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A Qualitative Study of Adolescent Perceptions of Electronic Cigarettes and Their Marketing: Implications for Prevention and Policy

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Abstract

This study examined youths' perceptions of electronic cigarettes ("e-cigarettes"), sources of e-cigarettes exposure, and preferred sources of e-cigarette health information. Participants ($n = 25$, M age 15.0 years) recruited during primary care visits completed an in-depth qualitative interview assessing these topics. Most participants (72%) perceived e-cigarettes as "healthier" than cigarettes and reported e-cigarette advertising exposure (80%) and interpersonal exposure (60%). Participants reported advertisements portray e-cigarettes as less harmful than cigarettes and novel products. Most (72%) indicated their doctor was their preferred source of e-cigarette health information, suggesting pediatric health care providers are well-positioned to counsel patients to prevent e-cigarette use.

Keywords

Electronic cigarettes; adolescents; perceptions; advertising

Introduction

Cigarette smoking remains the leading preventable cause of death in the U.S. and incurs an estimated \$300 billion in costs to society each year (Centers for Disease Control and Prevention (CDC), 2014; Xu, Bishop, Kennedy, Simpson, & Pechacek, 2015). Although the prevalence of smoking has decreased in recent decades, these declines have recently slowed (Centers for Disease Control and Prevention (CDC), 2014; Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality, 2013) and use of electronic cigarettes ("e-cigarettes") is increasing, especially among youths (Ayers, Ribisl, & Brownstein, 2011; Noel, Rees, & Connolly, 2011; Rose et al., 2014; Zhu et

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al., 2013). Recent national survey data indicate the prevalence of e-cigarette use among middle and high school students has reached 13.4%, surpassing cigarette smoking (9.2%) (Arrazola et al., 2015).

Although discussions of the potential public health impact of e-cigarettes continue to be divisive, there is consensus that preventing youth e-cigarette use is a critical public health goal (Cobb & Abrams, 2014; Fairchild, Bayer, & Colgrove, 2014; Grana, 2013). Patient education interventions in clinical settings are important strategies to prevent youth tobacco use. Existing guidelines recommend that pediatric health care providers educate all youths about the harms of tobacco use (American Academy of Pediatrics, 2009; Moyer & U.S. Preventive Services Task Force, 2013). Currently, however, there is limited research on how e-cigarettes can be addressed in such interventions (Pbert et al., 2015). Recent data also indicate pediatric healthcare providers have limited knowledge about e-cigarettes and limited comfort to educate young patients about e-cigarettes (Pepper, McRee, & Gilkey, 2014). However, providers also expressed concern about youth e-cigarette use and a need for information about how to address e-cigarette use with their patients (Pepper, McRee, & Gilkey, 2014).

Gaining a better understanding of youths' perceptions of e-cigarettes and exposure to risk factors that may influence e-cigarette perceptions and use can inform the development of health education interventions. Exposure to tobacco advertising is causally linked to youth tobacco use (Lovato, Watts, & Stead, 2011) and the increasing prevalence of youth e-cigarette use appears to be driven in part by advertising and marketing. From 2011 to 2013 e-cigarette advertising expenditures increased from \$6.4 million to an estimated \$39 million (Kim, Arnold, & Makarenko, 2014) and during this two-year period youths' exposure to e-cigarette advertising on television increased by 256% (Duke et al., 2014). E-cigarette ads use vibrant colors, portray features such as candy and fruit flavorings, and include celebrities, cartoons, and other imagery that appeal to youths (Pepper & Brewer, 2014). Experimental data indicate e-cigarette advertising exposure may increase youths' intentions to use e-cigarettes (Farrelly et al., 2015).

Currently, however, research on youths' exposure to e-cigarettes through marketing and other sources, and how these exposures may shape their perceptions of e-cigarettes and potentially influence use, is extremely limited. Gaining a better understanding of potential risk exposures and their possible effects on youth e-cigarette perceptions and use can help to guide the development of interventions to educate youths about e-cigarettes (Pepper, McRee, & Gilkey, 2014). The goal of this study was to examine in-depth youths' perceptions of e-cigarettes and to investigate how e-cigarette advertising and marketing and other exposures may influence these perceptions.

