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Assessing the Association between E-Cigarette Use and Exposure to Social Media in College Students: A Cross-Sectional Study

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Abstract

Background: Social media platforms provide an indirect medium for encouraging e-cigarette use between individuals and also serve as a direct marketing tool from e-cigarette brands to potential users. E-cigarette users share information via social media that often contains product details or health-related claims.

Objective: Determine whether e-cigarette use is associated with exposure to e-cigarettes on social media in college students.

Methods: Data from a sample of 258 college students was obtained via a clicker-response questionnaire (90% response rate). Demographic, lifetime and current e-cigarette/cigarette use, and e-cigarette exposure via social media (peer posts or advertisements) were examined. Logistic regression was used to assess the relationship between lifetime and current e-cigarette use and viewing peer posts or advertisements on social media while adjusting for cigarette use and self-posting about e-cigarettes.

Results: Overall, 46% of participants reported lifetime e-cigarette use, 16% current e-cigarette use, and 7% were current dual users of e-cigarettes and cigarettes. There were positive and significant associations between lifetime e-cigarette use and viewing peer posts (aOR=3.11; 95% CI =1.25–7.76) as well as advertisements (aOR=3.01; 95% CI =1.19–7.65) on e-cigarettes via social media after adjusting for cigarette use. Current e-cigarette use was only significantly associated with viewing peer posts via social media (aOR=7.58; 95% CI =1.66–34.6) after adjusting for cigarette use.

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Conflicts of Interest

The authors report no conflicts of interest.

Conclusions/Importance: Almost half of college students view peer posts and advertisements on e-cigarettes via social media. This exposure is associated with individual e-cigarette use. Continued efforts to examine online e-cigarette content are needed to help future interventions decrease e-cigarette use.

Keywords

Electronic Cigarettes; Social Media; College Students

Introduction

Electronic cigarettes (e-cigarettes) are the fastest growing form of tobacco use among all age groups in the United States (US) (U.S. Department of Health and Human Services, 2014). Estimates of current e-cigarette use among young adults ages 18–24 range from 5–10% in the last 30 days (Johnston, O'Malley, Bachman, Schulenberg, & Miech, 2016; Schoenborn & Gindi, 2015) with 21–28% of young adults reporting usage at least once in their lifetime (Kenne, Mix, Banks, & Fischbein, 2016; Schoenborn & Gindi, 2015). Due to rapid growth of promotion and marketing through media such as television and the internet (Duke et al., 2014; Richardson, Ganz, & Vallone, 2015; Singh et al., 2015), e-cigarette awareness has increased among all populations (King, Patel, Nguyen, & Dube, 2015). The internet has become a source of information for e-cigarettes on websites such as blogs/user forums and social media platforms (Yamin, Bitton, & Bates, 2010), particularly for young adults and youth. Surveillance of e-cigarette advertising on tracked websites reported that 27% of individuals accessing websites featuring e-cigarette marketing were under the age of 24 (Richardson et al., 2015), which could include college students.

Social media platforms such as Facebook, Twitter, and Instagram are common places to find advertisements, information, and content on e-cigarettes (Chu, Sidhu, & Valente, 2015; Kim et al., 2015; Link, Cawkwell, Shelley, & Sherman, 2015; Luo, Zheng, Zeng, & Leischow, 2014). Nearly 90% of young adults use at least one social media platform (Perrin, 2015). The average user age 18–34 reports two hours of use per day (comScore, 2015). Social media platforms are unlike other websites as they provide a unique environment where users interact socially with others by sharing content that is spread via their personal network. The type of network interaction varies by social media platform. For example, users on Facebook share status updates/posts, pictures that include commentary or share posts of others. On Twitter, users can interact in many of the same ways as Facebook, but must do so within a 140-character limit. Lastly, Instagram was created for sharing photos with commentary.

