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Vaping guidance and women's decision-making during pregnancy & postpartum

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ABSTRACT

Background: Vaping during pregnancy remains under researched and under reported, making appropriate prevention, health promotion and intervention difficult to design and mount. In this article we assessed the experiences and considerations of women who vape during pregnancy and/or within 2 years post-partum, in order to underpin realistic and informative health information for women and providers in face of conflicting and minimal guidance.
Design: 22 interviews were conducted with pregnant and post-partum women who vape(d) nicotine, cannabis, or both during pregnancy and/or after delivery.
Methods: Participants who were pregnant or postpartum were recruited via social media and interviews conducted on Zoom or by telephone, recorded and transcribed. Data were coded in NVivo 12 and analyzed using a combined deductive and inductive approach, and principles of abductive analysis were applied to the data.
Results: Three overarching themes related to decision making about vaping are described: women's agency in information seeking, approaches to assessing information, and ambivalence regarding vaping practices. Women looked for information on the health effects of vaping during pregnancy and made differing decisions in the context of limited research and guidance. At times, family, friends, partners, and internet resources influenced their decisions. Some women dealt with ambivalence by vaping only in private, while alone, and at home or as a convenience. The women were uniformly aware of societal judgement regarding pregnancy and substance use in general and feared being addressed by friends or strangers about vaping.
Conclusion: In the absence of definitive research and unambiguous clinical guidance, the women felt limited in finding accurate advice, but demonstrated agency in information seeking and assessment. Nonetheless, they also recounted their ambivalence regarding their vaping decisions and practices. We created varied knowledge information products to fill this void.

1. Introduction

Vaping devices and/or electronic nicotine delivery systems (ENDS) represent modern routes of administration for ingesting nicotine and/or cannabis. They are sometimes recommended as less harmful than smoking or suggested as a way to assist in smoking cessation for adult smokers. At the same time, at least 33 countries have prohibited the sale of vaping devices outright, and many more regulate their use [1]. In the context of ongoing differential policy treatment, health care providers and consumers can be uninformed or confused, and resulting health promotion initiatives, guidance, and general knowledge, can vary widely.

In general, vaping nicotine and/or cannabis during pregnancy and postpartum is not advised, with the exception of the UK, where the National Health Service (NHS) recommends vaping (nicotine) use during pregnancy to assist with stopping tobacco smoking [2]. In most settings where vaping nicotine is recommended to assist with adult tobacco smoking cessation [3], and where vaping devices are widely available, the precautionary principle is applied to *any* substance use during pregnancy, including nicotine and/or cannabis. In the USA the Centre for Disease Control (CDC) recommends against all use of ENDS for women who are pregnant as nicotine is a health danger for women

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and fetuses [4] and against use of cannabis for pregnant women [5].

1.1. Health effects of cannabis and nicotine vaping during pregnancy

The "it is safest not to use cannabis at all" during pregnancy (and breastfeeding) message [6] reflects evidence of harm to fetal health, women's health, and infant development including low birth weight and preterm birth [7]. While the full picture of specific long term health effects of vaping cannabis during pregnancy is still unknown the precautionary principle persists [8,9]. There is similar, more well-established advice recommending abstention from tobacco use and nicotine ingestion during pregnancy [10]. Despite this, vaping nicotine using ENDS is treated differently among public health experts in similar countries. For example, vaping nicotine is viewed as harm reduction by the NHS in the UK and recommended as preferable to tobacco smoking during pregnancy [11]. Conversely, the CDC warns that nicotine poses health risks for pregnant women and developing babies [12]. Straddling these positions, Health Canada states: *"While vaping products contain fewer harmful chemicals than cigarettes, they may still contain nicotine. Talk to your health care provider about your options of quitting nicotine during pregnancy"* [13].

One review of ENDS use during pregnancy reports a lack of evidence on the effectiveness of using ENDS to reduce or quit tobacco smoking but in light of emerging evidence suggesting potential developmental toxicology, reasserts advising against ENDS during pregnancy [14]. While there is a general lack of research on the health effects of e-cigarettes on the fetus, animal studies suggest that nicotine negatively impacts the immune system, lungs, neural development, and cardiac function of the developing fetus [15].

