their smoking cessation.
- **What are your research's implications towards theory, practice, or policy?**
 - It is important to focus on the current channels of communication to convey the right information about the use of ECs.

Introduction

Globally, studies from population data had established that electronic cigarette (EC) use has increased rapidly and gained popularity in recent years.^{1,2} A study in China reported an increasing prevalence of EC use among adults in general,² whilst another study reported an increase in prevalence among young adults but did not increase among middle-aged and older adults.³ An upward trend was also indicated in Malaysia.^{4,5} Malaysia recorded an overall increase in prevalence from .8% in 2011⁶ to 3.2% in 2016⁷; dominated by males with an increase from 1.8% and 6.0% in 2011⁶ and 2016,⁷ respectively. The 2019 National Health and Morbidity survey further revealed that 21% and 5% of Malaysians were conventional and electronic cigarette users in 2019.⁸ The increase in prevalence might be due to prominent promotion through online platforms, in print media, and on television and radio.⁹

There are conflicting perceptions of the use of ECs. Some advocate the use of ECs as a tool to assist in quitting tobacco cigarette smoking and perceive ECs as less harmful¹⁰ and less addictive¹¹ than conventional cigarettes. Several studies reported that ECs can reduce urges to smoke among conventional smokers,¹² but others suggested that they would end up becoming dual users (ie, using both conventional cigarettes and ECs), rather than quitting conventional cigarettes.¹³ On the other hand, there are concerns about the use of ECs as a way to renormalize smoking and sensitize individuals from perceiving ECs as a safer alternative,¹³ and reduce their motivation to quit smoking completely. This may contribute to nicotine addiction and public confusion¹⁴ while being a gateway to smoking for non-smokers.¹⁴⁻¹⁷

Findings from a systematic review and meta-analysis reported that EC users had at least a 3-fold risk of becoming cigarette smokers.¹⁸ It is unclear if ECs promote behaviors and habits that are similar to those found among conventional cigarettes smokers.¹⁹ In addition, there is also concern about the potential harms of inhaling second-hand EC emissions.²⁰ There are claims that EC use reduced health risks and is relatively less harmful than conventional cigarettes.²¹ On the other hand, there is growing evidence that more adults perceive ECs as being as harmful as, or more harmful than, conventional cigarettes.²²

There are conflicting views among health professionals about the role of ECs. Some do not recommend using ECs as a smoking cessation aid, despite viewing them as less harmful than conventional cigarettes.^{23,24} Some medical groups adopt a harm

reduction approach, most notably in England, whereby smokers were encouraged to use ECs to assist in quitting smoking if other methods failed.^{25,26} Such harm reduction messages associated with EC use contributed to the ambiguity surrounding its acceptability.

Both traditional and digital media communication channels had contributed to the increase in the awareness and use of ECs among young adults.²⁷ In particular, youth and young adults may be most vulnerable to advertisements promoting EC use.²⁸ Information promoting the use and the potential harms of ECs are disseminated through print as well as interpersonal sources such as EC retail outlet shopkeepers²⁹ who provide information and assist the clients to decide on e-liquids and devices designed to meet their preferences³⁰. Interpersonal communication through exposure to messages on the good and harmful effects of EC use from another person was found to be the highest source of awareness.³⁰ Studies reported that past-year exposure to tobacco products and EC messages were higher among EC ever-users, current smokers, and those with frequent internet access.³¹ Studies also suggested viewing EC advertisements act as a reminder to cigarette smoking and lowers former smokers' intentions to stop smoking.³² Promoters have successfully utilized social media to promote ECs^{33,34} using popular social media platforms to market ECs such as Youtube, Twitter, and Facebook.³⁵

Despite the interest in the effects of EC marketing and communication, there is a paucity of studies that evaluate how exposure to EC messages in various media platforms affects current smokers' perception of ECs.³⁶ The objective of this study was to examine adult male current smokers' perceptions on EC following exposure to information promoting its use and potential harms derived from the different media types and EC retail outlets.

Materials and Methods

Participants and Study Design

This study was part of a national prevalence survey on EC use among Malaysian adults.³⁶ Details of the study design, participants, and data collection methods had been published elsewhere.³⁶ Written consent was obtained from all participants. Ethical approval was obtained from the Medical Research and Ethics Committee of the Ministry of Health Malaysia (NMRR-16-171-28819).

Sample Size and Sample Distribution

The main household survey received a total of 4288 individuals, weighted to represent 19 million Malaysians. Only adult male conventional cigarette smokers were the focus of this study. This paper is a sub-analysis of the main study³⁶ which involved 957 respondents (22.5% of the total sample) who were smoking conventional cigarettes with or without EC use. Current dual users were also included. Definitions of conventional cigarette smoking were adopted from the Centres for Disease Control and Prevention, Atlanta, USA.³⁷ Dual users were defined as those who were currently smoking both conventional cigarettes and EC at the time of the interview. Excluded from further analysis were females, those who used EC only, and participants who did not respond to the questions on media exposure. Hence, only 376 male current conventional cigarette smokers were further analyzed.

Measurements

The perception questions were developed by the tobacco control experts from both academia and the Ministry of Health Malaysia.³ The questionnaire booklet was printed bilingual (English and Bahasa Malaysia) in the same book. It has 8 sections: Background, Smoking E-Cigarettes/Vape, Smoking Tobacco, Dual Users, Second-hand E-Cigarettes/Vape Vapor, Media, Perception, and E-Liquid Form.³ The Fagerström Test for Nicotine Dependence (FTND) was used to assess the level of physical nicotine addiction.³⁸ The original questionnaire consisted of 6 items that measured the quantity of cigarette consumption, and the participants' level of compulsion to use and dependence on cigarette smoking.