Many e-cigarette users engage in social media use to obtain information on products, which often has varying degrees of accurate information on products and health outcomes. Exposure to e-cigarette content via social media platforms may increase the likelihood of an individual using e-cigarettes through the dissemination and widespread uptake of information with questionable validity. A recent study reported that nearly 75% of adult e-cigarette users went online for information (Emery, Vera, Huang, & Szczypka, 2014). Furthermore, Link et al. (2015) reported that social media appears to be a common source for information on e-cigarettes as 23% used Facebook and 49% shared information on

Facebook (Link et al., 2015). User-generated content on social media platforms may consist of content created and shared by individuals or users can share industry-made brand advertisements. Specifically, e-cigarette users actively share their experiences and use through photographs, which has the potential to reinforce social acceptability of use (Link et al., 2015). Commentary on these platforms are often accompanied by hashtags such as “#ecigs” or “#vape” (Laestadius, Wahl, & Cho, 2016). However, brand-made content often misrepresents health effects or cessation potential of e-cigarettes (Huang, Kornfield, Szczypka, & Emery, 2014; Luo et al., 2014) and as such, there may be a knowledge gap regarding the health risks and benefits of e-cigarette use from information disseminated on social media platforms.

While there has been some research examining the effects of tobacco exposure to tobacco content on social media (Depue, Southwell, Betzner, & Walsh, 2015), no known study to date has examined the association between exposure to e-cigarette content via social media and e-cigarette use among college students. The aim of this study is to explore the extent to which a college student population is exposed to e-cigarettes on social media and to determine whether e-cigarette use is associated with social media exposure to e-cigarettes by examining frequency of viewing of posts of peers in their social network or viewing of advertisements about e-cigarettes.

Methods

For this study, Facebook, Twitter, and Instagram were selected as they are the most popular platforms (Greenwood, 2016), however just as social media content constantly changes, platforms also change as users may become more or less active, platforms gain or lose popularity, and new platforms are created. With social media’s ever expanding popularity, individuals often use multiple platforms, however this study was limited to only the selected three.

Data Collection

Surveys were administered by a single research team facilitator before non-tobacco related health lectures during two separate undergraduate psychology courses using audience-response clicker surveying. Administration of the facilitator-led survey was developed based on a previously established clicker-surveying protocol (LaBrie, Earleywine, Lamb, & Shelesky, 2006). Previous research examining substance use indicate that response clickers are a valid and reliable surveying method compared to paper/pencil surveys (LaBrie et al., 2006). On-screen response clickers have additional benefits including providing cost-effective assessments, allowing for easy administration, and producing relatively error-free data entry (LaBrie et al., 2006). Additionally, audience response systems such as the one used in this study, are known to enhance user attention and interest in the survey. However, few studies have examined how recall bias may be enhanced by this method (Miller, Ashar, & Getz, 2003).

Survey questions and responses were provided on-screen in a lecture-style format with results blinded to classroom attendees. A survey introduction screen was presented prior to survey administration where participants were told that they were not required to participate

and could opt out by not activating their clicker or answering questions. Additionally, participants were asked not to participate if they were younger than age 18.

Prior to data collection, the survey was pilot tested in two different undergraduate courses to determine the usability of the clicker response system and timing of questions. During survey administration, for each question, the facilitator waited two minutes or until the facilitator screen indicated that all respondents completed the question prior to proceeding to the next question. When two minutes expired, the facilitator informed respondents that they had an additional minute to answer before the group would proceed to the next question. Participants who did not respond during this time did not have their responses recorded for a particular item.

Each response-clicker has a unique identifier that respondents could activate at any point during the questionnaire. Additionally, respondents could stop answering questions at any point. As an example, a student may have arrived late to class and was not present to answer the first 3 questions of the survey. Similarly, a student may not have had responses collected if they left early from class. This may have resulted in missing responses at the beginning or end of the survey for individuals who did not want to participate. Institutional Review Board approval was obtained from Virginia Commonwealth University.