1.2. Health care providers' responses to cannabis and nicotine vaping during pregnancy

The current context is challenging for health care practitioners (HCPs). In Canada, for example, there are rapidly changing patterns of tobacco and cannabis use, the uptake of a range of routes of administration (ROA), recent legalization of cannabis, unclear safety of vaping, and strong efforts to reduce or eliminate overall tobacco use.

Despite emergent evidence on the potential harms of cannabis and nicotine vaping during pregnancy, this information is not typically collected in prenatal records, and HCPs do not consistently ask or advise against either e-cigarette or cannabis vaping during prenatal visits [16,17]. It is also unclear to what extent HCPs and organizations in Canada are prepared to discuss cannabis use in pregnancy from a harm reduction perspective, beyond the formal precautionary and abstinence stance. Even in the UK, where advice is clearer, a study found that most HCPs reported supporting women who already used ENDS, but do not recommend it as a smoking cessation method due to safety concerns [18]. Clearly, women, HCPs, and the public need clearer information regarding vaping either nicotine or cannabis during pregnancy.

1.3. What do women say about vaping either nicotine or cannabis during pregnancy?

Given limited research and mixed advice, women are understandably unsure about best practices. In other substance use research, women often describe specific experiences, meanings, and patterns of use, reflecting sex/gender related factors [19–21]. Little research exists on women's perspectives on vaping cannabis or nicotine during pregnancy, but it is essential to understand the situations and perspectives of women who are pregnant or recently pregnant about their decision-making. For women who use ENDS or vape nicotine, there is clear preference of ENDS over smoking tobacco cigarettes [22], even among dual-user (co-using cigarettes and vaping nicotine) pregnant women in the UK who recognize nicotine' s harm [23].

Cannabis use is more context specific, as legalization impacts usage among pregnant women. In a US study, pregnant women report decreased stigma and less fear of child welfare involvement [24] and in Canada, pregnant women report using cannabis to cope with negative events, and for therapeutic and recreational use [25]. In another Canadian sample, despite legalization, women report discomfort in discussing use with health care providers [26].

A study by the Society of Obstetricians and Gynecologists of Canada (SOGC) of 3200 women accessing their Facebook page for information on cannabis during pregnancy found that women resisted the standard abstinence advice in pregnancy [27]. They were often cynical, skeptical, presented personal experiences as evidence, and identified what they considered to be misinformation, lack of supportive evidence, and/or contradictory advice from their HCP. The SOGC recommended creating separate messaging for HCPs, women who were pro-cannabis, and women who wanted more information.

In this complexity we undertook a study to examine women's patterns and vaping during pregnancy and postpartum, content of devices, substances and products used, reasons for vaping, context of initiation and use, sex and gender related factors affecting vaping, and relational dynamics related to use with a view to developing theoretical insights regarding these practices. We wanted to assess women's attitudes regarding risks and benefits of vaping on fetal, infant and maternal health and experiences of consulting a healthcare provider regarding their vaping. Insight from women who vape(d) during pregnancy is crucial to underpin the design of relevant, respectful, and effective health information, health promotion, prevention, and interventions. In this article, we present the findings of the interviews conducted with women, exploring their experiences and perspectives.

2. Methods

Recruitment: Between October 2020 and September 2021, we recruited a sample of eligible participants through social media (the CEWH Facebook (now Meta), Twitter (now X) and Instagram accounts) to participate in a survey on vaping during pregnancy and postpartum. In addition, we emailed key organizational contacts to share information about the research project and asked them to advertise the study, which included an online survey. At the end of the survey, all 111 participants were asked if they were interested in participating in an interview and if they agreed, they shared their contact details. All participants gave their consent to participate in this study.

Twenty-two semi-structured interviews were conducted by Zoom or by phone by two members of the research team, using the following questions and prompts (see Table 1), and were recorded, transcribed and analyzed using NVivo 12 [28].

The characteristics of the 22 women who agreed to be interviewed are described in Table 2 below.

