RESEARCH ARTICLE

Is Exposure to Social Media Advertising and Promotion Associated with E-cigarette Use? Evidence from Indonesia

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Abstract

Background: E-cigarette use is a growing public health concern globally, including in Indonesia. **Objective:** Our study aimed to assess whether exposure to advertising and promotion in social media is associated with e-cigarette use in Indonesia, an upper-middle-income country. **Methods:** We conducted mixed-method research including quantitative and qualitative methods. For the quantitative methods, we did an online survey in the five largest cities in the country with 1,239 participants during September-October 2020. For the qualitative method, we conducted an in-person focused group discussion during November 2020 (while complying to the COVID-19 protocols). **Results:** We found high rates of e-cigarette ever use (29%) and current use (13%) among study participants. There was high exposure to e-cigarette advertising and promotion in social media, with a majority of participants (84%) reported ever seeing e-cigarette adverts or promotions on Facebook, Instagram, YouTube, and others. Both high rates of e-cigarette use and exposure to social media advertising are associated. Participants reported ever seeing adverts and promotions were 2.91 times and 2.82 times more likely ever to use and currently use e-cigarettes, respectively, after controlling for socioeconomic factors, region, and cigarette smoking status. **Conclusion:** Exposure to social media advertising and promotion is associated with e-cigarette use in Indonesia.

Keywords: Social media- advertising-promotion- e-cigarette- Indonesia

Introduction

Electronic cigarettes (e-cigarettes) come in many different shapes and sizes and are known by many other names such as e-cigs, e-hookahs, vapes, vape pens, tank systems, or mods (National Institute for Health, 2021). E-cigarettes are a growing public health concern globally, including in Indonesia where comprehensive tobacco control is lacking (Kusuma et al., 2019; Wahidin et al., 2020; Wahyuti et al., 2019; Nurjanah et al., 2020; Handayani et al., 2021). In 2011, the Global Adult Tobacco Survey, the latest available national data, showed that the current use of e-cigarette among 15+ years was 2.5% (MOH 2011). In 2019, a survey of university students aged 16-24 years in Yogyakarta showed 10.7% were current e-cigarette users (Kristina et al., 2020). Other surveys among high school students in Jakarta showed that up to 32.2% of participants reported ever used and 11.8% currently used e-cigarettes (Bigwanto et al., 2019; Fauzi and Areesantichai, 2020).

The sale and advertising between conventional cigarettes and e-cigarettes are different. In Indonesia, while conventional cigarettes are sold in stores and kiosks (Ministry of Health, 2011), most e-cigarettes are sold online and through vape shops (Orlan et al., 2020). Moreover, while conventional cigarettes are advertised and promoted through various media (e.g. television, radio, outdoor billboard, and the internet), e-cigarettes are advertised and promoted mainly through social media such as Facebook, Instagram, and YouTube (Fauzi, 2019). In June 2019, the Minister of Health sent a letter to the Minister of Communication and Information requesting to block advertisements of cigarettes on the internet. The latter then gave a direction to crawl or search online and found at least 114 channels on Facebook, Instagram, and YouTube with cigarette advertisements. However, not much progress has been made on regulating cigarette advertising and promotion within online media by sellers and social media influencers.

Previous studies have shown that social factors such as social interactions, social norms, endorsement by celebrities, friends, or social groups are significantly associated with e-cigarette use (Amin et al., 2020). A recent systematic review of 43 studies found that exposure to advertising increased intentions to use e-cigarettes. The review also found evidence of the influence of social

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interactions and social norms could increase e-cigarette use among smokers and nonsmokers (Amin et al., 2020). Another systematic review included 21 articles and found that although perceptions on e-cigarettes among social media users were mixed, more positive sentiments were expressed than negative ones (Kwon and Park, 2020). Moreover, a study conducted a thematic analysis of how exposure to e-cigarettes on social media might influence attitudes and perceptions towards e-cigs among young adults. It found three primary themes, including that social media normalizes e-cigarettes, visual appeals (e.g. aspirational lifestyles and appealing flavor) are influential, and constantly seeing e-cigarette related messages on social media may encourage trial (Alpert et al., 2020). However, all of these studies are from high-income countries, including the United States, United Kingdom, and New Zealand. Evidence from low- and middle-income countries is lacking. Thus, our study aims to assess whether exposure to advertising and promotion in social media is associated with e-cigarette use in Indonesia, an upper-middle-income country.