This paper mainly discusses results from the Media and Perception parts of the questionnaire: "In the last 30 days, did you observe any advertisements promoting e-cigarette/vape in the following media/places...?" and "In the last 30 days, did you observe any information about the danger (harm) of smoking e-cigarette/vape in the following media/place...?" The list of media/place was vape shops, TV, radio, posters, newspapers/magazines, and social media.

Respondents who answered "yes" were interviewed on perception statements (20 statements altogether): "Do you agree with the following statements?: I think E-cigarettes help people quit smoking tobacco cigarettes" and "People react more positively to e-cigarette users than to tobacco smokers" with responses ranging from "agree," "don't agree," "don't know," and "refuse to answer" for each statement. Similarly, the survey measured exposure to messages about potential harms of ECs and perceptions of harm. Each perception statement was treated as a separate dependent variable.

Statistical Analysis

The demographic characteristics and the agreement of the perception items by different exposures through different types of media and EC retail outlets were calculated using frequencies and

percentages. Male smokers'/EC users' exposure to promotional messages about ECs and also information on potential harms of EC use and their associations with perception items were analyzed using weighted simple logistic regression. For each perception (dependent variable), different types of media and EC retail outlets were treated as independent variables. The media/places were as follows: (a) Vape shop, (b) Social media, and (c) Conventional media (which was a combination of TV/radio, posters, and newspapers/magazines). Participants who answered "don't know" and "refuse to answer" were treated as missing data and were excluded listwise. The regression outcomes were presented in odds ratio and 95% confidence intervals. The odds ratio applies to those who agree with the perception item, with those who disagree as the reference group.

Results

Table 1 shows demographic characteristics of male adult smokers who were currently smoking conventional cigarettes and/or using ECs and reported they had ever seen any messages on the media (n = 376).

Table 2 shows the perceptions of current male adult smokers who were exposed to messages promoting ECs and/or harmful effects of ECs used through EC retail outlets, social media, and/or conventional media (TV, radio, posters, and newspapers/magazines) and their perceptions on messages of EC use.

The majority of smokers indicated agreement with the perceptions that EC is less satisfying than tobacco smoking, ECs have better smell, EC solutions cause poisoning, and ECs should be regulated rather than banned completely.

Overall, more than half (51.9%) of the participants reported they had received messages promoting EC use from social media, whilst 42.0% exposure to promoting messages in the vape shop. The largest proportion of participants reported receiving messages regarding the harm of EC use was from TV and radio (66%), followed by social media (49.5%), and newspapers/magazines (45.2%). Across all media types, more than half of the participants agreed that the smell of EC is better than a tobacco cigarette, EC solution causes poisoning, and EC use is less satisfying than tobacco smoking.

Based on the results of the simple logistic regression, in terms of exposure to messages in vape shops, those who saw messages promoting EC in the vape shop were less likely to believe EC vapor was more harmful to others compared to tobacco smoke (OR: .45, 95%CI [.27-.77], $P < .01$). Those exposed to messages highlighting the harm of EC were more likely to perceive that the public would react more positively to EC users than tobacco users (OR: 5.44, 95%CI [1.56-18.9], $P < .01$).

In terms of exposure to messages in social media, those who recalled they saw messages promoting EC were more likely to believe that EC helped people quit smoking (OR: 2.28, 95%CI [1.21-4.30], $P < .05$), the urge to smoke was reduced by EC (OR: 1.86, 95%CI [1.11-3.13], $P < .05$), EC was more effective than medication for quitting smoking (OR: 1.96, 95%CI [1.02-3.76], $P < .05$), breathing was improved after using EC (OR: 2.85, 95%

Table I. Demographic and smoking characteristics of current male adult smokers (N = 376).

Characteristic	n (%)
<i>Age group</i>	
18–24	76 (20.2)
25–44	192 (51.1)
45–64	91 (24.2)
65 and above	17 (4.5)
<i>Ethnicity</i>	
Malay	305 (81.1)
Chinese	15 (4.0)
Indian	6 (1.6)
Iban	8 (2.1)
Kadazan	5 (1.3)
Other Bumiputera	36 (9.6)
Others	1 (.3)
<i>Residence</i>	
Urban	176 (46.8)
Rural	200 (53.2)
<i>Religion</i>	
Islam	333 (88.6)
Buddhism	14 (3.7)
Christianity	19 (5.1)
Hinduism	6 (1.6)
Others	4 (1.1)
<i>Marital status</i>	
Married/Living with partner	240 (63.8)
Single/Separated/Divorced/Widowed	136 (36.2)
<i>Education</i>	
No formal education	20 (5.3)
Completed primary	97 (25.8)
Completed secondary	186 (49.5)
Completed college/university	73 (19.4)
<i>Employment</i>	
Government	42 (11.2)
Non-government	128 (34.0)
Self-employed	144 (38.3)
Student	23 (6.1)
Retiree	14 (3.7)
Not working	25 (6.6)
<i>Initiation age (Years) (means, SD)</i>	17.65±4.32
<i>Number of cigarettes smoked per day (means, SD)</i>	12.59±10.71
<i>Days of past abstinence of recent quit attempt (means, SD)</i>	14.24±34.72
<i>FTND status (means, SD) (n = 364)</i>	2.41±.99
None	73 (19.4)
Low	125 (33.2)
Low to moderate	112 (29.8)
Moderate	50 (13.3)
High	4 (1.1)
<i>Ever used EC</i>	
Yes	136 (36.2)
No	240 (63.8)
<i>Current conventional cigarette and EC user (dual user)</i>	
Yes	45 (12.0)
No	331 (88.0)

(continued)

Table 1. (continued)

Characteristic	n (%)
<i>Sources of e-liquid for EC users (n = 45)</i>	
Online	5 (11.1)
Vape shops	27 (62.8)
Night market	1 (2.3)
Others	12 (27.9)

CI [1.36–5.98], $P < .01$), the smell of EC was better than a tobacco cigarette (OR: 2.73, 95%CI [1.35–5.54], $P < .01$), and EC should be regulated rather than banned completely (OR: 3.08, 95%CI [1.75–5.41], $P < .001$). Those exposed to promoting messages were less likely to endorse EC smoke was more harmful to others compared to tobacco smoke (OR: .46, 95%CI [.27–.79], $P < .01$) and EC solutions caused poisoning (OR: .44, 95%CI [.26–.77], $P < .01$). Those who stated they were exposed to messages highlighting the harm of EC were less likely to believe EC vapor was more harmful to others compared to tobacco smoke (OR: .56, 95%CI [.32–.98], $P < .01$).