Measures

Demographics—To assess demographics, questions were adapted from the National College Health Assessment II (NCHA II) (American College Health Association, 2014). The NCHA II is a national survey provided to colleges and universities for the purposes of examining health and other outcomes of college populations (American College Health Association, 2012). Gender, race/ethnicity, and age were assessed by asking: *What is your sex (responses: Male or Female); What best describes you (responses: White, Black or African American, Hispanic or Latino, Asian or Pacific Islander, or Other); How old are you? (responses: 17 or younger, 18, 19, 20, 21, 22, 23, 24, or 25 or older).*

Self-Reported Electronic Cigarette/Cigarette Use—E-cigarette use was measured using items adapted from the National College Health Assessment II (NCHA II) (American College Health Association, 2014). Self-reported e-cigarette use was assessed by asking: *In the last 30 days, how many days did YOU use an e-cigarette/vapepen/e-hookah?* Self-reported cigarette use was assessed by asking: *In the last 30 days, how many days did YOU smoke a cigarette?* Responses for both cigarette and e-cigarette use were: *Never used; Have used once, but not in past 30 days; 1–2 days; 3–5 days; 6–9 days; 10–19 days; 20–29 days; All 30 days.* These items were recoded to produce lifetime and current use measures of e-cigarette and cigarette smoking. Lifetime use was defined as any use during the respondent's lifetime and included any use in the last 30 days. Current use was defined as any use only during the last 30 days. Current and lifetime use were measured as binary variables.

Social Media and Electronic Cigarette Use—Social media exposure related to e-cigarettes was measured by adapting The Facebook Alcohol Questionnaire (FAQ). The FAQ assesses alcohol-related posts on Facebook and consists of ten-items that measures an individual's level of posting regarding alcohol use as well as exposure to alcohol content

through frequency of Facebook friend posts on alcohol-related content (Cronbach's $\alpha = 0.79$) (Westgate, Neighbors, Heppner, Jahn, & Lindgren, 2014). Research and validated surveys/questions examining social media use related to any form of substance use is currently highly limited, thus we chose to model select questions based on the FAQ as it provided the most valid language to assess electronic cigarette or substance use on any social media platform within a specified time period. While components of FAQ questions are specific to Facebook, this study did not create or validate questions relating to social media use or e-cigarettes. The questions that were selected and adapted for this study, were reframed to be applicable to other social media platforms. The FAQ also asked specific questions regarding multiple actions on Facebook, however this study was interested in any use of social media and thus the entire measure was not used. The modeled question created for this study examine any use of Facebook, Twitter, or Instagram in relation to e-cigarettes, which includes status updates, comments, and pictures.

Social media use related to e-cigarettes was assessed three ways: self-posting about e-cigarettes, viewing peer posts about e-cigarettes, and viewing advertisements about e-cigarettes. Details regarding exposure to e-cigarette social media posting as well as individual posting behaviors were assessed as: 1) *In the past 6 months, how often did you post or mention e-cigarettes on (insert platform)?* 2) *In the past 6 months, how often did a friend post or mention e-cigarettes on (insert platform)?* 3) *In the past 6 months, how often did you see advertisements about e-cigs on (insert platform)?* Responses for the questions included: *Daily; Weekly; Every few weeks; Monthly; I never have.*

Exposure to e-cigarettes via social media was initially measured using all three questions (self-posting, peer posting, and advertisements). However, self-posting in this context does not qualify as an exposure as an individual who is self-posting about e-cigarettes most likely is also a user. Therefore, social media exposure in this study focused on viewing peer posts or advertisements.