Methods

Setting & Sample

Adolescents and their parents were approached regarding the study at the time of primary care visits to an adolescent medicine clinic that is part of a large urban tertiary care hospital located in Washington, D.C. Adolescents were eligible to participate if they were aware of e-

cigarettes, ages 12 to 17 years, in good health based on adolescent and parent self-report, and able to participate in an in-depth, qualitative telephone interview in English. After a description of the study, research staff determined adolescents' interest in participating and screened for eligibility. Among interested, eligible adolescents, written participant assent and parental consent were obtained and a telephone interview was scheduled. All procedures were reviewed and approved by an institutional review board.

Procedures

Participants completed a semi-structured in-depth telephone interview that lasted approximately 30 minutes. We chose an in-depth interview approach because it is a recommended method for investigating sensitive and/or risky behaviors and related perceptions, and for formatively developing preventive interventions (Patton, 2015; Ulin, Robinson, & Tolley, 2005). Interview content was developed based on existing research on e-cigarette awareness, perceptions, and behaviors (Pepper & Brewer, 2014), and with feedback from the study team. Open- and closed-ended questions assessed sources of initial exposure to e-cigarettes, recall of details of e-cigarette advertising locations and content, perceived harm and addictiveness of e-cigarettes, and specific features of e-cigarettes and their advertising that may enhance or detract from their appeal to youths. Open-ended questions began broadly to elicit participant's responses unprompted, and included probes to examine specific concepts in greater depth as needed. Closed-ended questions assessing e-cigarette perceptions were derived from validated items on population surveys of youth tobacco use (Arrazola et al., 2014; Patton, 2015; Ulin et al., 2005). A final closed-ended question asked participants to identify their own preferred source of education information on the potential risks of e-cigarettes. Response options included parents, doctors, teachers, health warning labels on e-cigarette packs, online, and an option to describe any other source(s).

Coding and analysis of interview data used an iterative, constant comparison method where interviews are reviewed, initial codes are developed, and interviews are re-reviewed and codes are revised as indicated in the data (Braun V & Clarke V., 2006; Pope, Ziebland, & Mays, 2000). Similar methods have been used in recent studies of youth and young adult e-cigarette perceptions (Choi, Fabian, Mottey, Corbett, & Forster, 2012; McQueen, Tower, & Sumner, 2011; Roditis & Halpern-Felsher, 2015). Interviews were recorded, transcribed verbatim, and two research team members initially reviewed transcripts to identify common themes and develop a codebook. Audio recordings were then reviewed and coded, and detailed notes were recorded. A third research team member was consulted to review instances where any uncertainties or discrepancies existed to determine a final codebook. There were few coding discrepancies between the two primary coders for major themes in the codebook, indicating our coding scheme achieved >90% agreement among the primary coders. Findings were summarized by themes and subthemes, with illustrative quotes as examples. A social ecological theoretical framework was used to organize the results (McLeroy, Bibeau, Steckler, & Glanz, 1988; Siegel & Lotenberg, 2007).

Results

Overall, 47 potentially eligible participants were approached for participation in the study, 25 of whom were confirmed to be eligible, provided adolescent assent and parental consent, and completed a study interview. Table 1 displays characteristics of participants. Participants averaged 15.0 (*SD* 1.5) years of age, and two had ever tried e-cigarettes. Participants were primarily non-Hispanic white or African-American/black, and most had parents who were married and had completed at least a college education (Table 1).

Sources of Exposure to E-Cigarettes

Quotes illustrating adolescents' reported sources of initial exposure to e-cigarettes are shown in Table 2. Almost all participants ($n = 18$) indicated initially hearing of e-cigarettes through some type of media, such as advertising on television or online. Participants also cited hearing of e-cigarettes at the retail point of sale ($n = 12$), including malls, major convenience stores, and gas stations. Exposures through these channels included seeing live demonstrations of e-cigarette use (e.g., at mall kiosks) and static advertisements.