In terms of exposure to conventional media, those exposed to harmful messages of EC had lower odds of believing that people react more positively to EC in comparison with conventional cigarettes (OR: .49, 95%CI [.25–.97]) and that EC should be regulated rather than banned (OR: .57, 95%CI [.33–.98]).

The results of the multiple logistic regression analyses, after adjusting for the influence of age, education level, and ever EC use showed that participants exposed to harmful messages in vape shops had higher odds of believing that people will react more positively to EC users than conventional smokers (aOR: 8.73, 95%CI [2.46–31.0]). Those receiving harmful messages from social media had lower odds of believing that people will react more positively to EC users than to conventional smokers (aOR: .49, 95%CI [.25–.97]). In terms of conventional media, recipients of promoting messages had higher odds of believing that EC is less addictive than tobacco cigarettes (aOR: 1.93, 95%CI [1.13–3.30]), whilst those exposed to harmful messages had lower odds of believing that people will react more positively to EC users compared to conventional smokers (aOR: .53, 95%CI [.29–.96]) (refer Table 3).

Discussion

Our findings showed different media types resulted in differing perceptions among smokers toward EC use based on their exposure to promoting or harmful messages in vape shops, social media, and conventional media (TV, Radio, Posters, Newspapers, and Magazines). Beyond using traditional communication channels, EC promoters increasingly utilized social media in mobilizing public opinion to promote ECs^{33,34} with the most frequently used social media platforms to market ECs such as Twitter and Facebook.³⁵

Social media exposure to EC messages was strongly associated with the perceptions of current male adult

smokers, regardless of it being a positive (promoting ECs) or negative perception (information on the dangers of EC use), before controlling for the influence of age, education level, and EC ever-user status. These findings were in agreement with another study that reported social media as an important marketing platform for ECs since the information obtained from this platform was shared and re-shared, influencing decisions of its use.³⁹ Social media tends to elicit more positive perceptions on EC use compared to other platforms. For example, those exposed to social media promoting messages in this study showed positive perceptions that EC helped them to quit smoking, able to reduce the urges to smoke, was more effective than medication to help in quitting smoking, and improved breathing after EC was used. The results were consistent with a systematic review of perceptions on EC use on social media platforms, whereby the sentiment towards EC use was largely more positive.⁴⁰ In addition, social media users are also more likely to perceive the smell of EC is better than cigarettes. This was consistent with a study that indicated younger generations of smokers who tended to use social media preferred flavored ECs compared to generation X consumers.⁴¹

The influence of social media on eliciting positive perceptions on e-cigarettes is worrying as statistics have shown that social media use is increasing among the younger generation, and EC providers may target this younger group as a new market of cigarette consumers.⁴² In Malaysia, young adults have been found to have the highest percentage in using the internet (30%) followed by middle-aged adults (25.9%).⁴³ Social media exposure may lead to positive views on EC use due to the frequency of exposure and has a normalizing effect on EC use perception, as was found in Alpert and colleagues' study on EC's influence on young adults.⁴⁴ However, as some of the associations became non-significant after adjusting for age, education level, and ever EC use, future studies should pay attention to the influence of these demographic variables when investigating the impact of social media on EC use.

It is interesting to note that exposure to messages on the harm of EC use on conventional and social media was associated with lower perceived social acceptance of EC use. This is an important finding as the use of e-cigarettes has been influenced by social and peer pressure.⁴⁵ Health promotion messages on the harm of EC can utilize a negative social

Table 2. Perceptions of current male adult smokers on e-cigarette use after exposure to messages promoting the use of e-cigarettes and/or the harm of e-cigarette use in the media and vape shop in the past 30 days (n = 376).