Statistical Analysis

This study examined the relationship between exposure to e-cigarettes via social media and current, as well as lifetime e-cigarette use using logistic regression. Three sets of models assessed the relationship between social media platforms (i.e., Facebook, Twitter, or Instagram) and individual e-cigarette use measured as lifetime e-cigarette use and current e-cigarette use in the last 30 days. All covariates were assessed for interaction and confounding was evaluated using a 10% change-in-effect between baseline bivariate models and models that added a single covariate. No covariates demonstrated interaction effects. Age, race, gender, self-posting about e-cigarettes on social media in the last six months, and (current or lifetime) cigarette use were included in additional models as confounders. Age, race, and gender are traditional confounders for tobacco use. To examine models with the confounders, three sets of "adjusted models were assessed. In the first adjusted model, age, race, and gender were added. In the second adjusted models, cigarette use was added along with age, race, and gender. Finally, in the third adjusted models self-posting about e-cigarettes was added along with cigarette use, age, race, and gender. Lifetime e-cigarette use

was adjusted for lifetime cigarette use whereas current e-cigarette use was adjusted for current cigarette use

Conceptually, individuals who are tobacco or e-cigarettes users could be more likely to have a peer social media network of tobacco or e-cigarettes users. Additionally, individuals who have previously posted about e-cigarettes on social media platforms are more than likely e-cigarette users and have peers who also post about e-cigarettes. In order to examine the relationship between viewing peer posts or advertisements and e-cigarette use, controlling for these individuals is important to the relationship.

Three sets of models were then tested to assess relationships between exposure to e-cigarette use via social media and lifetime as well as current e-cigarette use. The first set of models (baseline) testing the relationship did not control for any covariates. The second set of models controlled only for age, race, and gender. The third set of models controlled for cigarette use and self-posting about e-cigarettes, in addition to age, race, and gender. SAS version 9.4 (SAS Institute Inc., Cary, NC, USA) was used for all analyses.

Results

Study Population

Among those who activated their clicker (N=288), only 42% answered all survey questions. We examined the data for patterns of missing responses. Nearly 75% of respondents had less than two missing items and among those who had more than two missing items, most of these responses were either at the beginning or end of the survey, indicating that responders either joined the survey late or left early. Respondents who answered less than half of the survey (10 out of 20 questions) or did not provide responses to age, race, and sex collectively were not included in the final analyses (n=30) (final sample size N=258). Thus, based on this rule, the overall survey response rate was 90%.

Among 258 undergraduate participants, 67% of respondents were female, 49% identified as white (non-Hispanic), 21% as black (non-Hispanic), 12% as Hispanic, and 16% as Asian. Lastly, 59% of the participants were between the ages of 18–20, 33% between ages 21–24, and 8% age 25 or older (Table 1).

E-cigarette and Cigarette Use

Of the 258 respondents, 46% reported lifetime use of e-cigarettes and 16% of participants were current e-cigarette users who used in the last 30 days (Table 1). Further, 39% reported lifetime use of cigarettes, while 18% of participants were current cigarette users within the last 30 days. Nearly 7% of respondents reported use of both e-cigarettes and cigarettes in the last 30 days and 25% reported lifetime use of both e-cigarettes and cigarettes. Approximately 4% of users reported lifetime cigarette use and current e-cigarette use; 7% of participants indicated lifetime e-cigarette and current cigarette use. Lastly, 12% of users reported only lifetime cigarette use whereas, 18% reported only lifetime e-cigarette use.

Social Media Use and E-cigarettes

Of all participants, 43% of participants report viewing a peer post about e-cigarettes through at least one social media platform in the last 6 months. Of these, 31% viewed posts on Facebook, 16% on Twitter, and 28% on Instagram. Almost half (48%) of participants viewed an advertisement about e-cigarettes in the last 6 months on at least one platform. Of these, 40% viewed advertisements on Facebook, 13% on Twitter, and 13% on Instagram in the last 6 months (% on each platform not mutually exclusive).

Of all participants, 10% reported any self-posting on social media using at least one platform. Of these participants 4% posted on Facebook, 3% on Twitter, and 3% on Instagram in the last 6 months (Table 1).

Unadjusted Bivariate Models

In baseline bivariate models, lifetime e-cigarette use was significantly associated with viewing peer posts (OR=3.94; 95% CI=1.94–8.00) and viewing advertisements (OR=4.00; 95% CI=1.94–8.14) on social media (Table 2). Current e-cigarette use (any use in the last 30 days) was significantly associated with viewing peer posts (OR=5.86; 95% CI=2.25–15.30) and viewing advertisements (OR=3.07; 95% CI=1.17–8.02) on social media.

