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Perceptions of Electronic Cigarettes among Medicaid Eligible Pregnant and Postpartum Women

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Abstract

Objective: To describe perceptions and beliefs about e-cigarette use during pregnancy among pregnant and newly postpartum women.

Design: An exploratory, qualitative descriptive study.

Setting: University affiliated prenatal clinics.

Participants: Twelve pregnant or recently postpartum women who reported using tobacco and electronic cigarettes.

Methods: Semi-structured focus groups were audio recorded and professionally transcribed. The transcripts were coded to consensus and analyzed with MAXQDA using content analysis.

Results: Four overarching themes emerged: (a) *attraction to e-cigarette as a harm reduction strategy*; (b) *uncertainty regarding the health effects of e-cigarettes*; (c) *ambivalence regarding novel product characteristics*; (d) *behaviors reflected dual use and often complete relapse to traditional cigarettes*.

Conclusion: Pregnant women are initially attracted to e-cigarettes as a harm reduction strategy, but they often return to traditional cigarettes in the postpartum period. Nurses should counsel pregnant women on the adverse effects of fetal exposure to nicotine. Evidence-based nursing interventions are needed to prevent relapse during the postpartum period.

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Disclosure

The authors report no conflict of interest or relevant financial relationships.

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Precis

Pregnant women are initially attracted to e-cigarettes as a harm reduction strategy but they often return to traditional cigarettes in the postpartum period.

Keywords

Electronic Cigarettes; Qualitative Research; Tobacco Use

Smoking cigarettes during pregnancy is associated with serious adverse outcomes, including miscarriage, altered placental attachment and function, impeded fetal lung and brain development, preterm birth, and small for gestational age infant. After birth, infants born to women who smoked during pregnancy are at increased risk for sudden infant death syndrome (SIDS), altered lung function, and behavioral disorders (Dietz et al., 2010). Secondhand smoke exposure further increases the risk of SIDS, as well as respiratory infections, slowed lung growth, and middle ear disease (United States Department of Health and Human Services, 2014).

Pregnancy is a strong motivator for smoking cessation. Despite the increased motivation for smoking cessation, 10% of pregnant women in the United States smoke (Dietz et al., 2010), which shows the addictive nature of nicotine. Thus, some pregnant women use harm reduction methods during pregnancy, such as cutting down or use of electronic cigarettes (e-cigarettes) as a smoking cessation method or an alternative to complete abstinence from tobacco products (Graham, Flemming, Fox, Heirs, & Sowden, 2014).

An e-cigarette is a device that produces nicotine aerosol (also referred to as vapor or e-liquid) by heating a solution that typically contains propylene glycol or glycerol, nicotine, and flavoring agents (Grana & Ling, 2014). The majority of individuals who use e-cigarettes report doing so because they are considered less harmful than traditional cigarettes, or to quit or reduce their use of traditional cigarettes (Adkison et al., 2013; Brown et al., 2014; Etter, 2010; Goniewicz et al., 2014).

The perceptions that the e-cigarette is safe, healthier than cigarettes, or a smoking cessation aid may lead to an increase in use among pregnant women (Baeza-Loya et al., 2014). According to Kahr and colleagues (2015), pregnant women in the greater Houston area reported perceiving e-cigarettes as less harmful than traditional cigarettes but unsafe during pregnancy (Kahr et al., 2015). E-cigarette use during pregnancy may be particularly prevalent among vulnerable populations of women. Prevalence of smoking traditional cigarettes during pregnancy is greatest among low income women (Tong et al., 2013) and varies regionally. For example, the prevalence is particularly high in Kentucky, a tobacco growing state, where nearly one in every four pregnant women smoke traditional cigarettes (Campaign for Tobacco-free Kids, 2016). According to the Surgeon General, nicotine is linked to adverse fetal outcomes, including preterm delivery and stillbirth (United States Department of Health and Human Services, 2014). E-cigarette vapors contain known toxic and irritating carbonyl compounds (formaldehyde, acetaldehyde, and acrolein), volatile organic compounds, tobacco specific nitrosamines, and metals (cadmium, nickel, and lead)

(Goniewicz et al., 2014). In addition, results of a recent study demonstrated that some of the e-cigarette flavoring chemicals were aldehydes (Tierney, Karpinski, Brown, Luo, & Pankow, 2015). While the level of toxic substances in e-cigarettes are significantly lower than in traditional cigarettes (Goniewicz et al., 2014), virtually nothing is known about the health effects of e-cigarette use during pregnancy on fetal outcomes. The purpose of this study was to describe perceptions and beliefs about e-cigarette use during pregnancy among Medicaid eligible pregnant and newly postpartum women in Kentucky who reported smoking three months prior to pregnancy or during pregnancy.