Perceptions on EC Use Messages	Agreement	Vape Shop [n (%)]		Social Media [n (%)]		Poster [n (%)]		TV/Radio [n (%)]		Newspaper/Magazine [n (%)]	
		^a Promoting	^b Harmful	^a Promoting	^b Harmful	^a Promoting	^b Harmful	^a Promoting	^b Harmful	^a Promoting	^b Harmful
EC helps people quit smoking tobacco cigarette	Agree	62 (39.7)	5 (33.3)	83 (43.0)	69 (37.3)	39 (45.3)	27 (39.1)	22 (23.4)	75 (32.2)	18 (25.0)	61 (37.0)
	Disagree	94 (60.3)	10 (66.7)	110 (57.0)	116 (62.7)	47 (54.7)	42 (60.9)	72 (76.6)	158 (67.8)	54 (75.0)	104 (63.0)
The urge to smoke is reduced by using EC	Agree	68 (46.3)	5 (33.3)	86 (46.5)	77 (43.8)	39 (46.4)	23 (7.64)	25 (27.5)	87 (39.7)	16 (24.2)	66 (43.4)
	Disagree	79 (53.7)	10 (66.7)	99 (53.5)	99 (56.3)	45 (53.6)	49 (7.89)	66 (72.5)	132 (60.3)	50 (75.8)	86 (56.6)
EC is more effective than medication for quitting smoking	Agree	31 (21.5)	2 (13.3)	50 (28.4)	44 (26.0)	19 (23.2)	15 (23.8)	8 (9.0)	37 (17.5)	5 (7.6)	32 (21.5)
	Disagree	113 (78.5)	13 (86.7)	126 (71.6)	125 (74.0)	63 (76.8)	48 (76.2)	81 (91.0)	174 (82.5)	61 (92.4)	117 (78.5)
Breathing is improved after using EC	Agree	35 (25.4)	1 (7.7)	50 (30.5)	39 (24.2)	22 (28.6)	16 (25.8)	14 (16.7)	41 (21.2)	15 (22.7)	33 (22.8)
	Disagree	103 (74.6)	12 (92.3)	114 (69.5)	122 (75.8)	55 (71.4)	46 (74.2)	70 (83.3)	152 (78.8)	51 (77.3)	112 (77.2)
EC use is less satisfying than tobacco smoking	Agree	95 (70.4)	8 (57.1)	117 (67.2)	108 (65.5)	53 (67.1)	37 (63.8)	46 (54.1)	134 (67.3)	37 (56.1)	95 (64.6)
	Disagree	40 (29.6)	6 (42.9)	57 (32.8)	57 (34.5)	26 (32.9)	21 (36.2)	39 (45.9)	65 (32.7)	29 (43.9)	52 (35.4)
People react more positively to EC users than that to tobacco smokers	Agree	51 (33.3)	9 (60.0)	66 (35.5)	57 (31.8)	33 (37.9)	20 (28.6)	19 (20.2)	64 (27.5)	17 (26.3)	51 (31.1)
	Disagree	102 (66.7)	6 (40.0)	120 (64.5)	122 (68.2)	54 (62.1)	50 (71.4)	75 (79.8)	169 (72.5)	55 (76.4)	113 (68.9)
The smell of an EC is better than a tobacco cigarette	Agree	129 (82.7)	9 (64.3)	169 (87.6)	157 (84.9)	71 (80.7)	49 (72.1)	72 (74.2)	188 (79.7)	50 (73.5)	132 (81.5)
	Disagree	27 (17.3)	5 (35.7)	24 (12.4)	28 (15.1)	17 (19.3)	19 (27.9)	25 (25.8)	48 (20.3)	18 (26.5)	30 (18.5)
EC is less addictive than tobacco cigarettes	Agree	71 (49.0)	8 (53.3)	92 (50.0)	86 (50.0)	47 (58.0)	31 (48.4)	33 (37.9)	95 (45.2)	27 (42.2)	72 (49.0)
	Disagree	74 (51.0)	7 (46.7)	92 (50.0)	86 (50.0)	34 (42.0)	33 (51.6)	54 (62.1)	114 (54.8)	37 (57.8)	75 (51.0)
EC vapor is more harmful to others compared to tobacco smoke	Agree	54 (39.1)	5 (41.7)	72 (41.1)	75 (45.5)	32 (41.6)	25 (41.7)	49 (54.4)	105 (50.7)	33 (50.8)	72 (49.0)
	Disagree	84 (60.9)	7 (58.3)	99 (57.9)	90 (54.5)	45 (58.4)	35 (58.3)	41 (45.6)	102 (49.3)	32 (49.2)	75 (51.0)
EC solutions causes poisoning	Agree	87 (66.9)	8 (57.1)	95 (61.3)	92 (62.6)	47 (65.3)	38 (65.5)	66 (78.6)	137 (72.1)	45 (72.6)	89 (65.9)
	Disagree	43 (33.1)	6 (42.9)	60 (38.7)	55 (37.4)	25 (34.7)	20 (34.5)	18 (21.4)	53 (27.9)	17 (27.4)	46 (34.1)
EC should be regulated rather than banned completely	Agree	101 (65.6)	8 (53.3)	134 (71.3)	118 (69.9)	55 (66.3)	42 (60.0)	47 (49.0)	123 (52.3)	42 (59.2)	98 (59.8)
	Disagree	53 (34.4)	7 (46.7)	54 (28.7)	61 (34.1)	28 (33.7)	28 (40.0)	49 (51.1)	112 (47.7)	29 (40.8)	66 (40.2)
Total	Yes	158 (42.0)	15 (4.0)	195 (51.9)	186 (49.5)	88 (23.4)	72 (19.1)	103 (27.4)	248 (66.0)	74 (19.7)	170 (45.2)
	No	212 (56.4)	353 (93.9)	174 (46.3)	184 (48.9)	285 (75.8)	296 (78.7)	273 (72.6)	125 (33.2)	300 (79.8)	202 (53.7)
	Don't know	3 (8)	7 (1.9)	5 (1.3)	5 (1.3)	1 (3)	7 (1.9)	0 (0)	2 (5)	1 (3)	3 (8)
	Refused	2 (5)	0 (0)	1 (3)	0 (0)	1 (3)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Note: EC = Electronic cigarette.

^aPromoting = Exposure to messages promoting EC use.

^bHarmful = Exposure to harmful messages about EC

Table 3. Weighted simple and multiple logistic regression[§] on the perception of current male adult smokers after exposure to messages promoting the use of e-cigarettes and the harm of e-cigarette use in the media and vape shop in the past 30 days.