A majority of participants ($n = 15$) also reported interpersonal exposures to e-cigarettes, including via family members and peers. Several indicated that e-cigarettes were something "older" peers were using, and 12 reported friends who were e-cigarette users. Six indicated interpersonal exposures increase vulnerability to e-cigarette use, responding that they "might" or "maybe" would try e-cigarettes if a friend offered one. One adolescent (female, age 17) indicated, "*Some of my friends, they have them and so they're always like 'oh it's not that bad for you' and like they have a bunch of flavors for theirs. So it's crossed my mind like what if I did try it.*"

E-Cigarette Advertising Channels and Content

When asked specifically about e-cigarette advertising, most participants ($n = 20$) reported exposure to e-cigarette advertising. Of those, participants described advertisements they saw on television ($n = 8$), online ($n = 5$), and print ($n = 2$). Six adolescents noted seeing point-of-sale advertising, identifying gas stations and malls as sources of exposure.

When asked to recall the advertisement they saw, half of participants described colors they remembered, the way the e-cigarette or advertisement "lights up," and the ways in which the advertisement appeared "attractive" or "trendy." Two adolescents recalled celebrities appearing in advertisements. When probed if they could recall a specific e-cigarette brand advertised, all 11 adolescents who recalled a brand named Blu. Seven adolescents recalled e-cigarette flavorings appearing in advertisements, mentioning apple, blueberry, raspberry, strawberry, mint, watermelon, and coffee. One adolescent (female, age 14) recalled, "*I think you could make your own flavor.*"

Participants indicated advertisements conveyed that e-cigarettes were "new" and "cool," and emphasizing they were "safer" or "better" than combustible cigarettes and/or expressing themes of freedom or choice. For instance, one participant (male, age 16) described an advertisement as conveying, "*It's less harmful, it's portable, it comes in different colors.*" Also, a 14 year old male described a television advertisement, "*Yeah, I think it was the Blu*

company. B-I-u. There was a guy maybe in his mid-30s or early 40s... He was on a motorcycle, most of the commercial was in black and white. He was saying something about how our country was founded on tobacco and something else about freedom."

Perceived Harm & Addictiveness

When asked about their perceptions of e-cigarettes, about three quarters of participants drew comparisons to conventional cigarettes. One 16 year old male noted that e-cigarettes are *"like cigarettes but they don't use actual tobacco. Just water vapor."* Another participant, a 12 year old female commented with uncertainty, *"It's like a cigarette and it's electronic and you smoke water. Or something like that."* The majority of participants ($n = 18$) perceived that e-cigarettes are a safer alternative to conventional cigarettes, using the words "cleaner" and "healthier" to describe e-cigarette use. One participant (male, age 16) noted, *"I heard that it's a more safe and I guess more healthy way of smoking than regular cigarettes."* Others had heard mixed information about the potential harms of e-cigarettes. One participant (male, age 16) said, *"I guess it's a smokeless alternative to smoking. It's kind of suggested that they're safe just because there's no smoke but I didn't really know if they are or not."*

Twenty-one participants indicated e-cigarettes are harmful, or most likely harmful, citing similarities to conventional cigarettes. One 14 year old male claimed, *"It's still putting chemicals in your body, you're still inhaling smoke."* However, a majority of adolescents indicated e-cigarettes are relatively "safe" or "healthy" compared with conventional cigarettes. One 16 year old male noted, *"I think any cigarettes are harmful but out of all of them I think e-cigarettes are the most healthy, that's based on what I've heard."* Of the four adolescents who believed that e-cigarettes were not harmful, or responded with uncertainty, two of them had used e-cigarettes. One adolescent who had tried e-cigarettes said, *"I suppose they are safe because of the way they work and their ingredients."*

