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Perceived barriers to smoking cessation and perceptions of electronic cigarettes among persons living with HIV

Patricia A. Cioe^{1,2}, Rebecca E. F. Gordon^{1,2}, Kate M. Guthrie^{2,3,4}, Matthew S. Freiberg⁵, and Christopher W. Kahler^{1,2}

¹Center for Alcohol and Addiction Studies, Brown University School of Public Health, Providence, RI

²Department of Behavioral and Social Sciences, Brown University School of Public Health, Providence, RI

³Department of Psychiatry & Human Behavior, Alpert Medical School, Brown University, Providence, RI

⁴Centers for Behavioral & Preventive Medicine, The Miriam Hospital, Providence, RI

⁵Department of Medicine, Vanderbilt University School of Medicine, Nashville, TN

Abstract

Smoking is more prevalent in persons living with HIV than the general population and is linked to increased morbidity and mortality. Some have suggested that based on current knowledge of harms and benefits, it may be feasible to advise smokers who are unable or unwilling to quit to switch to electronic cigarettes (ECs) as a less harmful alternative. We conducted 25 qualitative interviews with HIV-positive current or former smokers to explore perceived barriers to smoking cessation and perceptions of ECs. A high level of nicotine dependence, smoking as a form of stress management, motivational factors (including lack of readiness, low self-efficacy, ambivalence toward quitting), and having a social network of smokers were identified as cessation barriers. Low knowledge of ECs and uncertainty about EC safety and efficacy were barriers to EC uptake. However, current smokers indicated a willingness to try ECs. This study provides evidence that HIV-positive smokers face significant individual and environmental barriers to cessation. ECs may have potential as a harm reduction strategy in this population; however, there is a significant need for education regarding use and relative safety.

INTRODUCTION

The prevalence of cigarette smoking among PLWH in the U.S. is 3–4 times that of the general population (40–70)% (Lifson & Lando, 2012; Mdodo et al., 2015; Pacek & Cioe, 2015) and recent studies have found that HIV-positive smokers lose more years to smoking than to HIV infection itself (Helleberg et al., 2015; Reddy et al., 2016). HIV-positive

Corresponding Author: Patricia A. Cioe PhD, Brown University School of Public Health, Center for Alcohol and Addiction Studies, Box G-S121-4, Providence, RI 02912; (401) 863-6638 (phone); (401) 863-6644 (fax);, Patricia_Cioe@brown.edu.

DECLARATION OF INTERESTS

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smokers have increased rates of cardiovascular disease, pulmonary disease (Cui et al., 2010; Feinstein et al., 2016; Freiberg et al., 2013; So-Armah & Freiberg, 2014), and cancer (Helleberg et al., 2014; Reddy et al., 2017) and cigarette smoking is the single greatest contributor to the elevated rate of disease (Glass et al., 2006; Lifson & Lando, 2012). Smoking cessation studies in PLWH have demonstrated disappointing outcomes (Cioe, 2013; Ledgerwood & Yskes, 2016; Pacek & Cioe, 2015). Although the majority of HIV-positive smokers report a strong desire to quit (Mamary, Bahrs, & Martinez, 2002), they are less likely to quit compared with general population smokers (Cooperman, 2016; Mdodo et al., 2015), and smoking cessation barriers among PLWH needs to be explored (Cooperman, 2016) further. Interest in and use of smoking cessation medications in PLWH is generally low (Ledgerwood & Yskes, 2016; Pacek & Cioe, 2015) and less than half of these smokers endorse total abstinence as a goal (Humfleet et al., 2009; Niaura et al., 2000). Some studies in PLWH have shown promise in non-cessation smoking-related endpoints, such as reducing the number of cigarettes smoked per day, lowering nicotine dependence levels, and reducing withdrawal symptoms (Cropsey et al., 2013), which may eventually lead to cessation.

Electronic cigarette (EC) awareness and use have increased over the past 3–5 years (Pericot-Valverde, Gaalema, Priest, & Higgins, 2017) and over one-third of smokers in the general population report that they have tried ECs (King, Patel, Nguyen, & Dube, 2015). Some studies report that ECs aid in smoking reduction, temporary abstinence (Caponnetto, Polosa, Russo, Leotta, & Campagna, 2011; R Polosa et al., 2014; Siegel, Tanwar, & Wood, 2011), and reduced craving (C. Bullen et al., 2010); however, other studies show that ECs do not increase smoking cessation levels (Christopher Bullen et al., 2013; Caponnetto et al., 2013). Despite this, many smokers perceive ECs to be less harmful than tobacco, and, some EC users believe that ECs will help them achieve smoking cessation (Pericot-Valverde et al., 2017; Soule, Maloney, Guy, Eissenberg, & Fagan, 2017; Stein et al., 2015). Many smokers reduce their combustible cigarette (CC) smoking when using ECs, which may lead to eventual smoking cessation (Etter & Bullen, 2011, 2014; R. Polosa et al., 2011).