Perceptions on EC Use Messages	Vape Shop [OR (95% CI)]		Vape Shop [§] [aOR (95% CI)]		Social Media [OR (95% CI)]		Social Media [§] [aOR (95% CI)]		Conventional Media [OR (95% CI)]		Conventional Media [§] [aOR (95% CI)]	
	^a Promoting	^b Harmful	^a Promoting	^b Harmful	^a Promoting	^b Harmful	^a Promoting	^b Harmful	^a Promoting	^b Harmful	^a Promoting	^b Harmful
EC helps people quit smoking tobacco cigarette	1.08 (66-174)	.60 (20-1.63)	.79 (.50-1.27)	.58 (.16-2.04)	2.28* (1.21-4.30)	1.15 (.67-1.98)	1.62 (.75-3.49)	.91 (.46-1.84)	.70 (.42-1.17)	.78 (.46-1.33)	.86 (.49-1.51)	.87 (.50-1.51)
The urge to smoke is reduced by using EC	1.33 (76-233)	.51 (.18-1.40)	1.00 (.54-1.85)	.55 (.16-1.92)	1.86* (1.11-3.13)	1.14 (.68-1.92)	1.25 (.62-2.49)	.98 (.51-1.85)	.74 (.42-1.28)	1.01 (.61-1.67)	1.10 (.54-1.88)	1.14 (.65-1.99)
EC is more effective than medication for quitting smoking	.77 (46-1.28)	.30 (.05-1.75)	.43** (.24-.79)	.24 (.03-1.85)	1.96* (1.02-3.76)	1.12 (.55-2.29)	.92 (.43-1.98)	.75 (.31-1.80)	.58 (.32-1.05)	.53 (.25-1.12)	.77 (.38-1.54)	.52 (.24-1.15)
Breathing is improved after using EC	1.15 (66-2.02)	.26 (.03-2.15)	.83 (.46-1.50)	.25 (.02-2.78)	2.85** (1.36-5.98)	.92 (.48-1.74)	2.29 (.99-5.28)	.84 (.43-1.67)	1.03 (.57-1.89)	.98 (.49-1.97)	1.51 (.75-3.05)	1.11 (.55-2.24)
EC use is less satisfying than tobacco smoking	1.37 (80-2.35)	1.01 (27-3.84)	1.18 (.65-2.140)	.99 (.25-3.86)	1.54 (.86-2.75)	1.07 (.60-1.91)	1.28 (.64-2.56)	.92 (.48-1.76)	.79 (.45-1.37)	1.31 (.74-2.33)	.88 (.50-1.55)	1.38 (.76-2.54)
People react more positively to EC users than that to tobacco smokers	1.02 (60-1.71)	5.44** (1.56-18.9)	.73 (.43-1.22)	8.73** (2.46-31.0)	1.56 (.84-2.91)	.84 (.46-1.53)	.88 (.44-1.77)	.49* (.25-.97)	.97 (.53-1.79)	.51* (.30-.87)	1.30 (.68-2.51)	.53* (.29-.96)
The smell of an EC is better than a tobacco cigarette	1.18 (61-2.30)	.43 (.11-1.67)	.79 (.41-1.54)	.32 (.07-1.39)	2.73** (1.35-5.54)	1.65 (.89-3.05)	1.80 (.85-3.79)	1.05 (.57-1.95)	.64 (.32-1.13)	1.190 (.57-2.47)	.74 (.42-1.29)	1.39 (.62-3.14)
EC is less addictive than tobacco cigarettes	1.20 (76-1.90)	1.91 (53-6.89)	.92 (.54-1.56)	2.16 (.56-8.37)	1.35 (.82-2.20)	1.25 (.70-2.22)	.88 (.49-1.56)	.98 (.51-1.87)	1.39 (.83-2.32)	1.21 (.73-2.01)	1.93* (1.13-3.30)	1.22 (.69-2.15)
EC vapor is more harmful to others compared to tobacco smoke	.45** (.27-.77)	.78 (27-2.31)	.60 (.34-1.06)	.72 (.30-1.73)	.46** (.27-.79)	.56* (.32-.98)	.70 (.35-1.40)	.75 (.38-1.48)	.88 (.55-1.41)	.76 (.46-1.28)	.63 (.38-1.06)	.68 (.39-1.21)
EC solutions causes poisoning	.89 (47-1.67)	.77 (29-2.08)	.74 (.38-1.46)	1.17 (.34-4.03)	.44** (.26-.77)	.69 (.40 - 1.18)	1.07 (.55-2.07)	.88 (.48-1.63)	1.44 (.87-2.39)	1.39 (.80-2.43)	.94 (.51-1.74)	.72 (.41-1.29)
EC should be regulated rather than banned completely	1.35 (83-2.22)	1.14 (34-3.78)	.94 (.55-1.62)	1.151 (22-6.00)	3.08*** (1.75-5.41)	1.51 (.87-2.60)	1.65 (.89-3.07)	.97 (.53-1.76)	1.13 (.70-1.84)	.57* (.33-.98)	1.53 (.89-2.64)	.65 (.35-1.19)

Note: EC = Electronic cigarette.

^aSignificant to P value < .05.

^bSignificant to P value < .01.

^cSignificant to P value < .001.

^dPromoting = Exposure to messages promoting EC use.

^eHarmful = Harmful messages about EC.

^fConventional media comprised TV, radio, newspapers, magazines, and posters.

^gMultiple logistic regression adjusted for the influence of age, education level, and ever using e-cigarettes.

acceptance of EC as a stepping stone to preventing EC initiation. On the other hand, those who are exposed to harmful messages in vape shops showed higher odds of believing that people react more positively to EC users than cigarette smokers. Visitors to vape shops may already be using EC and have friends who also use and react positively to EC, and therefore may continue to believe the higher social acceptance of EC regardless of the harmful messages they are exposed to.

Our study also found that after controlling for the influence of age, education level, and ever EC use status, participants exposed to conventional media also had a higher belief that EC is less addictive than conventional cigarettes. This belief may be related to the harm reduction approach to EC use, because if people perceive that EC is less addictive, they may use it as a strategy to quit smoking. A study by Jankowski et al has shown that EC use is more addictive than cigarette smoking.⁴⁶ Our findings show that there is a need for public health messages that convey the harm of EC use, including its addictiveness, to infiltrate both conventional and social media so that this perception of relative lack of addictiveness may be debunked.