Materials and Methods

This is a mixed-method study, including quantitative and qualitative methods. For the qualitative method, data collection was through an online survey using Google form during September-October 2020. We targeted the country's five biggest cities (in terms of population size) including Bandung, Jakarta, Semarang, Surabaya, and Yogyakarta. For sample calculation, we used a recent study that found 17.7% of students in Jakarta reported ever having used e-cigarettes (Fauzi and Areesantichai, 2020) and 5% margin of error, resulting in a minimum sample of 224 per city, or 1120 in total. The inclusion criteria included male/female, at least 15 years old, cigarette smokers and non-smoker, and willing to participate. A trained research assistant led data collection in each region or five researchers in total.

For the qualitative method, we conducted in-person focused group discussion (FGD) during November 2020, while complying with the COVID-10 protocol. Data collection was approximately two hours and was conducted with nine e-cigarette users aged 15-34 years. The age group was selected based on the highest number of respondents in our quantitative results (~80% of all survey participants). The discussion was conducted in Semarang city, where the main research team is based. Data collection was led by three trained facilitators.

For the quantitative data analysis, we employed multivariate logistic regression. Two primary outcome variables included e-cigarette ever use and current use. Our main independent variable is exposure to e-cigarette advertising and promotion in social media, including Facebook, Instagram, and YouTube. An e-cigarette display was classified as advertising and promotion if they clearly disclose in videos or images selling e-cigarettes or receiving remuneration from an e-cigarette company or if they provide a coupon link on the company's website (Hua et al., 2013). There are four main independent variables: (a) answering yes/no to whether one has ever

seen e-cigarette advert and promotion in social media; (b) how often seeing e-cigarette advert and promotion (i.e. never, few a year, few a month, and few a week or almost daily); (c) how long the duration of typical e-cigarette advert and promotion (i.e. 1 minute or less, 1-5 minutes, and more than 5 minutes); and (d) who did the advertising and promotion (i.e. regular people, celebrity or social media influencer, e-cigarette seller, and public figure or politician – allowing multiple answers). Control variables included sex, age, education level, occupation, income level, region, and current cigarette smoking. All analyses were conducted in STATA 15. For the qualitative analysis, we employed thematic analyses.

Ethical approval was provided by the health ethics committee of the Faculty of Public Health, Universitas Muhammadiyah Semarang, Semarang, Indonesia (No: 410/KEPK-FKM/UNIMUS/2020).

Results

In terms of descriptive statistics of our study participants, we included in Table 1 sample characteristics (panel a) and e-cigarette use (panel b). We analyzed a total of 1,239 individuals, including 51% males and 49% females. Fifty-seven percent were 15–24 years old (youth), and 44% were 25-34 (young adults) and 35+ years (adults). In terms of education level, 49% had completed primary or high schools and 50% had completed diploma, undergraduate, or postgraduate. There were 44% who were students and 23% worked as employees with the government and private companies. Almost half (47%) of participants had a monthly income level less than IDR 1 million (~ USD 68) and 25% while 40% had an income level between IDR 1-5 million. By region, the proportions of participants in each of the five study regions were similar of 19-21%. Among the participants, 18% were currently smoking cigarettes and 82% were not. In terms of e-cigarette use, 29% of participants reported ever use e-cigarettes and 13% currently use e-cigarettes.

Also, we provided descriptive statistics of the exposure to e-cigarette advertising and promotion in social media among study participants in Table 2. A majority of participants (84%) reported ever seeing e-cigarette advert or promotions on social media including Facebook, Instagram, and YouTube. In terms of the frequency in seeing the advert and promotions, 30% of participants reported very often (i.e. seeing a few a week to almost daily), 38% reported seeing a few in a month, and 19% reported seeing a few in a year. In terms of the duration of typical adverts or promotion, 49% of participants reported a duration of 1 minute or less, 37% reported 1-5 minutes, and 14% reported 5 minutes and more. In terms of advertisers or promoters, 50% of participants reported regular people, 49% celebrity or social media influencer, 41% e-cigarette seller, and 7% public figure or politicians.