Twenty-two participants (88%) believed that e-cigarettes are addictive, again citing similarities to cigarettes. Only seven specifically indicated they were aware that e-cigarettes contain nicotine, and two indicated e-cigarette flavors may enhance addictiveness. A 14 year old male said, *"E-cigarettes have different tastes, different kinds like apple and berry flavors so I guess they could be addictive."* Two participants responded with uncertainty, one claiming that it is "not likely" that e-cigarettes are addictive. When asked whether e-cigarettes are more or less addictive than cigarettes, eleven adolescents believed that e-cigarettes were less addictive. One participant (female, age 17) indicated, *"I'm thinking that they probably don't have as much nicotine or whatever is in cigarettes that make them so addictive."* Seven adolescents reported e-cigarettes are as addictive as cigarettes. One (female, age 15) indicated, *"They're just as addictive because they have nicotine in them I think. They're the same as regular cigarettes except without the tar and other gross things."* Three adolescents were unsure about the addictiveness of e-cigarettes, one of whom had tried e-cigarettes previously. This participant (male, age 15) noted, *"[It is] Hard to say if they're more or less addictive...on most e-cigs you can adjust the nicotine level so it could go either way."*

Perceptions of E-Cigarette Advertising

Quotes illustrating themes that emerged with respect to youths' perceptions of e-cigarette advertising are shown in Table 3. Participants indicated advertisements portrayed e-cigarettes as attractive to try, safe to use, and new and cool. The majority ($n = 20$) believed advertisements make young people want to try e-cigarettes. More than half of participants ($n = 15$) reported functions and features such as flavors, colors and lights, and modern designs enhance the appeal of e-cigarettes among youths. One (female, age 17) noted, *"I think the more ads they put up, the more inclined younger people are to try it. Especially if they are flavored, it'd be interesting to try them."* The two participants who had tried e-cigarettes described them as a toy, indicating it is fun to "play" with the "smoke clouds." One 15 year old male said, *"People my age like to do cool smoke tricks, like blow O's and do tricks."* Another (male, age 15) noted, *"One kid I knew he never even smoked cigarettes, he just got one because he liked the way the smoke came out."* Eleven adolescents described the ways in which e-cigarettes are advertised as safe or less harmful and nine indicated advertisements portraying e-cigarettes as "new" or "cool" also enhance their appeal.

Several adolescents described other aspects of advertisements that contribute to the appeal of e-cigarettes, including using celebrities and claiming e-cigarettes. One 17 year old female indicated, *"Well, I mean it definitely made me think that they were better for you so I assume that it also made a lot of other teenagers think that... if a celebrity is doing it and they're fine, why can't we do it and we'll be fine."* Others noted the ads could be shifting social norms including one who noted, *"These ads try to make it seem like there's a lot of people using them, it's really a form of peer pressure."*

Despite participants' description of how advertisements may impact young people, several noted that they were not directly affected. This concept was captured by one participant (male, age 14), *"The way that it affected me was that I flipped the channel. However, I could see how some kids could be interested or curious."* Another participant (female, age 14) indicated there is likely more involved in e-cigarette adoption than advertising alone, noting *"I guess for some people it could, if some people are considering it or if their friends do it, [or] if people are presented with an opportunity or if they're given good reasons why they should try."*

Preferred Sources of Information on E-Cigarettes

When asked about their preferred sources of information the potential risks of e-cigarettes, a majority identified a doctor ($n = 18$), and just over a quarter ($n = 7$) indicated warning information on an e-cigarette package. One participant (male, age 15) summarized a common perception, *"Definitely a doctor, and the actual package. A doctor can give any professional opinion and the package because that's the company actually telling you what's harmful about their products - so why would they lie?"*

Discussion

Our findings revealed that adolescents interviewed were primarily exposed to e-cigarettes through advertising and interpersonal sources (e.g., peers, family). Adolescents expressed

that e-cigarette advertising conveying themes of potential reduced harms and emphasizing product features such as novelty and flavorings may enhance their appeal. A majority of youths perceived e-cigarettes as less harmful and less addictive than cigarettes, suggesting themes conveyed in e-cigarette advertising may influence youths' perceptions. Finally, adolescents indicated healthcare providers are their most preferred source of information on the potential risks of e-cigarettes. These findings have implications for future research and preventive interventions.