Studies reported that individuals who were uncertain whether ECs were safer than conventional tobacco were less likely to have tried using ECs.⁴⁷ In our study, we are uncertain if current conventional cigarette smokers are at risk of becoming future EC users or if this may reflect a set preference for conventional cigarettes alone with no particular risk of switching. There is a lack of information on identifying which smokers are at risk of switching back to tobacco smoking after using ECs.⁴⁸ Past studies reported that a significant minority stopped using ECs because they do not taste like conventional cigarettes,^{49,50} they are costly⁵¹ or that the users were “just experimenting.”⁵² Other studies also indicated that most smokers wanted to quit smoking and that the majority used ECs to assist them. However, they failed to do so and continued to become dual users.⁴⁹

Globally, researchers suggested that ECs are less harmful than conventional cigarettes,⁵³ yet the long-term evidence of the implications to public health is still lacking. However, what we know is that there is a sharp increase in the initiation of EC use among the youth and young adults,⁵⁴ whilst another study reported an increase in EC use among adults in general.² Therefore, the factors leading to this increase need to be studied more extensively. The findings from this study suggest that those exposed to promoting messages regarding EC use in conventional media minimized its addictiveness, whilst those receiving harmful messages in both social and conventional media believed that EC users were less socially acceptable. The results may inform the formation of regulations which address the use of media in disseminating messages about EC use in Malaysia. Considering that the long-term effects of EC use are still

being established, tighter control should be exercised by health authorities on the use of social and conventional media in promoting EC use.

Limitations of the Study

This study has a few limitations. As it was a cross-sectional study, no causal statements can be made about the observed associations. However, we were unable to measure how the effect of cumulative exposure to EC marketing and susceptibility to EC use affected their perception. Future longitudinal study is able to determine this relationship because they offer temporality.^{55,56} We did not include former smokers, who might have stopped smoking while using ECs. We were also unable to state with certainty whether those aged 18 to 24 years old who had tried or used ECs in the past were current conventional smokers. Another limitation was the exclusion of women from the study. Despite the limitations stated, this was a population-based, nationwide study conducted via face-to-face interviews by trained data collectors.

Conclusion

Our study showed that social media played a pivotal role in catapulting the perception of smokers into believing that ECs were safer alternatives and more effective than medication to help in their smoking cessation. However, there is a need to further study the mediating role of educational level and past EC use in the influence of social media exposure to EC messages on perceptions of EC use. In addition, the influence of conventional media in shaping perceptions toward EC use should not be ignored. Therefore, it is important to focus on the current channels of communication to convey the right information about the use of ECs.

Acknowledgments

We thank the Director General of Health Malaysia for his kind permission to publish this paper. The authors thank fieldworkers for their contributions and survey respondents for their co-operation for making this study possible. Special thanks to Lena Yeap Lay Ling from Stats Consulting Pte. Ltd. for her contribution in the statistical analysis. WLH, CSS, NB and CCMH acknowledges grant support from the Fundamental Research Grant Scheme, Ministry of Higher Education (FRGS/1/2020/SKK06/UKM/02/8).

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The grant

for this project was awarded by National Institute of Health, Ministry of Health Malaysia (NIH/IPH/16-002) & University Kebangsaan Malaysia (FRGS/1/2020/SKK06/UKM/02/8).

Ethical statement

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000. Ethical approval was obtained from the Medical Research and Ethics Committee of the Ministry of Health Malaysia (NMRR-16-171-28819). Informed consent was obtained from all patients for being included in the study

Availability of Data and Materials

Data can be obtained from the corresponding author upon reasonable request.