Adjusted Models controlling for Age, Race, and Gender

After adjusting for age, race, and gender, lifetime e-cigarette use was significantly associated with viewing peer posts (aOR=3.51 [95% CI=1.60–7.70]) and viewing advertisements (aOR=3.90; 95% CI=1.76–8.63) on social media (Table 2). Adjusting for the same covariates, current e-cigarette use (last 30 days) use was significantly associated with viewing peer posts (aOR=5.12; 95% CI=1.78–15.16) and viewing advertisements (aOR=3.13; 95% CI=1.12–8.79) on social media. Lastly, within these models, we also tested e-cigarette use and self-posting about e-cigarettes via social media. These associations were found to be non-significant for current use (aOR = 4.17 95 % CI= 0.96–18.1) and lifetime use (aOR = 3.14 95 % CI= 0.59–16.9).

Adjusted Models Controlling for Age, Race, Gender, Self-posting, and Cigarette Use

In the third set of models adjusted for age, race, gender, and cigarette use, lifetime e-cigarette use remained significantly associated with viewing peer posts (aOR= 4.09; 95% CI=1.73–9.65) and viewing advertisements (aOR= 3.84; 95% CI=1.63–9.05). Adjusting for the same covariates, current e-cigarette use was significantly associated with viewing peer posts (aOR= 9.94; 95% CI=2.25–44.0), but not significant for viewing advertisements (aOR= 2.94; 95% CI=0.87–34.6).

In the final set of models adjusting for age, race, gender, cigarette use, and self-posting, lifetime e-cigarette use remained significantly associated with viewing peer posts (aOR= 3.11; 95% CI=1.25–7.76) and viewing advertisements (aOR= 3.01; 95% CI=1.63–9.05) on social media. However, while current e-cigarette use remained significantly associated with viewing peer posts (aOR= 7.58; 95% CI=1.66–34.62) after adjusting for self-posting and cigarette use, current e-cigarette use and viewing advertisements (aOR= 2.63; 95% CI=0.73–9.48) was not significantly associated.

Discussion

This study is the first to examine the relationship between social media exposure to e-cigarettes and individual e-cigarette use among college students. Overall, we found positive, significant relationships between viewing peer posts or advertisements on e-cigarettes via social media and e-cigarette use. Current and lifetime e-cigarette use was significantly associated with viewing peer posts or viewing advertisements about e-cigarettes on social media platforms prior to adjusting for cigarette use and self-posting about e-cigarettes. The significant relationship between viewing peer posts and advertisements about e-cigarettes via social media and e-cigarette use in unadjusted and adjusted models also suggests that exposure to content on social media could be an important risk factor for e-cigarette use in college populations. No known study to date has examined these relationships.

After adjustment, lifetime e-cigarette use was significantly associated with viewing peer posts and advertisements. However, the association for current e-cigarette use was only significantly associated with viewing peer posts. This suggests that current e-cigarettes may see something different on the social media networks or responding to questions differently than lifetime users. Due to the cross-sectional nature of this study and the questions that were assessed, this cannot be determined. No known study to date has examined this relationship. The difference in the association between current and lifetime e-cigarette use and viewing advertisements social media use is an interesting finding. The association between current e-cigarette users and viewing advertisements on social media was significant in the models until controlling for cigarette use and self-posting about e-cigarettes. Possible explanations for this could be that around half of current e-cigarette users were also current cigarette users or that current e-cigarette and cigarette users may be less receptive to advertising or report/recall something different than non-cigarette e-cigarette users.