Moreover, we provided the associations between exposure to social media advertising and promotion and e-cigarette ever/current use in Table 3. In panel a, results show that ever seeing e-cigarette advert and promotions on social media was significantly associated with e-cigarette use. Participants that reported ever seeing advert and

promotion were 2.91 times and 2.82 times more likely to ever use and currently use e-cigarettes, respectively. In panel b, results show that a higher frequency of exposure to social media advertising and promotion was associated with e-cigarette use. Compared to never seeing, participants that reported seeing a few per month (often) were 3.41 times and 4.13 times more likely to ever use and currently use e-cigarettes, respectively. Moreover, participants seeing a few per week to almost daily (very often) were 6.79 times and 13.82 times more likely to ever use and currently use e-cigarettes, respectively. All these estimates were significant at a 5% level and have controlled for socioeconomic factors, region, and cigarette smoking status.

Furthermore, in panel c, results show that the duration of advert and promotion seen on social media was significantly associated with e-cigarette use. Compared to seeing adverts and promotions for 1 minute or less,

participants seeing for 5+ minutes were 1.84 times and 2.69 times more likely to ever use and currently use e-cigarettes, respectively. In terms of who did the advertising and promotion, in panels d-g, results show that participants who reported advert and promotions by celebrities or social media influencers were 2.30 times and 2.32 times more likely to ever use and currently use e-cigarettes, respectively, compared to otherwise. Also, those who reported advert and promotions by e-cigarette public figures or politicians were 2.42 times and 1.90 times more likely to ever use and currently use e-cigarettes, respectively, compared to otherwise.

We also provided the predicted probability of e-cigarette use by socioeconomic, region, and smoking status in Figure 1. By sex, e-cigarette ever use and current use among males were 4.3 times (46.9% vs. 11%) and 4.9 times (21.2% vs. 4.3%) higher than among females, respectively. By age, e-cigarette ever use and
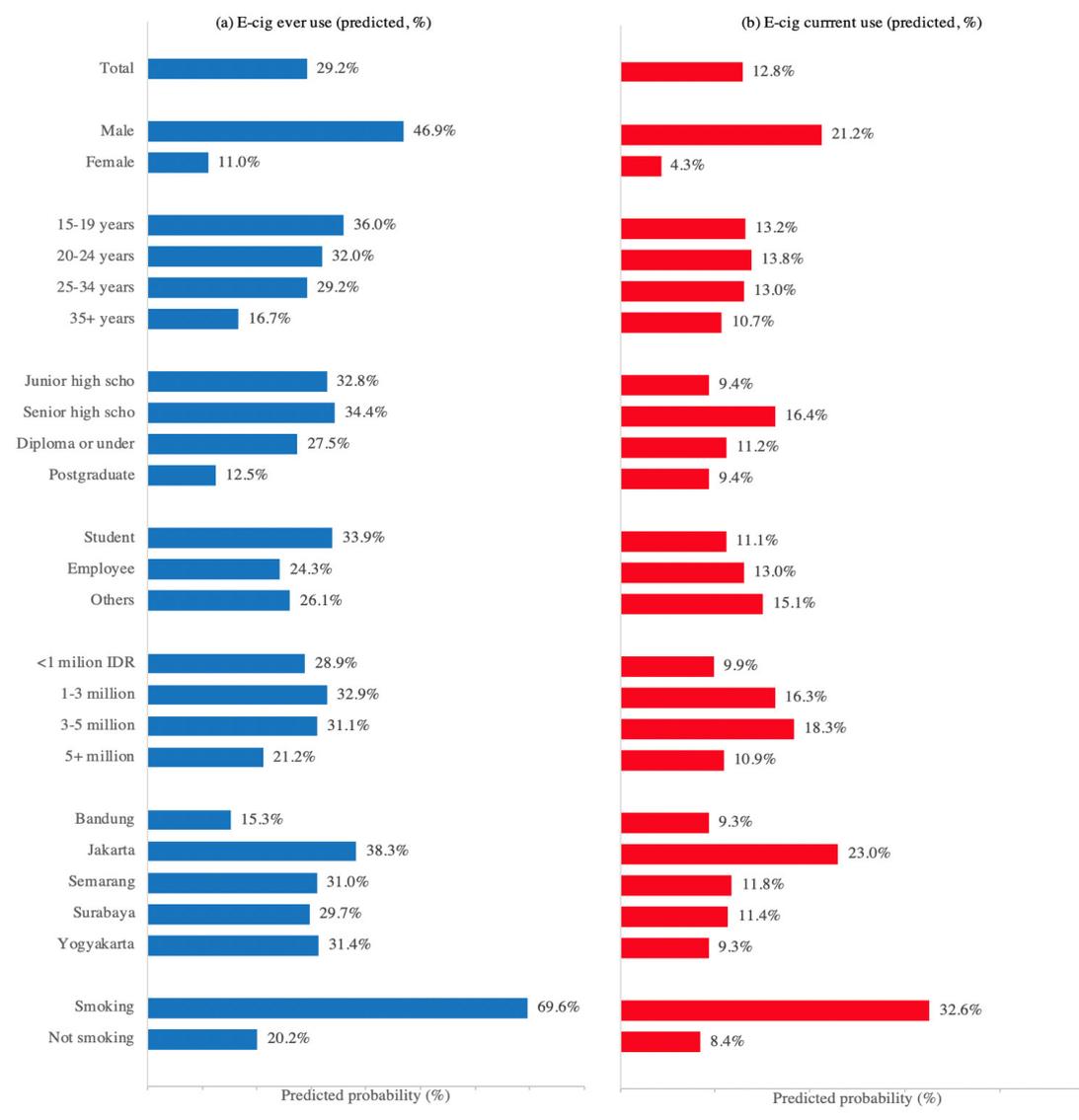
Note: The values are predicted probabilities of e-cigarette use. We first regressed (logit) e-cig use on socieconomic indicators and smoking status (as used in Table 3). We then used -predict- command in STATA 15 and calculated the average of predicted values by each indicator.