The long-term effects of ECs is unknown. However, a Cochrane review found that serious adverse events related to short-term EC use were rare (McRobbie, Bullen, Hartmann-Boyce, & Hajek, 2014). It is thought that, over the long term, switching from CCs to ECs greatly reduces harm to users and those around them (Hajek, Etter, Benowitz, Eissenberg, & McRobbie, 2014; Levy et al., 2018). Some have suggested that, based on current knowledge, it may be feasible for health care providers to advise smokers who are unable or unwilling to quit to switch to ECs as a less harmful alternative to smoking and a possible route to cessation (Hajek et al., 2014). The purpose of this study was to examine perceived barriers to smoking cessation and perceptions of ECs among PLWH.

METHODS

This study was a qualitative secondary data analysis (Szabo & Strang, 1997). The parent study (N = 30) examined perceptions of cardiovascular disease (CVD) risk in PLWH. Eligibility criteria, recruitment, data collection, and data analysis procedures have been previously reported (Cioe, Guthrie, Freiberg, Williams, & Kahler, 2018). We included only

current or former cigarette smokers in this analysis. The interviews queried smoking behaviors (current and past), quit attempts, barriers to cessation, and EC perceptions.

RESULTS

Thirty-six patients were screened for the parent study; 25 were eligible for this analysis, with 11 ineligible due to never smoking. Table 1 summarizes the sample demographic and clinical characteristics, obtained by self-report. Answers to interview questions revealed four themes related to barriers to smoking cessation and three themes related to perceptions of ECs. Illustrative quotes corresponding to each theme are shown in Tables 2 and 3.

Theme 1. A high level of nicotine dependence

Participants described difficulty in quitting smoking, despite a desire to quit and multiple quit attempts. They attributed this difficulty to a high level of dependence on nicotine. Those with illicit drug use histories described the addiction to nicotine as more difficult to address than illicit drugs they had used in the past and explained that this had impeded their ability to stop smoking. They also described having symptoms of nicotine withdrawal and cravings. Some participants stated that they did not have the ability to quit, expressing low self-efficacy for quitting. Further, the participants stated that they were unable to change their smoking habits despite their knowledge that continued smoking would affect their health.

Theme 2. The perception that smoking helped manage stress

Each participant who indicated that they had made a quit attempt in the past was asked about the factors that led to their slip or relapse. Many participants indicated that they had slipped or relapsed to smoking during a stressful situation and believed that smoking helped them manage stress. They described a lack of alternative stress management skills and explained that cigarette smoking fostered a sense of calm.

Theme 3. Low motivation to quit

Some study participants said that their motivation to quit was low, and they weren't ready to quit. Others expressed ambivalence toward quitting explaining that they enjoyed smoking. Some participants reported that they consciously chose not to quit.

Theme 4. Having a social network of smokers

Participants stated that many of their friends or family members smoked, which was perceived as a barrier to quitting successfully. It also was related to their lack of desire to make an initial quit attempt. Further, participants reported that having smokers in their social networks contributed to their relapse after a quit attempt.

Theme 5. Low level of EC knowledge

Participants described having a lack of information about ECs, with any knowledge of ECs coming from what they had seen on television or had learned from other smokers. There was confusion over the constituents in ECs and whether they contained nicotine. Participants also perceived that ECs were expensive compared to CCs.

Theme 6. EC safety and efficacy.

Participants had general safety concerns, especially compared to a CC. Some were worried about EC vapor and long-term health effects. Participants reported knowing smokers who tried ECs and had not quit, so they were not sure they would aid in cessation.

Theme 7. Willingness to try ECs

Most participants indicated a willingness to try ECs. However, because there was concern about the cost of ECs, participants said they would be more willing to try ECs if they were provided as part of a program.

DISCUSSION

This study provides evidence that HIV-positive smokers face significant individual and environmental barriers to smoking cessation, some of which may be especially salient in this population. ECs as a method of harm reduction or path toward cessation may have potential in this population; however, there is a significant need for education regarding their use and relative safety or harm, compared with CCs.