There was a non-significant relationship between self-posting about e-cigarettes and self-reported current e-cigarette use in this study. This finding was interesting as an individual's current e-cigarette use may lead to posting more content. Consequently, models assessing the relationship between exposure to e-cigarettes via social media and lifetime as well as current e-cigarette use adjusted for the influence of self-posting as it changed adjusted and unadjusted models by more than 10%. Less than 10% of participants report self-posting about e-cigarettes on any social media platform, however of these 10% (n=15), 4 users who reported self-posting were current and ever non-users. Additional study is needed to understand the behaviors of self-posting about e-cigarettes and e-cigarette use.

There was a high prevalence of current e-cigarette use among young adults in the college setting. These results were similar to those summarized in previous studies (Johnston et al., 2016; Kenne et al., 2016; Ramo, Young-Wolff, & Prochaska, 2015) and were nearly equal to cigarette users. The prevalence of lifetime e-cigarette use (42%) surpassed that of lifetime cigarette use (38%). Approximately 7% of respondents reported being current dual users of cigarettes and e-cigarettes in this sample. Other studies have also reported that current (last 30 day) and lifetime e-cigarette use now surpasses current and lifetime cigarette use (Johnston et al., 2016; Kenne et al., 2016; Ramo et al., 2015; Sutfin et al., 2015). Current

college cigarette smokers are more likely to be current e-cigarette users than non-smokers and individuals who start using e-cigarettes, have a higher susceptibility and greater likelihood of becoming a cigarette smoker (Barrington-Trimis et al., 2016; Primack, Soneji, Stoolmiller, Fine, & Sargent, 2015; Sutfin et al., 2015). Dual users are often less motivated to quit smoking (Jorenby, Smith, Fiore, & Baker, 2016) and in college populations, dual use is related to heavier use of e-cigarettes and cigarettes and higher rates of heavy drinking (Littlefield, Gottlieb, Cohen, & Trotter, 2015).

The social media networks of college students are an important risk factor for e-cigarette use and may be a promising area of intervention and education. E-cigarette exposure via social media is widespread among college students. Almost half of the sample had been exposed to at least one form of e-cigarette content via friend posts or advertisements. Nearly a quarter of all participants reported viewing peer posts on e-cigarettes in the last 6 months with the highest prevalence of platform exposure occurring via Facebook (31%) and Instagram (28%). Respondents reported seeing advertisements on multiple social media platforms, with the highest prevalence of exposure also occurring on Facebook (39%). Approximately 13% reported viewing an advertisement on either Twitter or Instagram. Further, social media platforms often personalize content and display “suggested” or “promoted” posts in the form advertisements that are the result of search terms for products either directly on the social media platform or through a web-search. Consequently, interventions against e-cigarette use may address the frequent exposure to e-cigarette-related content within an individual’s social network. Such an approach would address altering perceptions of use since the high prevalence of exposure via social media as well as its influence on individual lifetime e-cigarette use may be due to a perceived normalization of e-cigarette use in this population via social messaging. Therefore, these results encourage continued effort to examine social media content on e-cigarettes which may help future interventions or educational messaging on preventing e-cigarette initiation.

Limitations

This study should be considered in light of the following limitations: First, responses may be subject to self-response, recall, and social desirability biases as a result of respondents answering survey questions about past use alongside classmates. However, to address these biases, questions were asked using validated methods and responses that were blinded to the audience. Second, this is a cross-sectional study, therefore causality and temporality cannot be inferred. Third, the survey was administered using a clicker-surveying technique. This allowed for quick data collection, though this method theoretically could produce different results compared to individually administered surveys and potentially enhance recall bias among participants because they are given a time limit. Other studies utilizing self-report of substance use have issues of recall bias, however we do not know how much recall bias could be a function of using the clickers as the primary surveying technique. Research has however, demonstrated the effectiveness of this data collection technique (LaBrie et al., 2006). The sample size of this study is relatively small and encourages additional studies of larger sample sizes to test for replication. Fourth, the terms used for e-cigarettes used in the survey consisted of *e-cigarette/vapepen/e-hookah* and may not have covered nomenclature that respondents associate with being an e-cigarette. Lastly, within the relationship between

e-cigarette use and e-cigarette exposure via social media exists a potentially unique effect. Exposure to e-cigarettes on social media may influence e-cigarette use and based on our significant findings, it appears that there may be a relationship between viewing peer posts and e-cigarette use. Additionally, for individuals who are current users, they most likely are or have viewed social media related content because they are users. This study does not assess e-cigarette or cigarette use of peers or family, which may explain the significant findings in this study. Thus, this relationship needs to be further explored as it may be a promising area for effective intervention against e-cigarette use by denormalizing the behavior.