Available evidence indicates that advertising exposure and product perceptions (e.g., perceived harms) are two intertwined factors that influence youth e-cigarette initiation and use. A recent analysis of national survey data indicated that exposure to tobacco advertising via the internet, print media, or point-of-sale was associated with an increased odds of reporting having ever used e-cigarettes among middle- and high-school aged youths (Agaku & Ayo-Yusuf, 2013). Results of another analysis of national survey data showed that one third of high-school aged adolescents perceive e-cigarettes are less harmful than cigarettes, and such perceptions were more prevalent among those who had tried e-cigarettes (Ambrose et al., 2014). A recent study of more than 2,000 youths also found that positive attitudes toward e-cigarettes and cigarettes and lower perceived risks of e-cigarettes were associated with both e-cigarette and cigarette use (Barrington-Trimis et al., 2015). The findings of these observational investigations are consistent with a recent experimental study conducted with a national sample of adolescents aged 13–17 demonstrating that adolescents who viewed e-cigarette ads were more likely to report intentions to try e-cigarettes and to endorse beliefs that e-cigarettes are less harmful than cigarettes (Farrelly et al., 2015).

Results of the present study complement and extend the existing research in important ways. Many youths interviewed indicated initially learning of e-cigarettes through advertising on television, online, and at point-of-sale. This suggests that, in the absence of public health messaging or other efforts to educate youth about e-cigarettes (Anand et al., 2015), advertising is one of youths' primary source of information about e-cigarettes. The findings also help to identify specific advertising elements that enhance the appeal of e-cigarettes among adolescents, including messaging conveying potential reduced harms, depictions of flavorings, and use of celebrity spokespeople. Such themes are evident in e-cigarette ads (Grana & Ling, 2014) and our data provide initial evidence they may impact youths' e-cigarette perceptions. This suggests e-cigarette advertising exposure and product perceptions are risk factors that may be important to address through behavioral interventions and federal tobacco regulations.

Implications for Practice

Pediatric clinical encounters provide an important opportunity to educate and counsel youths about e-cigarettes, but there is limited evidence to guide such intervention efforts (Pbert et al., 2015). In the present study, most participants indicated they prefer to receive e-cigarette risk information from their doctor, suggesting they would be receptive to these conversations. Pediatric healthcare providers are in an important position to counsel youths about tobacco use, and could adapt proven tobacco use screening and behavioral intervention strategies to e-cigarettes. This could include asking patients about their

experience with e-cigarettes, assessing their perceptions and exposure to potential risk factors such as e-cigarette advertising, and advising them to avoid using e-cigarettes and all other forms of tobacco (Moyer & U.S. Preventive Services Task Force, 2013; Pbert et al., 2015). Although pediatric providers are well-poised to discuss e-cigarettes with their young patients, one recent study also reported that pediatric healthcare providers' primary sources of information about e-cigarettes were patients, the news media, and advertising/point of sale (Pepper, McRee, & Gilkey, 2014). This research, along with our findings, indicates a need to educate providers about available e-cigarettes to equip them with the necessary knowledge and skills to educate young patients.

From a policy standpoint, although e-cigarettes are not currently regulated by the Food and Drug Administration (FDA), in April 2014 the FDA proposed a "deeming" rule to bring e-cigarettes and other currently unregulated tobacco products under the agency's regulatory authority. The deeming rule would require warning labels on e-cigarette packaging and advertising, institute a minimum national purchase age of 18 years, and place restrictions on advertising and promotions, such as prohibiting use of certain descriptors (e.g., low, light, mild) and prohibiting free samples (Center for Tobacco Products, Food and Drug Administration, January 2015; Federal Register, April 25, 2014). The rule would also position the FDA to take additional regulatory action as evidence emerges, such as prohibiting youth-oriented advertising and characterizing flavors as has been done with combustible cigarettes. Prior research demonstrates tobacco advertising exposure is associated with tobacco use initiation among youths (Lovato et al., 2011), and that flavorings such as fruit, mint, and candy enhance the appeal of tobacco products to youths (Ambrose et al., 2015). Our findings suggest the proposed deeming rule, when finalized, could provide important regulatory opportunities surrounding advertising and flavorings to limit the appeal of e-cigarettes among youths in the future. Finally, the FDA also engages in efforts to educate the public about the potential harms of tobacco products, including "The Real Cost" national mass media campaign currently targeting youths at risk of cigarette smoking with prevention messages. In the future, if e-cigarettes are deemed a regulated product similar efforts could be launched to target at-risk youths.