ORCID iD

Ching Sin Siau  <https://orcid.org/0000-0003-3055-551X>

References

- Dai H, Leventhal AM. Prevalence of e-cigarette use among adults in the United States, 2014-2018. *JAMA*. 2019;322(18):1824-1827.
- Zhao Z, Zhang M, Wu J, et al. E-cigarette use among adults in China: Findings from repeated cross-sectional surveys in 2015-16 and 2018-19. *Lancet Public Health*. 2020;5(12):e639-49.
- Bao W, Liu B, Du Y, Snetselaar LG, Wallace RB. Electronic cigarette use among young, middle-aged, and older adults in the United States in 2017 and 2018. *JAMA Intern Med*. 2020;180(2):313-314.
- Institute for Public Health. *Tobacco & E-Cigarette Survey Among Malaysian Adolescents (TECMA)*. 2016. <http://www.iku.gov.my/images/IKU/Document/REPORT/TECMA2016/TabaccoandECigarette.pdf>. <http://www.iku.gov.my/images/IKU/Document/REPORT/TECMA2016/TabaccoandECigarette.pdf>. Accessed January 19, 2021.
- Wong LP, Shakir SM, Alias H, Aghamohammadi N, Hoe VC. Reasons for using electronic cigarettes and intentions to quit among electronic cigarette users in Malaysia. *J Community Health*. 2016;41(6):1101-1109.
- Institute for Public Health. Report of the Global Adult Tobacco Survey (GATS) Malaysia, 2012. Ministry of Health Malaysia; 2011. *Ministry of Health Malaysia: Kuala Lumpur*. <https://drive.google.com/file/d/0Bw-E12kH6924X01xUHF6cERjQTg/view>. Accessed January 19, 2021.
- Institute for Public Health. *National E-Cigarette Survey (NECS) 2016: Prevalence and Pattern of E-Cigarette and Vape Use among Malaysian Adults*. Published 2016. Accessed January 19, 2021.
- Institute for Public Health. *National Health and Morbidity Survey Key Findings. Ministry of Health Malaysia. Published 2020 Ministry of Health Malaysia: Kuala Lumpur*. http://iku.gov.my/images/IKU/Document/REPORT/NHMS2019/Infographic_Booklet_NHMS_2019-English.pdf. Accessed November 11, 2021.
- Kim AE, Lee YO, Shafer P, Nonnemaker J, Makarenko O. Adult smokers' receptivity to a television advert for electronic nicotine delivery systems. *Tobac Control*. 2015;24(2):132-135.
- Volesky KD, Maki A, Scherf C, Watson LM, Cassol E, Villeneuve PJ. Characteristics of e-cigarette users and their perceptions of the benefits, harms and risks of e-cigarette use: Survey results from a convenience sample in Ottawa, Canada. *Health Promot Chronic Dis Prev Can Res Policy Pract*. 2016;36(7):130.
- Choi K, Forster JL. Beliefs and experimentation with electronic cigarettes: A prospective analysis among young adults. *Am J Prev Med*. 2014;46(2):175-178.
- Palazzolo DL. Electronic cigarettes and vaping: A new challenge in clinical medicine and public health. A literature review. *Front Public Health*. 2013;1:56.
- Liu X, Lugo A, Davoli E, et al. Electronic cigarettes in Italy: A tool for harm reduction or a gateway to smoking tobacco? *Tobac Control*. 2020;29(2):148-152.
- Miech R, Patrick ME, O'Malley PM, Johnston LD. E-cigarette use as a predictor of cigarette smoking: Results from a 1-year follow-up of a national sample of 12th grade students. *Tobac Control*. 2017;26(e2):e106-11.
- Tan AS, Lee CJ, Chae J. Exposure to health (mis) information: Lagged effects on young adults' health behaviors and potential pathways. *J Commun*. 2015;65(4):674-698.
- Chapman S. Should electronic cigarettes be as freely available as tobacco cigarettes? No. *Bmj*. 2013;346. doi:10.1136/bmj.f3840.
- Borland R. Electronic cigarettes as a method of tobacco control. *Bmj*. 2011;343:d6269. doi:10.1136/bmj.d6269.
- O'Brien D, Long J, Quigley J, Lee C, McCarthy A, Kavanagh P. Association between electronic cigarette use and tobacco cigarette smoking initiation in adolescents: A systematic review and meta-analysis. *BMC Publ Health*. 2021;21(1):1-0.
- Goniewicz ML, Lingas EO, Hajek P. Patterns of electronic cigarette use and user beliefs about their safety and benefits: An internet survey. *Drug Alcohol Rev*. 2013;32(2):133-140. doi:10.1111/j.1465-3362.2012.00512.x.
- Czogala J, Goniewicz ML, Fidelus B, Zielinska-Danch W, Travers MJ, Sobczak A. Secondhand exposure to vapors from electronic cigarettes. *Nicotine Tob Res*. 2014;16(6):655-662. doi:10.1093/ntr/ntt203.
- Rodrigo G, Jaccard G, Djoko DT, Korneliou A, Esposito M, Belushkin M. Cancer potencies and margin of exposure used for comparative risk assessment of heated tobacco products and electronic cigarettes aerosols with cigarette smoke. *Arch Toxicol*. 2021;95(1):283-298.
- Huang J, Feng B, Weaver SR, Pechacek TF, Slovic P, Eriksen MP. Changing perceptions of harm of e-cigarette vs cigarette use among adults in 2 US national surveys from 2012 to 2017. *JAMA Netw Open*. 2019;2(3):e191047.
- Van Gucht D, Baeyens F. Health professionals in Flanders perceive the potential health risks of vaping as lower than those of smoking but do not recommend using e-cigarettes to their