METHODS

Twelve women participated in this exploratory study with a qualitative, descriptive design (Sandelowski, 2000). This was the second phase of a two part study that was approved by the University of Kentucky Institutional Review Board. In the initial phase, a convenience sample of pregnant women was recruited from prenatal clinics to participate in a survey regarding tobacco and e-cigarette knowledge, attitudes, and behaviors. For the second phase, women were invited to participate in focus groups if they (1) reported smoking (traditional cigarettes or e-cigarettes) in the three months preceding their pregnancy or during their pregnancy; (2) had given permission to be contacted for additional studies. Women were compensated for study participation with a \$20 Walmart gift card.

Two focus groups that each lasted approximately one hour were conducted in a private room in a prenatal clinic affiliated with a university healthcare system. The focus groups were semi-structured and based on a focus group guide that was designed to elicit perceptions and beliefs about the product. The focus group guide was reviewed by experts in e-cigarettes, tobacco treatment, and tobacco use among pregnant women. Initial prompts included *I brought this with me today (an e-cigarette). How would you describe it?* and *What comes to mind first when you think about e-cigarettes?* Women were then asked to describe the first time they used an e-cigarette and their current use patterns. Next, women were asked about their perceptions of risks and benefits of using e-cigarettes during pregnancy. Finally, women were asked to compare the risks of e-cigarettes to traditional tobacco cigarettes. The moderator had a set of probes to use and followed up on the answer to each question, as well as explored unexpected topics that arose during the discussion. The focus groups were voice recorded and a project assistant observed and took notes.

The recordings were professionally transcribed, and the transcripts were checked for accuracy. Members of the project team reviewed the transcripts and notes and identified patterns and trends. Enrollment in the study ended when data saturation was reached (i.e., no new ideas emerged from the participants) (Berg & Lune, 2009). Data were analyzed using content analysis. The identified patterns and trends were used to inductively create codes. Codes were affixed to the transcript to identify overarching categories in the data using MAXQDA. Both focus groups were coded by two trained Project Assistants (AM & SA). Each discrepancy was discussed and resolved by the project team until consensus was reached.

Results

The sample for this qualitative study included 12 women, 8 of whom were pregnant at the time of data collection and four who were newly postpartum. The sample was predominately White (9/12 of the women) and single (7/12 of the women) and reported an annual household income of less than \$9,999. Four overarching themes emerged: (a) *attraction to e-cigarette as a harm reduction strategy*; (b) *uncertainty regarding the health effects of e-cigarettes*; (c) *ambivalence regarding novel product characteristics*; (d) *behaviors reflected dual use and often complete relapse to traditional cigarettes*.

Attracted to E-Cigarette as a Harm Reduction Strategy

Participants primarily used e-cigarettes during pregnancy as a harm reduction strategy. According to one participant, “At the beginning of my pregnancy, I would only smoke like maybe 3 cigarettes at the most...and I went to Marlboro Lights...and then I completely just quit and picked up the e-cig.” This was driven by their belief that the e-cigarette was a less harmful alternative compared to traditional cigarettes. Compared to traditional cigarettes, participants viewed e-cigarettes as “not as threatening as regular cigarettes.” One participant explained, “I think that you don’t get the tar which is like the main thing for cigarettes.” Participants viewed e-cigarettes as “cleaner” options, appreciated that “you don’t have to deal with all the pesticides,” and viewed the secondhand vapor as safe. One participant reported a benefit of e-cigarettes as “not having smoke around the baby” and another explained, “It’s just vapor, like you have nothing to lose by using their product.”

The participants were attracted to e-cigarettes as cessation devices over traditional cessation products:

The patches can get sweaty, they fall off. The gum can cause cavities and do other things and it’s just nasty, it’s not appealing at all...And if you go and you get the vape, you’re still doing that oral fixation to be able to hold it up in your mouth; you’re still getting to see that you’re smoking, you’re seeing the smoke come out of your mouth, you’re still tasting the smoke.