3. Data analysis

Our approach was abductive analysis [29] which framed our coding, data analysis, iterative constant comparisons of data, fostering theoretical understanding of vaping among pregnant women. Abductive analysis is an approach and a process that is exploratory, creative, speculative, and about inference [29] including" a valuing of prompts from experiences outside research work and to backward mapping what can be traced in hindsight from an idea to justified belief or research claim" [29]. We also drew on Dierckx de Casterlé et al.'s insights on iterative analysis of qualitative data, and the benefits of a team-based approach [30].

We utilized backward mapping considering the situations of pregnant and mothering women who use substances, their resistance to stereotyping and categorization, reluctance to disclose substance use, and an understanding of stigma and shame directed at pregnant women (and mothers) who use substances of any type [31,32]. Pregnant women using substances are often vilified, threatened with child welfare

Table 1
Semi-structured interview questions.

1. Can you tell me a bit about the first time you vaped?
   a) What did you vape?
   b) What was it like?
   c) What was the best part?
   d) What was the worst part?
   e) Who were you with?
2. Can you describe your current vaping?
   a) What do you vape?
   b) How do you vape?
   c) Where do you vape?
   d) When do you vape?
   e) Do you ever vape alone?
   f) Noticed any impact on your health?
3. Did your vaping change during pregnancy and postpartum?
   a) Did you ever used flavoured nicotine or cannabis?
   b) If you stopped vaping during pregnancy, did you start/are you starting again?
4. Why did you vaped/vape during pregnancy? (nicotine/cannabis)?
   a) Did you find it beneficial to vape (morning sickness, anxiety and depression, sleep, appetite)
   b) Did you have any concerns or worries about harms from vaping during your pregnancy/postpartum/breastfeeding? (own, fetal or infant health, gestational age)
5. What do you know about vaping and pregnancy/postpartum?
   a) How did you get your information about vaping during pregnancy/postpartum?
   b) Have you ever asked your healthcare provider for information?
   c) If so, what information about vaping during pregnancy/postpartum did you receive?
6. What do you wish you had known during your pregnancy about vaping?
   a) Harms
   b) Benefits
   c) Other women's experiences
7. What would you tell other pregnant/postpartum women about vaping?
   a) Would you vape in a future pregnancy?
   b) Is there anything you would like to add?

Table 2
Socio-demographic characteristics of the women.

	N
Pregnant women	14
Postpartum women	8
Substance	
Cannabis	7
Nicotine	11
Cannabis and nicotine	4
Age category	
16-19	0
20-25	5
26-30	5
31-35	9
>36	3
Race/ethnicity	
Indigenous (First Nations, Inuit, or Métis)	6
White	15
Other	1
Education	
Grade school/some high school	1
Completed high school	2
Technical/trade school/community college	7
Some university, no degree	6
Completed university degree	4
Post-graduate degree	2
Income	
$29,999 and under	4
$30,000–59,999	5
$60,000–99,999	8
$100,000 and over	4
Refuse to answer	1
Marital status	
Common law	6
Married	8
Divorced or separated	1
Single, never married	7
Sexual orientation categories	
Bisexual	6
Heterosexual	16

involvement, and criminalized [33,34]: pressures that exist when using tobacco, opioids, alcohol and cannabis during pregnancy. Our analysis reflected on this social context, recent legalization of cannabis in Canada, and the marginalization of women mixing substance use with reproductive labour, calling upon reflexivity, iterative meaning-making, and pragmatic considerations of impact. Post interviews and transcription, broad themes were deductively identified by the team and the first author, who was also an interviewer, further refined these based on her personal memos. These were further discussed and refined with all team members, forming the basis for coding and developing sub/themes. These broad themes were deduced based on existing qualitative research on women's smoking [19] and reflection on the longstanding stigmatizing social and practice landscape regarding maternal substance use [33,34] (see Table 3 for the final version of the codes and subcodes).

Four researchers, excluding the first author, but including the second interviewer, independently coded 22 transcripts, refining codes and subcodes based on the main themes in three iterative discussions focusing on capturing women's decision-making experiences during pregnancy and postpartum. The first author reflected on their analyses, re-read all post interview memos and the coded transcripts, and summarized the findings, in order to draw theoretical conclusions. This analysis was then further discussed and iterated among the whole research team.