Figure 1. Predicted Probability of e-Cigarette Ever Use and Current Use by Socioeconomic

Table 1. Descriptive Statistics of Study Participants

	n	%
(a) Sample characteristics		
Sex		
Male	628	51%
Female	611	49%
Age		
15-19 years	306	25%
20-24 years	391	32%
25-34 years	285	23%
35+ years	257	21%
Education		
Junior high school or below	130	10%
Senior high school	486	39%
Diploma or undergraduate	494	40%
Postgraduate	129	10%
Occupation		
Student	549	44%
Employee	286	23%
Others	404	33%
Income		
<1 milion IDR	580	47%
1-3 million	312	25%
3-5 million	180	15%
5+ million	167	13%
Region		
Bandung	239	19%
Jakarta	238	19%
Semarang	257	21%
Surabaya	247	20%
Yogyakarta	258	21%
Current cigarette smoking		
Yes	225	18%
No	1013	82%
(b) E-cigarette use		
Ever use e-cigarette		
Yes	361	29%
No	877	71%
Current use e-cigarette		
Yes	159	13%
No	1079	87%
N	1239	

Note: N, sample; %, proportion. For occupation; students include school and university; employees include private companies, civil servants, and entrepreneurs; others include casual workers and unemployed. For education, school includes completed primary and high schools; university includes completed undergraduate and graduate degrees. There was one missing value for education. Minimum monthly wages ranged from IDR 2,000,000 in Yogyakarta city to 4,300,000 in Jakarta in 2019/2020.

current use were highest among 15-19 years (36% and 32%, respectively) and 20-24 years (13.2% and 13.8%, respectively). By education, e-cigarette ever use was