Uncertainty Regarding the Health Effects of E-Cigarettes

Despite participants’ attraction to e-cigarettes as a cessation device, they described uncertainty: “And now there’s like studies out that they’re not as safe as they once thought so I just don’t even chance it anymore.” Another explained, “I’ve seen online where you can like get like pneumonia and stuff... it’s kind of like liquid going into your lungs but I don’t know how true that is; I just read that.” A participant reported, “They say it’s just water and glycerin but there is other stuff in there too and you don’t really know...so I just wouldn’t chance it.”

Participants also reported mixed messages from their health care providers. One participant reported, “My sister did and her doctor told her not to use it at all. He said he would rather her smoke like a couple of cigarettes a day than use the e-cig.” However, another reported,

And then I completely just quit and picked up the e-cig and worked with it while I was kind of pregnant but I was kind of scared but I talked to my doctor about it and they said it was fine you know so.

Ambivalence Regarding Novel Product Characteristics

Participants described positive and negative characteristics of the novel product. Participants enjoyed the variety of flavors, and one reported, “Today, I feel like a menthol, tomorrow I’ll feel like strawberry, the next day I feel like unicorn.” Participants also viewed the ability to select the nicotine dose as a positive attribute. According to one participant, “Even though you do get nicotine, you can choose what level of nicotine you want to get and some of them have an automatic like shut off if you puff on it too many times.” Another explained, “Lower milligrams of nicotine is better and if you can get the ones without nicotine in it, that’s even better.” Participants also described the possibility of using an e-cigarette to conceal illicit substance use. One participant explained, “It’s pure legal, it’s legit. Marijuana, it’s a way that you can hide it, alter the smell...you’re a cop, and I’m smoking this, you’re not going to come over and be like, ‘What’s in your e-cig?’”

However, participants also described negative aspects of e-cigarette components. Participants reported frustration with the required equipment associated with e-cigarette use. One stated, “Cigarettes...you have a lighter, that’s it, that’s what you need.” Another explained,

If you lose the charger, oh man...I’d walk down to the gas station...I’d be like, please, please, just sell me another charger. And they’re like, we can’t just sell just the charger, you’d have to buy a batter too...it’s really frustrating.

A respondent stated, “You had to keep it charged up all the time and the battery would go down really fast and it was frustrating and it made me want a real cigarette...there’s no comparison.” Another source of frustration with e-cigarette use was the feeling that “there’s something missing” or that it “just wasn’t strong enough.” A participant explained, “I think not smoking at all was less frustrating than trying to get the satisfaction of a real cigarette from an e-cigarette.” Finally, another negative attribute was discomfort associated with use. One participant reported, “It felt like it burned your throat”, and another stated, “It hurts.” A participant explained, “When I first started using the e-cigs, I felt like I could breathe better, but I still didn’t feel completely as good as when I quit like altogether.”

Behaviors Reflected Dual Use and Often Complete Relapse to Traditional Cigarettes

Participants also reported relapse to traditional cigarettes. One stated, “I just lost the taste for e-cigs and stayed with the cigarette.” Another explained, “It made me quit for like a month or two but then I got to where I wanted an actual cigarette, and so I was like, just forget this and I’ll go back to a cigarette.” Several participants reported that the relapse occurred during the postpartum period. One participant stated, “It [electronic cigarettes] helped with the cravings...but after I had him [her son], I picked it [traditional cigarettes] right back up.” Another explained,

The first time I tried one [an e-cigarette] was the first time I got pregnant, which was like 6 years ago...I quit smoking though and I didn't start back until I had twins, at like 6 months...and then I started back when one passed away.

Discussion

The majority of participants were attracted to e-cigarettes to reduce or stop smoking traditional cigarettes. Participants perceived e-cigarettes as “cleaner” than traditional cigarettes, and highlighted a lack of “tar” and “pesticides.” These perceptions align with e-cigarette marketing. Many e-cigarette retail marketing sites include claims related to health (95%) and smoking cessation (64%). These websites also included claims that e-cigarettes are cleaner (93%) and do not emit secondhand smoke (76%). Although many sites had a disclaimer (e.g., “may be hazardous for pregnant women or those sensitive to nicotine”), the disclaimers were displayed less prominently than other messages, often at the bottom of the website in small print (Grana & Ling, 2014).