4. Results

We conducted 22 interviews with 14 women who were pregnant and 8 women who had delivered their babies. Among the interviewed women, 11 vaped nicotine, 7 vaped cannabis and 4 vaped both cannabis and nicotine. Their ages ranged from 20 to 42 years old.

Our analysis revealed several main themes, after iterative coding, team discussions, and clumping of data. Abductive analyses were useful in that some surprising examples and experiences emerged, inconsistent with stereotypes of pregnant substance-using women that assume addiction, dependence or lack of information or knowledge about harms. Some women describe complex decision making, drawing

Table 3
Codes.

Agency (whether and how women represent their agency)
Actively seeking knowledge and research
Actively thinking critically
Not wanting to know
Ambivalence (patterns of use)
Not ambivalent
Ambivalent
Influences of other people
Family
Friends
HCP (GP, OBGYN, midwife, nurse)
Media
Online support groups
Other professions
Partners
Social media (Facebook, Twitter, etc.)
Risk assessment and reduction (how women assessed risk)
Benefits
Physical health
Mental health (e.g., ADHD, depression, anxiety, insomnia, etc.)
Others (e.g., discretion, safety, etc.)
Perceived harm reduction (e.g., being natural as harm reduction)
Harms
Fetal/child health
Mental health
Physical health
Others (e.g., COVID influence - isolation, boredom, etc.)
Stigma
Comments about stigma
Perceived shame and guilt
Stigma about using it publicly
Stigma towards other substances - tobacco, alcohol
Stigma from HCP and health care systems

conclusions to abstain from, adopt harm reduction by, or continue, vaping, possibly reflecting the nature of vaping vs smoking, that allows for more agency and less stigmatization of substance use among pregnant women and mothers. In this article, we describe the three main themes that pertain to decision making.

Agency: Many of the women interviewed described exercising ongoing effort in determining how to make decisions about vaping nicotine and/or cannabis during pregnancy and postpartum. They report independently seeking evidence, information, and advice from a range of sources regarding vaping cannabis, nicotine, or both. Sources included published academic research, websites of various health agencies and organizations, health care providers, including doctors, obstetricians and midwives, magazines, newspapers, online chat groups, friends, and family members.

So I did a summary search on cannabis and breast-feeding and how it's a bit similar to drinking and breast-feeding, that there's a very small amount of marijuana goes into the breast milk. That's about what I know. I have not done research about vaping and breast-feeding, just 'cause I was on that mentality of 'oh, well, women back in the fifties used to smoke while they're pregnant, their kids are fine' ….(laugh) So that's where – as far as my knowledge for vaping goes. And then for the marijuana, yeah, I've read that it's still not recommended because they don't know much about it, but that – there's only a very small amount that goes in, and it's not like I'm smoking myself silly, either. I'm just doing the tiniest little amount and at night-time, so then it has time to filter out and whatnot, and then – yeah, that's pretty much – that's about all I know. (22 years old, postpartum, vaped both cannabis and nicotine during pregnancy and postpartum).

In some instances, women relayed information from research articles, offering critiques or comparisons to other research results. Some displayed a deep familiarity with prevailing evidence, advice, and news on the use of vaping devices, nicotine, and cannabis during pregnancy and postpartum, and aided by the internet, they repeatedly described 'doing their own research', crossing jurisdictions, disciplines, and platforms in their searching.

I read things like health journals, health magazines. I also read university study research papers etc. And what I found challenging was that these studies were so old – they were decades old, these studies. And also the test populations of women, so many other factors were combined into it, like narcotic use, tobacco use, etc … I don't smoke tobacco, and I haven't used any other drugs or alcohol or anything during my pregnancy. I'm just using cannabis. And so that was difficult for me, because I didn't feel that these articles truly applied to my own situation. (36, pregnant, cannabis only).