Table 2. Exposure to Social Media Advertising on e-Cigarette

	n	%
Ever see e-cig advert in social media		
Yes	1034	84%
No	196	16%
How often see (frequency)		
Never	152	12%
Few a year	239	19%
Few a month	467	38%
Few a week or almost daily	372	30%
Duration		
1 minute or less	558	49%
1-5 minutes	428	37%
5+ minutes	159	14%
Advertiser: Regular people		
Yes	620	50%
No	610	50%
Advertiser: Celebrity/influencer		
Yes	607	49%
No	623	51%
Advertiser: Seller		
Yes	505	41%
No	725	59%
Advertiser: Public figure/politician		
Yes	90	7%
No	1140	93%
N	1239	

For duration, there were 94 missing values; for other variables 9 missing values; Advertiser variables are provided separately because the question of who advertised could have multiple answers.

highest among participants who completed primary school and junior high schools (32%.8%) while current use was highest among those completed senior high school (16.4%). By occupation, students had the highest rates of ever use e-cigarette (33.9%) but had relatively lower rates of current use (11.1%). By monthly income, those in the middle-income category (1-3 and 3-5 million IDR) had the highest rates of ever use (32.9% and 31.1%, respectively) and current use (16.3% and 18.3%, respectively) of e-cigarettes. By region, participants from Jakarta had the highest rates of e-cigarette ever use and current use (38.3% and 23%, respectively). Moreover, Bandung had the lowest rates of ever use (15.3%) while Bandung and Yogyakarta had the lowest rates of current use (9.3%). Lastly, by smoking status, e-cigarette ever use and current use among cigarette smokers were 3.4 times (69.6% vs. 20.2%) and 3.9 times (32.6% vs. 8.4%) higher than among non-smokers, respectively.

Our thematic analysis from the focus group discussion shows that almost all informants knew e-cigarettes for the first time at senior high schools out of curiosity and intention to try. Also, informants reported getting information on products and buying e-cigarettes on social media, including one informant who was a seller

Table 3. Associations between Exposure to Social Media Advertising/Promotion and e-Cigarette Use

	E-cig ever use OR (SE)		E-cig current use OR (SE)	
(a) Ever see e-cig advert in social media			N=1230	
No	Ref		Ref	
Yes	2.91**	(0.76)	2.82**	(1.01)
(b) How often seeing advert (frequency)			N=1230	
Never	Ref		Ref	
Few a year	2.16**	(0.78)	2.05	(1.24)
Few a month	3.41**	(1.13)	4.13**	(2.27)
Few a week or almost daily	6.79**	(2.24)	13.82**	(7.47)
(c) Duration of advert			N=1145	
1 minute or less	Ref		Ref	
1-5 minutes	1.13	(0.19)	1.29	(0.28)
5+ minutes	1.84**	(0.43)	2.69**	(0.70)
(d) Advertiser: Regular people			N=1230	
No	Ref		Ref	
Yes	0.97	(0.15)	0.60**	(0.12)
(e) Advertiser: Celebrity/influencer			N=1230	
No	Ref		Ref	
Yes	2.30**	(0.37)	2.32**	(0.47)
(f) Advertiser: Seller			N=1230	
No	Ref		Ref	
Yes	1.69**	(0.26)	1.69**	(0.32)
(g) Advertiser: Public figure/politician			N=1230	
No	Ref		Ref	
Yes	2.42**	(0.67)	1.90**	(0.60)

N, sample; Ref, Reference; OR, Odds Ratio; SE, Standard Error; Values are from logit regression of the outcome variables (i.e. e-cigarette ever use and current use) on advertising exposure, controlling for age, sex, education, income, occupation, and smoking status. Analyses were conducted in STATA 15.

of cigarettes using social media platforms. In terms of reasons to use, almost all informants perceived that e-cigarettes are less harmful than conventional cigarettes, mainly from social media sources such as produce reviews on YouTube. Also, many informants expressed that using an e-cigarette is more trendy and 'cooler', especially from using more expensive e-cigarette devices. Also, female participants expressed additional reasons that using e-cigarettes was perceived as cleaner, no residue, better smell, and can learn vaping tricks. Lastly, informants perceived that, unlike conventional cigarettes, e-cigarettes are not addictive, and users can choose the nicotine level.