Individual barriers cited, including nicotine dependence, perceived risk of withdrawal, craving, and smoking for stress management, have been previously reported in the literature (Weinberger, Seng, Esan, & Shuter, 2017). These barriers prevented smokers from achieving abstinence despite knowing that smoking affected their health. Utilizing effective pharmacologic therapy in this group of smokers during quit attempts to reduce these barriers is essential. Previous studies have demonstrated that nicotine replacement therapy (NRT) adherence in this population is poor (Ingersoll, Cropsey, & Heckman, 2009; Ledgerwood & Yskes, 2016; Matthews, Conrad, Kuhns, Vargas, & King, 2013), therefore research to improve uptake of and adherence to combination NRT or oral medications, such as bupropion and varenicline, are clearly needed (Ledgerwood & Yskes, 2016; Pacek & Cioe, 2015).

A social network of smokers emerged as an environmental barrier to successful cessation. Inadequate social support for smoking cessation has been previously reported in PLWH (Gamarel et al., 2017; Krishnan et al., 2017) suggesting that interventions to enhance social support are needed. A pilot study using peer counselors with NRT noted significant differences in 7-day point prevalence abstinence, suggesting that enhancing social support may be an effective approach (Wewers, Neidig, & Kihm, 2000). A cell-phone intervention that aimed to enhance social support was also promising (Vidrine, Marks, Arduino, & Gritz, 2012). Standard approaches are not adequate for HIV-positive smokers, and targeted, innovative approaches are needed to improve outcomes.

Finally, participants had low EC knowledge. Yet, despite a concern for safety (compared with CC), participants expressed a willingness to try them. Similarly, a study in opioid-dependent smokers reported that 80% of participants were willing to try ECs (Stein et al., 2015). Our findings directly contrast EC safety perceptions in the general population, however, where it has been reported that most smokers believe that ECs were not at all or less harmful than CCs (Pericot-Valverde et al., 2017; Stein et al., 2015). There is a need for

education regarding the substantial harm of continued CC smoking, and the comparative or relative safety of ECs in PLWH. One study examined positive outcome expectancies related to EC use among general population smokers, recognizing that this may be an important construct related to EC uptake (Soule et al., 2017). They found that ECs provided users with similar positive effects as CCs, such as perceived stress reduction and increased relaxation. Research is needed to determine whether a similar effect is noted among HIV-positive smokers. Concern for cost of ECs was reported, however, with the current cost of CCs, ECs may be similar in cost as this point.

This study has some limitations. As a qualitative study, results may not generalize to all HIV-positive smokers. Also, the primary study examined CVD risk perception and did not collect data on current EC use. Notwithstanding this limitation, this study has important strengths. It is, to our knowledge, the first study to qualitatively examine barriers to smoking cessation and perceptions of electronic cigarettes in PLWH, a group that is disproportionately affected by smoking-related morbidity and mortality. Secondly, this study enrolled both current and former CC smokers, increasing the range of perceptions and responses from both those who have been unable or unwilling to quit, and those who have successfully achieved sustained abstinence.

In summary, HIV-positive smokers face individual and environmental barriers to smoking cessation. Improved understanding of the perceived barriers to smoking cessation among HIV-positive smokers may inform the development of innovative strategies for this population. While the long-term effects of ECs are unknown (McNeill A et al., 2015), they may represent a less harmful option for smokers who are highly dependent on nicotine and are unwilling or unable to quit smoking. However, education regarding potential benefits or harms of ECs in PLWH is needed.

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INTERVIEW QUESTIONS:

1. Tell me about your smoking [habits].
2. So you've smoked for [how long]?
3. Are you interested in quitting [smoking]?
4. Would you say you're ready to quit in the next 30 days?
5. Have you tried quitting [smoking] before?
6. Tell me what you've tried [to quit smoking].
 - a. How many times have you tried to quit smoking?
 - b. What helped you [to quit] and what has not helped you?
7. What were your barriers to staying quit?
 - a. Why did you end up going back to [smoking] cigarettes?
8. What do you know about electronic cigarettes [e-cigarettes]?
9. Have you ever tried an electronic cigarette?
10. Would you try an electronic cigarette?
11. Do you think it [e-cigarette] helps people quit smoking regular cigarettes?
12. Do you think it could help you either cut down or quit?
13. Do you feel like there are any benefits to the electronic [cigarette]?
14. Do you think it's safer than smoking [regular] cigarettes?
15. What is attractive about that [smoking an electronic cigarette]? How is that different from smoking [regular] cigarettes?
16. So do you think that might be better for your health than smoking a cigarette?
17. Are they more expensive than cigarettes, or are they about the same?

Table 1.

Demographic and clinical characteristics at baseline.