The participants in this study also reported a lack of consistent messaging from their healthcare providers. A sample of Minnesota healthcare providers (family physicians, nurse practitioners, and pediatricians) reported that their most frequent sources of e-cigarette related information were other patients, advertisements, and news stories (Pepper, McRee, & Gilkey, 2014). The results of this study, as well as the literature, indicate that there is a need for a consistent message from the healthcare community regarding e-cigarettes, particularly for pregnant women and women of childbearing age.

The women in this study discussed their perceptions of the risks and benefits of using e-cigarettes during pregnancy. Further, the well-established harms of nicotine use during pregnancy did not emerge as a central theme. There has been an on-going public debate over the risks and benefits of e-cigarettes, although the health outcomes from nicotine use are less frequently discussed. It is possible that the combination of retail e-cigarette marketing claims, mixed messages from healthcare providers, as well as the on-going debate over the safety of these devices overshadows the known risk.

Participants described switching to e-cigarettes during pregnancy but relapsing to traditional cigarettes after the birth of their child. It is well documented in the literature that relapse to smoking is common among women who stop smoking during pregnancy. Grover and colleagues demonstrated that smoking cessation during pregnancy was not a significant predictor of three year smoking abstinence (Grover, Zvolensky, Lemeshow, Galea, & Goodwin, 2012). According to a systematic review of the literature, interventions to promote smoking cessation or reduction or prevent relapse in the postpartum period (e.g., counseling, advice materials) were not effective (Levitt, Shaw, Wong, & Kaczorowski, 2007). Additionally, a recent synthesis of qualitative research emphasized the complexity of smoking cessation during and after pregnancy, specifically for women who are socially or economically disadvantaged (Flemming, McCaughan, Angus, & Graham, 2015). It is clear that there remains an inerrant need for continued research to develop efficacious interventions with this highly vulnerable population.

Limitations

The small sample size and the homogeneity of the sample pose limitations. Further, women were recruited from one geographic location. Although limitations exist, this study has several strengths. The sample for this study was Medicaid eligible women from a tobacco growing state with a high prevalence of tobacco use during pregnancy. Further, this study provides a contextual basis for the phenomenon of e-cigarette use during and after pregnancy. These findings will also provide preliminary data necessary to conduct a larger feasibility study to develop interventions that will address the multifaceted factors associated with e-cigarette use during pregnancy among women of childbearing age.

Conclusion

The prevalence of e-cigarette use has rapidly grown since their introduction to the market. Some e-cigarette users were drawn to the product as either a smoking cessation aid or a healthier alternative to smoking. Pregnant and postpartum women in this study were initially attracted to e-cigarettes as a harm reduction strategy, and also report a lack of consensus with healthcare messaging. Further, there is uncertainty surrounding the newness of the device and its components. Several participants reported switching to e-cigarette use (from traditional cigarettes) during pregnancy, but had relapsed to traditional cigarettes in the postpartum period. Results from this study support the need for clear messages regarding the adverse fetal effects of nicotine exposure, as well as the development of evidence based methods to prevent postpartum relapse to smoking.

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References

- Adkison SE, O'Connor RJ, Bansal-Travers M, Hyland A, Borland R, Yong H-H, ... Fong GT (2013). Electronic nicotine delivery systems: International Tobacco Control four-country survey. *American Journal of Preventive Medicine*, 44(3), 207–215. doi: 10.1016/j.amepre.2012.10.018 [PubMed: 23415116]
- Baeza-Loya S, Viswanath H, Carter A, Molfese DL, Velasquez KM, Baldwin PR, ... Salas R (2014). Perceptions about e-cigarette safety may lead to e-smoking during pregnancy. *Bulletin of the Menninger Clinic*, 78(3), 243–252. doi:10.1521/bumc.2014.78.3.243 [PubMed: 25247743]
- Berg BL, & Lune H (2009). *Qualitative research methods for the social sciences* Boston, MA: Pearson Education Limited publishing as Allyn & Bacon.
- Brown J, West R, Beard E, Michie S, Shahab L, & McNeill A (2014). Prevalence and characteristics of e-cigarette users in Great Britain: Findings from a general population survey of smokers. *Addictive Behaviors*, 39(6), 1120–1125. doi: 10.1016/j.addbeh.2014.03.009 [PubMed: 24679611]
- Campaign for Tobacco-free Kids. (2016, January 7). Key state specific tobacco-related data & rankings Retrieved from <https://www.tobaccofreekids.org/research/factsheets/pdf/0176.pdf>
- Dietz PM, England LJ, Shapiro-Mendoza CK, Tong VT, Farr SL, & Callaghan WM (2010). Infant morbidity and mortality attributable to prenatal smoking in the United States *American Journal of Preventive Medicine*, 39(1), 45–52. doi: 10.1016/j.amepre.2010.03.009 [PubMed: 20547278]
- Etter J-F (2010). Electronic cigarettes: a survey of users. *BMC Public Health*, 10(1), 1–7. doi: 10.1186/1471-2458-10-231 [PubMed: 20043862]