Discussion

We found high rates of e-cigarette ever use (29%) and current use (13%) among our study participants in the five largest cities in Indonesia. This aligns with previous studies showing 32.2% of high school students reported ever used and 11.8% currently used e-cigarettes in Jakarta, and 10.7% of university students currently use e-cigarettes in Yogyakarta (Bigwanto et al., 2019; Fauzi and Areesantichai, 2020; Kristina et al., 2020). While comparable to 20.4% of e-cigarette users among university

students in Malaysia (Ezat et al., 2018), this finding is relatively higher than overall 3.2% and 4.5% current user of e-cigarettes among adults in Malaysia and the United States, respectively (Ab Rahman et al., 2018; Mirbolouk et al., 2018). This may be because 80% of our sample are youth or young adults of 15-34 years old, which have been shown to have the highest rates of e-cigarette use (Ab Rahman et al., 2018; Mirbolouk et al., 2018).

We also found high exposure to e-cigarette advertising and promotion on social media. A majority of participants (84%) reported ever seeing e-cigarette advert or promotions on Facebook, Instagram, YouTube, and others. Also, 68% of participants reported seeing a few in a week or a month, with 51% of participants reported seeing adverts and promotions with a longer duration of 1 minute or more. Both high rates of e-cigarette use and exposure to social media advertising are associated, as shown in our multivariate regression results. Participants reported ever seeing advert and promotion were 2.91 times and 2.82 times more likely to ever use and currently use e-cigarettes, respectively, after controlling for socioeconomic factors, region, and cigarette smoking status. This finding aligns with previous studies showing that social factors and media are associated with e-cigarette use (Amin et al., 2020). A study in the United States randomized a sample of young adults to advert exposure or control and found that exposure to the advert was associated with trying e-cigarette among never users of e-cig and cigarettes (AOR=2.85) (Villanti et al., 2016). Another study of young adult non-smokers who had never used an e-cigarette found that those exposed to social media advert had 2.8 times higher odds of being open to using an e-cigarette in the future (Villanti et al., 2016).

Moreover, our findings from the qualitative component show that many informants obtained information and bought e-cigarettes on social media platforms. Reasons for using e-cigarettes include perception of less harmfulness, trendier and 'cooler' looking, cleaner and better smell, and less addictive compared to conventional cigarettes. These findings align with previous studies. Recent qualitative research in the United States aimed to understand how exposure to e-cigarettes on social media might influence attitudes and perceptions towards e-cigs among young adults. It found three primary themes, including that social media normalizes e-cigarettes, visual appeals (e.g. aspirational lifestyles and appealing flavor) are influential, and constantly seeing e-cigarette related messages on social media may encourage trial (Alpert et al., 2020). Another study among young people in the United Kingdom showed that social media sources (e.g. Facebook, Twitter, and YouTube) were commonly mentioned as influencing opinions on e-cigarette, alongside the Internet and family and friends. Also, "Fitting in" and "looking cool" were mentioned as explanations for the appeal of e-cigarettes (Villanti et al., 2016).

For policy, our findings support introducing a national regulation to ban the advertisement and promotion of e-cigarettes on all social media platforms in Indonesia and other countries that have not done so (Ministry of Health, 2011). Globally, the borderless nature of social media presents a clear challenge for enforcing Article 13

of the World Health Organization Framework Convention on Tobacco Control, which requires all ratifying nations to implement a ban on tobacco advertising, promotion, and sponsorship. All countries, including Indonesia, need to tackle this public health challenge by collaboratively and effectively counter the advertising and promotion of cigarette and e-cigarette products in all media, especially social media, which are primarily used by young people (Villanti et al., 2016).

Our study has at least two limitations. First, by including only the five largest cities in Indonesia in our sample, our study is not representative of the rural areas in the country with different patterns of social media exposure, and e-cigarettes use. Second, 80% of our sample were from the young age of 15-34, which may limit the generalization on the impact of social media use in other age groups, particularly younger group of 10-15 years old that among the main users of social media.

Author Contribution Statement

ARW, NN, ABA conceived the study. ARW, NN, APA conducted data collection. WRW and DK analyzed the data and drafted the manuscript. NN, APA, and ABA provided inputs to the manuscript. All authors approved the final version.

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