- smoking patients. *Harm Reduct J*. 2016;13(1):1-8. doi:10.1186/s12954-016-0111-4.
24. Binns C, Lee MK, Low WY. Children and e-cigarettes: A new threat to health. *Asia Pac J Publ Health*. 2018;30(4):315-320. doi:10.1177/1010539518783808.
 25. Public Health England. *E-Cigarettes: An Evidence Update A Report Commissioned by Public Health England*. Published 2015, Wellington House: London. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/457102/Ecigarettes_an_evidence_update_A_report_commissioned_by_Public_Health_England_FINAL.pdf. Accessed January 19, 2021.
 26. Gao W, Sanna M, Huang LL, Chiu YW, Chen YH, Chiou HY. Juggling two balls—smoking (re) normalization and harm reduction: E-cigarettes—facts and misconceptions in Taiwan. *Asia Pac J Publ Health*. 2018;30(4):328-331. doi:10.1177/1010539518773479.
 27. Hart EP, Sears CG, Hart JL, Walker KL. Electronic cigarettes and communication: An examination of college students' perceptions of safety and use. *Ky J Commun*. 2017;36(1):35.
 28. Duke JC, Lee YO, Kim AE, et al. Exposure to electronic cigarette television advertisements among youth and young adults. *Pediatrics*. 2014;134(1):e29-36.
 29. Pearson JL, Richardson A, Niaura RS, Vallone DM, Abrams DB. e-Cigarette awareness, use, and harm perceptions in US adults. *Am J Publ Health*. 2012;102(9):1758-1766. doi:10.2105/AJPH.2011.300526.
 30. Pepper JK, Emery SL, Ribisl KM, Brewer NT. How US adults find out about electronic cigarettes: Implications for public health messages. *Nicotine Tob Res*. 2014;16(8):1140-1144. doi:10.1093/ntr/ntu060.
 31. Filippidis FT, Laverty AA, Fernandez E, Mons U, Tigova O, Vardavas CI. Correlates of self-reported exposure to advertising of tobacco products and electronic cigarettes across 28 European Union member states. *Tobac Control*. 2017;26(e2):e130-3. doi:10.1136/tobaccocontrol-2016-053479.
 32. Maloney EK, Cappella JN. Does vaping in e-cigarette advertisements affect tobacco smoking urge, intentions, and perceptions in daily, intermittent, and former smokers? *Health Commun*. 2016;31(1):129-138. doi:10.1080/10410236.2014.993496.
 33. Lee AS, Hart JL, Sears CG, Walker KL, Siu A, Smith C. A picture is worth a thousand words: Electronic cigarette content on Instagram and Pinterest. *Tob Prev Cessat*. 2017;3. doi:10.18332/tpc/74709.
 34. Willis E, Haught MJ, Morris DL II. Up in vapor: Exploring the health messages of e-cigarette advertisements. *Health Commun*. 2017;32(3):372-380. doi:10.1080/10410236.2016.1138388.
 35. Collins L, Glasser AM, Abudayyeh H, Pearson JL, Villanti AC. E-cigarette marketing and communication: how e-cigarette companies market e-cigarettes and the public engages with e-cigarette information. *Nicotine Tob Res*. 2019;21(1):14-24.
 36. Ab Rahman J, Mohd Yusoff MF, Nik Mohamed MH, Mahadir Naidu B, Lim KH, Tee GH, Mohamad MS, Kartiwi M, Draman S, Ab Rahman NS, Aris T. The Prevalence of E-Cigarette Use Among Adults in Malaysia. *Asia Pac J Public Health*. 2019 Oct;31(7_suppl):9S-21S. doi: 10.1177/1010539519834735. Epub 2019 Mar 17. PMID: 30880403.
 37. Smoking and tobacco use, key terms and definitions. Centers for Disease Control and Prevention Web Site. https://www.cdc.gov/tobacco/basic_information/tobacco_industry/reporting/terms/index.htm. Updated April 23, 2020. Accessed January 19, 2021.
 38. Heatherton TF, Kozlowski LT, Frecker RC, Fagerstrom KO. The Fagerstrom test for nicotine dependence: A revision of the Fagerstrom tolerance questionnaire. *Br J Addict*. 1991;86:1119-1127.
 39. van der Tempel J, Noormohamed A, Schwartz R, Norman C, Malas M, Zawertailo L. Vape, quit, tweet? Electronic cigarettes and smoking cessation on Twitter. *Int J Environ Res Public Health*. 2016;61(2):249-256. doi:10.1007/s00038-016-0791-2.
 40. Kwon M, Park E. Perceptions and sentiments about electronic cigarettes on social media platforms: Systematic review. *JMIR Public Health Surveill*. 2020;6(1):e13673.
 41. Krishen AS, Hu HF, Spivak AL, Venger O. The danger of flavor: E-cigarettes, social media, and the interplay of generations. *J Bus Res*. 2021;132:884-896.
 42. Vogel EA, Ramo DE, Rubinstein ML, et al. Effects of social media on adolescents' willingness and intention to use e-cigarettes: An experimental investigation. *Nicotine Tob Res*. 2021; 23(4):694-701.
 43. Malaysian Communications and Multimedia Commission. Internet users survey 2018: Statistical brief number twenty-three. Published 2018. <https://www.mcmc.gov.my/skmmgovmy/media/General/pdf/Internet-Users-Survey-2018.pdf> <https://www.mcmc.gov.my/skmmgovmy/media/General/pdf/Internet-Users-Survey-2018.pdf>. Accessed January 19, 2021
 44. Alpert JM, Chen H, Adams KA. E-cigarettes and social media: Attitudes and perceptions of young adults to social media messages. *Addiction Res Theor*. 2020;28(5):387-396.
 45. Fadus MC, Smith TT, Squeglia LM. The rise of e-cigarettes, pod mod devices, and JUUL among youth: Factors influencing use, health implications, and downstream effects. *Drug Alcohol Depend*. 2019;201:85-93.
 46. Jankowski M, Krzystanek M, Zejda JE, et al. E-cigarettes are more addictive than traditional cigarettes—a study in highly educated young people. *Int J Environ Res Publ Health*. 2019; 16(13):2279.
 47. Sherratt FC, Newson L, Marcus MW, Field JK, Robinson J. Perceptions towards electronic cigarettes for smoking cessation among Stop Smoking Service users. *Br J Health Psychol*. 2016; 21(2):421-433. doi:10.1111/bjhp.12177.
 48. McKeganey N, Dickson T. Why don't more smokers switch to using e-cigarettes: The views of confirmed smokers. *Int J Environ Res Public Health*. 2017;14(6):647. doi:10.3390/ijerph14060647.
 49. Biener L, Hargraves JL. A longitudinal study of electronic cigarette use among a population-based sample of adult

- smokers: Association with smoking cessation and motivation to quit. *Nicotine Tob Res.* 2015;17(2):127-133. doi:10.1093/ntr/ntu200.
50. Simonavicius E, McNeill A, Amott D, Brose LS. What factors are associated with current smokers using or stopping e-cigarette use? *Drug Alcohol Depend.* 2017;173:139-143. doi:10.1016/j.drugalcdep.2017.01.002.
 51. Biener L, Song E, Sutfin EL, Spangler J, Wolfson M. Electronic cigarette trial and use among young adults: Reasons for trial and cessation of vaping. *Int J Environ Res Public Health.* 2015; 12(12):16019-16026.
 52. Pepper JK, Emery SL, Ribisl KM, Southwell BG, Brewer NT. Effects of advertisements on smokers' interest in trying e-cigarettes: The roles of product comparison and visual cues. *Tobac Control.* 2014;23(suppl 3):iii31-6.
 53. Levy DT, Cummings KM, Villanti AC, et al. A framework for evaluating the public health impact of e-cigarettes and other vaporized nicotine products. *Addiction.* 2017; 112(1):8-17.
 54. Delnevo CD, Giovenco DP, Steinberg MB, et al. Patterns of electronic cigarette use among adults in the United States. *Nicotine Tob Res.* 2016;18(5):715-719.
 55. Mantey DS, Cooper MR, Clendennen SL, Pasch KE, Perry CL. E-cigarette marketing exposure is associated with e-cigarette use among US youth. *J Adolesc Health.* 2016; 58(6):686-690.
 56. Al-Delaimy WK, Myers MG, Leas EC, Strong DR, Hofstetter CR. E-cigarette use in the past and quitting behavior in the future: A population-based study. *Am J Publ Health.* 2015; 105(6):1213-1219.