	Total(N = 25)
<i>Age (M, SD)</i>	54.2 (6.8)
<i>Years of Education(M, SD)</i>	11.4 (2.9)
	N (%)
<i>Gender</i>	
Female	8 (32.0)
Male	16 (64.0)
Transgender female	1 (4.0)
<i>Race/Ethnicity</i>	
Hispanic/Latino	2 (8.0)
Not Hispanic/Latino	23 (92.0)
<i>Race/Ethnicity</i>	
White	12 (48.0)
Black	12 (48.0)
More than one race	1 (4.0)
<i>Education Level</i>	
High School or less	20 (80.0)
Bachelor Degree or higher	5 (20.0)
<i>Employment Status</i>	
Full-time	4 (16.0)
Part-time	4 (16.0)
Unemployed	1 (4.0)
Disabled	16 (64.0)
<i>Relationship Status</i>	
Married	2 (8.0)
Single/Divorce/Widow	23 (92.0)
<i>Time Since HIV Diagnosis</i>	
<20 years	12 (48.0)
>21 years	13 (52.0)
<i>Smoking Status</i>	
Current Smoker	15 (60.0)
Quit in Last 30 Days	1 (4.0)
Quit >30 Days Ago	9 (36.0)

Table 2.**Perceived Barriers to Quitting: Illustrative Quotes**

Theme 1. A high level of nicotine dependence.
<p>But the addiction is...it's so powerful....I'll say one thing. It was easier to stop drugs than it is to stop smoking. I got the patch on right now. It doesn't give me enough, uh—I still crave... it just isn't working for me. I mean, if I'm jonesing, I get crazy. I get crazy. When I'm fiending. I get nuts. It's awful. Oh, dear God. Like a junkie for a fix. And I hate it so much. I hate smoking. I hate the smell. I hate the taste. I hate it all. It's a bad addiction. (51 year-old female)</p>
<p>Yeah. I know smoking could bring it [heart disease] on, but I still smoke. [Laughter]. (72 year old female)</p>
<p>Smoking is horrible, just horrible for the body. I know that...but I also know that I'm gonna quit, at some point, again. But it's hard. (50 year old male)</p>
<p>It's hard to stop smoking...I'm telling ya. (51 year old male)</p>
<p>I have COPD – for many years. Um, so – which is why I have to quit smoking, too – but that's the hardest thing ever to quit. (58 year old male)</p>
<p>I came down with cancer...Then I was on a roll to, to stop (smoking), but it's the hardest thing ever to do. ..and I think maybe it's also because I'm a...I have an addictive personality. (54 year old male)</p>
<p>Yeah, but I have stopped. I – this is probably about my ninth time stoppin. (62 year old female)</p>
<p>I don't like to be dependent on anything. I would wanna quit tomorrow if I could. I just know I can't. (54-year-old male)</p>
Theme 2. Smoking provides stress management.
<p>When I'm stressed...I smoke a little bit more. (52 year old female)</p>
<p>Um, stress [caused relapse], so the cigarette became a way of handling – dealing with the stress. (50 year old male)</p>
<p>It [smoking] just make(s) me relaxed, you know, and then I just get into the shower, or whatever, you know? My mind [is] always thinking, you know? It's like that. (50 year old male)</p>
<p>But I have to smoke cuz my nerves are bad. (58 year old female)</p>
Theme 3. Low motivation to quit.
<p>Yeah. I'm really on top of my-my [health], except for the smoking....I've also tried to quit smoking, but that didn't work. I wasn't ready. I'm not ready...matter of fact, I have the patches. I don't even like putting that on...I just continue to smoke. (50 year old male)</p>
<p>Yes, I think I would [like to quit smoking]. But I can't say. It seemed like to me if I really, really, really wanted to, I could, so I must not really, really, really, want to. (72 year old female)</p>
<p>I don't like the effects of what it's doing to me, so- But still, I continue to do it [smoke], so that must mean I like it... I'm still like wondering why I still smoke, and I'd want, I wanna quit, but I don't wanna quit. So, I don't think I'm ready to quit, that's all....I have a habit of doing it. Not that I like the habit. I don't like it.... basically...I just didn't wanna quit. (51 year old male)</p>
<p>Me, I choose to smoke, I think. I don't think I really wanna quit. Because I'm not – if I wanted to quit, I can really quit. I don't really try to quit... cuz I like it. If I wanted to quit, I could probably quit. (51 year old male)</p>
<p>It's just a matter of me saying, “Okay. It's time to do this”. I wanna be finished. (63 year old male)</p>
<p>I would wanna quit tomorrow if I could. I just know I can't. (54 year old male)</p>
<p>Um, just the will [to quit smoking]. I can quit it, but a lot of times I just say, “Aw, I don't wanna quit”. (58 year old male)</p>
Theme 4. Having a social network of smokers.