Our findings highlight important areas of research to better understand risk factors for youth e-cigarette use. Although the results suggest a constellation of factors that may influence youth e-cigarette use (e.g., product perceptions, advertising exposure, interpersonal factors), longitudinal data on youth e-cigarette use and potential risk factors remains limited (Leventhal et al., 2015). Prospective studies are needed to investigate the interplay among potential risk factors and patterns of use of e-cigarettes and other tobacco products. Experimental research to determine whether specific aspects of e-cigarette advertising (e.g., explicit or implicit claims about harms, depictions of flavorings) affect youth perceptions of e-cigarettes and use behaviors may also be warranted. Studies to develop and test the efficacy of developmentally-appropriate e-cigarette prevention education messaging targeting youths are also needed.

The study findings should be interpreted in light of important limitations. The study was conducted with a small, convenience sample of adolescents recruited from a single clinical site and geographical area, which limits generalizability of the findings. The fact that

participants were recruited from a clinical setting could also have influenced their responses (e.g., preferring doctors as their sources of information about e-cigarettes). The interview covered a specific set of topics independent of participant's age or developmental stage, and responses could vary for younger and older adolescents. Such age-related differences could be examined in the future with a larger sample of youths. We did not gather comprehensive information about tobacco product use (e.g., cigarette smoking) and exposure to other factors (e.g., parental tobacco use) that may have affected youths' responses. Finally, all data were based on participant self-report, which may be subject to the influence of certain biases (e.g., social desirability).

Despite these limitations the results point to youth exposure to e-cigarette advertising, other interpersonal exposures (e.g., peers, family members), and individual-level perceptions of e-cigarette harm, addictiveness, and appeal as potential factors influencing youth e-cigarette use. The findings also indicate that adolescent healthcare settings are an important setting to deliver e-cigarette prevention education and counseling to youths.

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Table 1.

Sample characteristics (n=25)

	n (%)
Age	14.96 (SD = 1.5)
Gender	
Male	11 (44%)
Female	14 (56%)
Hispanic Ethnicity	2 (8%)
Race	
African-American/Black	8 (32%)
White	13 (52%)
Another Race	4 (16%)
Ever Tried An E-Cigarette	2 (8%)
Parent Education	
High School Diploma/GED	1 (4%)
Some College	4 (16%)
College Degree	8 (32%)
Graduate Degree	12 (48%)
Parent Marital Status	
Married	20 (80%)
Divorced	4 (16%)
Never Married	1 (4%)

Table 2.

Sources of initial exposure to e-cigarettes

Source	Exemplary Quotes
Advertising/Media (n=18)	<ul style="list-style-type: none"> • <i>“Once I heard about them on TV I was definitely more open to it. So when, I feel like, once I saw that one ad on TV, I was seeing them everywhere.”</i> (Female, age 17)
Point-of-Sale (n=12)	<ul style="list-style-type: none"> • <i>“Probably like at the mall, because they were advertising it at one of the kiosks.”</i> (Female, age 15)
Interpersonal (n=16)	<ul style="list-style-type: none"> • <i>“The older kids at high school like to talk about stuff like that. You overhear conversations as they walk by.”</i> (Male, age 14)

Note: Categories are not mutually exclusive; some participants indicated > 1 source of exposure to e-cigarettes

Table 3.

Perceptions of e-cigarette advertising

Theme	Exemplary Quotes
Attractive to Try (n=20)	<ul style="list-style-type: none"> • <i>"I feel like it would make them want to try them. It seems cool if it's in an ad or a magazine that is portraying it well."</i> <p>(Female, age 16)</p>
Less Harm (n=11)	<ul style="list-style-type: none"> • <i>"It kind of glamorizes them, shows them a safe alternative to regular smoking."</i> <p>(Male, age 14)</p>
New or Cool (n=9)	<ul style="list-style-type: none"> • <i>"Every time something new comes out, like a new iPhone or a new Xbox, anything new comes out somebody is definitely going to get it."</i> <p>(Male, age 16)</p>

Note: Categories are not mutually exclusive; some participants indicated >1 theme