- Flemming K, McCaughan D, Angus K, & Graham H (2015). Qualitative systematic review: barriers and facilitators to smoking cessation experienced by women in pregnancy and following childbirth. *Journal of Advanced Nursing*, 71(6), 1210–1226. doi: 10.1111/jan.12580 [PubMed: 25430626]
- Goniewicz ML, Knysak J, Gawron M, Kosmider L, Sobczak A, Kurek J, ... Benowitz N (2014). Levels of selected carcinogens and toxicants in vapour from electronic cigarettes. *Tobacco Control*, 23(2), 133–139. doi: 10.1136/tobaccocontrol-2012-050859 [PubMed: 23467656]
- Graham H, Flemming K, Fox D, Heirs M, & Sowden A (2014). Cutting down: insights from qualitative studies of smoking in pregnancy. *Health & Social Care in the Community*, 22(3), 259–267. doi: 10.1111/hsc.12080 [PubMed: 24224830]
- Grana RA, & Ling PM (2014). “Smoking revolution”: A content analysis of electronic cigarette retail websites. *American Journal of Preventive Medicine*, 46(4), 395–403. doi: 10.1016/j.amepre.2013.12.010 [PubMed: 24650842]
- Grover KW, Zvolensky MJ, Lemeshow AR, Galea S, & Goodwin RD (2012). Does quitting smoking during pregnancy have a long-term impact on smoking status? *Drug and Alcohol Dependence*, 123(1–3), 110–114. doi: 10.1016/j.drugalcdep.2011.10.024 [PubMed: 22101026]
- Kahr MK, Padgett S, Shope CD, Griffin EN, Xie SS, Gonzalez PJ, ... Suter MA (2015). A qualitative assessment of the perceived risks of electronic cigarette and hookah use in pregnancy. *BMC Public Health*, 15(1), 1–8. doi: 10.1186/s12889-015-2586-4 [PubMed: 25563658]
- Levitt C, Shaw E, Wong S, & Kaczorowski J (2007). Systematic review of the literature on postpartum care: effectiveness of interventions for smoking relapse prevention, cessation, and reduction in postpartum women. *Birth*, 34(4), 341–347. doi: 10.1111/j.1523-536X.2007.00194.x [PubMed: 18021150]
- Pepper JK, McRee A-L, & Gilkey MB (2014). Healthcare Providers’ Beliefs and Attitudes About Electronic Cigarettes and Preventive Counseling for Adolescent Patients. *Journal of Adolescent Health*, 54(6), 678–683. doi: 10.1016/j.jadohealth.2013.10.001 [PubMed: 24332394]
- Sandelowski M (2000). Focus on research methods: Whatever happened to qualitative description? *Research in Nursing & Health*, 23, 334–340. [PubMed: 10940958]
- Tierney PA, Karpinski CD, Brown JE, Luo W, & Pankow JF (2015). Flavour chemicals in electronic cigarette fluids. *Tobacco Control* doi: 10.1136/tobaccocontrol-2014-052175
- Tong VT, Dietz PM, MORrow B, D’Angelo DV, Farr SL, Rockhill KM, & England LJ (2013). Trends in smoking before, during and after pregnancy-Pregnancy Risk Assessment Monitoring System, United States, 40 sites, 2000–2010. *Morbidity and Mortality Weekly Report*, 62(SS06), 1–19. [PubMed: 23302815]
- United States Department of Health and Human Services. (2014). *The health consequences of smoking-50 years of progress: A report of the Surgeon General* Atlanta, GA: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office of Smoking and Health.

Call Outs:

1. Virtually nothing is known about the health effects of e-cigarette use during pregnancy on fetal outcomes.
2. Participants reported an initial attraction to e-cigarettes as a harm reduction strategy and expressed uncertainty regarding the health effects of e-cigarettes.
3. Participants reported dual use of traditional cigarettes and e-cigarettes during pregnancy and relapse to traditional cigarettes during the postpartum period.