I was just with my boyfriend. He had came over, and I had a couple of roommates that were smokin', and I just – it just triggered me. (52 year old female)

You know, you have somebody....that you can go to and say, you know, oh, my god, I can't do this. So I did. I went to my friend. I said, you know.... I'm having a really hard time...he said, "Yeah, I know what you mean. Here, have a cigarette." He gave me a cigarette. (50 year old male)

I was in rehab, so I just didn't. And actually, when I was in there, because no one else was around me smokin', I—I didn't have a problem. [bein' around other smokers] is difficult. (54 year old male)

And when I was in jail....and it didn't bother me....I was, like....I didn't even want a cigarette. Smellin' it or...you have family members that you're around, and they smoke constantly—
- and all your friends—they smoke constantly, and they say, "Oh, here. Here's a cigarette." And like, the whole house smokes cigarettes, so, what am I gonna do? ... I'm, like, "All right. Give me a cigarette." (44 year old transgender female)

One morning I woke up and ... I'm, like, "I don't want a cigarette" ... I didn't smoke for the next two or three days. It turned into two months, two months and a half. Then I had somebody comin' into my house smokin'. That be—bam! Like, "One puff, one puff." And that's how I started back. This is how I got caught up this time, by havin' people smoke around me. And I was still weak, so I ended up pickin' it up again. (58 year old male)

I tried a couple of times [to quit], but oh, it's really hard. It really is...my partner smokes, so that makes it even harder. (55 year old female)

Table 3.**Illustrative Quotes of Electronic Cigarettes Perceptions.****Theme 5. Low level of EC knowledge.**

I don't know anything about 'em. It's just different—it's different... I don't know. It's just like a vapor that comes out of it. And it—it gives a different—some of 'em have vanilla or chocolate, or it just gives different sense of smells. (52 year old female)

Um, you're off of nicotine, you know. And that's what—uh, that would—that would attract me to it... they're kind of expensive... they really are. I had a friend of mine, paid \$100.00 for one. They are expensive. They last a pretty long time. But, I just can't afford that. (50 year old male)

[I know] nothing [about ECs], other than what they say on TV. I don't know how much they cost. I'd have to find out how much they cost and how long it, like—you know, how long do they last before you have to replace them and everything. (72 year old female)

I really don't know anything about them. They deliver nicotine? I'm not as big a fan of something that's gonna give me the drug that I'm hooked on. I know people who have. Well, some of them like it, and they haven't gone back to real cigarettes, but they're—they're hooked on that electronic thing. (50 year old male)

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Theme 6. EC Safety and efficacy.

I don't bother with 'em... I even hate it when, like, they do it in the buildin'... it fills up with all this vapor and stuff like that... I don't know (if they're safer than a cigarette). (52 year old female)

I've had several people that are on it, and they're right back to smoking, so...they were just using the electronic cigarette. And then they just went back to cigarettes.... (50 year old male)

But they're so new out, I guarantee 10, 15 years down the road, there's gonna be some kind of reaction from doing these vapors... It's only a matter of time... It's gonna cause something with the lungs. You're putting inhalers in your body... that's like getting a can—huffing. I mean, you're getting some kind of fluid you know nothing about, and you're smoking it. You're heating it up and smoking it... it hasn't been out long enough for them to have enough studying it. But I think down the road, there's gonna be a lot of complications due to that.... [But] I know I'm putting, like, 7,000 chemicals every time I take a puff [of a regular cigarette]. (51 year old female)

I don't know... it must be some kind of chemicals in there... and, it looks like it's all right now, but 20 years down the road, who knows, you know? So I don't know. I don't know if it's any safer, but I think for the time being, most people figure, well, I'm not sucking in 20 cigarettes a day (72 year old female)

I have not seen anyone quitting that, as well. That's what concerns me, you know. I mean, my [laughter] sample size is small, but you know. (50 year old male)

Who knows what chemicals that has in it, too? (51 year old male)

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Theme 7. Willingness to try ECs.

Yeah. I'd try it. I would—I don't know if it would be better, but I would try it, anyways... I guess if someone gave me one, you know, but if I have to go out there and buy one and then, you know... You know, every month, I got to buy another one? But if someone said, "Here. This is a program. You want you to try this for, like, say, a month and see how it works," then I - I would try it that way ... if someone was to give me one and says, "Just try it for three days, just three days and see," then I would do it. (72 year old female)

I think so. Yeah. I think I'd try it, yeah. Mm-hmm [+]. (50 year old male)