Conclusions

In conclusion, this study provides one of the first insights to the relationship between social media and e-cigarette use. The resulting significant associations between viewing peer posts and advertisements with e-cigarette use indicates that individual users could be influenced by viewing e-cigarettes on their social media networks.

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Table 1.

Demographics and Characteristics of Cigarette, E-cigarette, and Social Media Use (N=258)

	N	%
Age		
18–20	146	16.2
21–24	84	28.8
25 or older	20	8.0
Gender		
Male	85	32.6
Female	176	67.4
Race		
White (non-Hispanic)	127	49.4
Black (non-Hispanic)	56	21.8
Asian/Pacific Islander	32	12.5
Other Race	42	16.4
E-Cigarette use ^a		
Never Used	136	54.0
Have, but not in past 30 days	76	30.2
1–9 days	29	11.5
10–29 days	7	2.8
Daily	4	1.6
Cigarette use ^a		
Never Used	150	61.7
Have, but not in past 30 days	50	20.6
1–9 days	24	9.9
10–29 days	15	6.2
Daily	4	1.7
Current E-cigarette and Cigarette use ^a	18	7.0
Lifetime use of both E-cigarettes and Cigarettes ^b	64	24.8
Self-posted about E-Cigarettes in the last 6 months ^c	15	10.0
Facebook	10	4.0
Twitter	7	2.9
Instagram	8	3.3
Peer-posts about E-Cigarettes viewed in the last 6 months ^c	64	43.8
Facebook	75	31.3
Twitter	36	16.4
Instagram	66	28.3
Advertisements viewed about e-cigarettes in the last 6 months ^c	65	48.5
Facebook	94	39.6
Twitter	30	13.0

	N	%
Instagram	30	13.0

^aLast 30 days

^bBased on current use and have used, but not in the last 30 days

^cFrequency and percent on each platform, not mutually exclusive and will not add up to overall value

Table 2.

Associations Between Self-Reported Lifetime E-cigarette Use and Types of Social Media Use about E-cigarettes

		Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)^e	Adjusted Odds Ratio (95% CI)^f	Adjusted Odds Ratio (95% CI)^g
Lifetime E-cigarette Use^{ac}	Peer-posts about e-cigarettes	3.94 (1.94–8.00)*	3.51 (1.60–7.70)*	4.09 (1.73–9.65)*	3.11 (1.25–7.76)*
	Advertisements seen	4.00 (1.94–8.25)*	3.90 (1.76–8.63)*	3.84 (1.63–9.05)*	3.01 (1.19–7.65)*
Current E-cigarette Use^{bd}	Peer-posts about e-cigarettes	5.86 (2.25–15.3)*	5.12 (1.73–15.16)*	9.94 (2.25–44.0)*	7.58 (1.66–34.6)*
	Advertisements seen	3.07 (1.17–8.02)*	3.13 (1.12–8.79)*	2.94 (0.87–9.94)	2.63 (0.73–9.48)

^a. Any use within past 30 days or have used, but not in the last 30 days

^b. Any use within past 30 days

^c. Adjusted for Lifetime Cigarette use

^d. Adjusted for Current Cigarette use

^e. Adjusted for age, race, and gender

^f. Adjusted for age, race, and gender, in addition to Cigarette use

^g. Adjusted for age, race, and gender, in addition to Cigarette use and self-posting about e-cigarettes

* significant p<0.05