Assessment: In the face of these exercises in research, discussion, and reading, they describe their own processes of measuring and assessing risk, which were largely individual and private. The risk/benefit balance was explicitly or implicitly mentioned in light of potential risks to their own overall mental health, including anxiety, depression or attracting stigma if they did not vape cannabis and/or nicotine.

We don't have all the same reality and I think it's important to know that before judging someone for her – a pregnant woman for addiction. Maybe she needs that to be sane in this pregnancy. (28, postpartum, did not vape during pregnancy, started after delivery, vaped both cannabis + nicotine after delivery).

A minority of women dismissed the evidence, based on its inconclusivity, conflicting results, or poorly designed studies.

I know that there is a lot of information out there about smoking and pregnancy so I think – smoking cigarettes and pregnancy – so I think that subconsciously, I went, 'Well, there's no necessarily bad things about this … there's no major studies like smoking and pregnancy … so it can't be that bad, or there'd be breaking news.' Yeah, I … decided, "Well, this (vaping) is obviously better than smoking. (20, postpartum, nicotine).

Most women avidly consumed information, compared notes between sources, and discussed with like-minded women friends, especially those who had vaped during pregnancy. The risks to health and welfare of themselves and their fetus or infant were weighed, and harm reduction approaches taken up.

Put in the research, ask the questions, talk to people you trust but also talk to people that you don't think are going to give you the answers you want as well. 'Cause I think the truth lives somewhere in between all of that ….I think it's important to keep all of that in the air but then I also – I empower women to make the choices, not just whether or not they're going to consume cannabis but whatever other actions and methods they need to take during a pregnancy, as its your choice. (36, pregnant, cannabis).

Ambivalence: The women described ongoing ambivalence amidst the lack of credible information, perceived societal stigma, internalized stigma, and varied influences from family and friends.

I guess I just wish there was more knowledge and more scientific studies backing – to know, yes, it's wrong, no, it's – or, no, it's wrong, yes, it's right. It's very – there's just not a lot of knowledge. I don't think that cannabis use is good for every single person, just to begin with. So I'm torn on whether someone should use it in pregnancy, just based on that. We don't know. … But then, at the same time, I know that some women really find it useful for mitigating especially … nausea and stuff like that. Yeah. I'm really torn on the entire subject (34, pregnant, vaping cannabis).

In this arena, women differed depending upon their own child's health, partner's or family members' approval or judgement of their decisions and their level of resistance to stigma, adjusting their behaviours in different situations. In some cases, partner support involved co-vaping, developing boundaries about vaping, or agreeing to not mention it. Some women dealt with ambivalence by vaping only in private, while alone, and at home or as a convenience, or rationalizing. The women were aware of societal judgement regarding pregnancy and substance use in general and feared being addressed by friends or strangers about vaping.

So I was off and on. I stopped for a bit. And then I decided to see how it would be if I did both. Because I found at certain instances, certain places and certain times, I wouldn't smoke that much. And I thought, "I'm just wasting money." And at least with the vaping, if I just wanted to have a couple of drags, I could have a couple of drags, and that's that … So I found that it worked because they (cigarettes) stink if I'm on the bus or in the car, anywhere at work. It has a certain smell to it and I just really didn't want – I

didn't like it, personally. So I loved the fact that I had that option. So that's how I continued with vaping and smoking (42, postpartum, vaping and smoking nicotine during pregnancy and postpartum).

Don't vape! Don't, because there's not enough proven studies about it and you don't know about what could happen. I would say that more about the nicotine vaping. I feel like it's different to be smoking marijuana, a little bit more than the nicotine. The only concern that I have about smoking marijuana was that I don't know – he's fine, of course, he's completely good, he's very smart, he's very strong … But I don't know what his – how his brain development will be, when he goes to school or – and I don't know if – you just don't know, and that's a risk that I decided to take. So I would just tell moms, 'maybe just don't do it'. (22, postpartum, vaped both cannabis and nicotine during pregnancy and postpartum).

5. Discussion

Our analysis was exploratory, speculative, and inferential [29], given the disconnect between health advice and women's realities regarding vaping. It was useful to build upon broader analyses of substance use during pregnancy, recognizing that vaping utilizes new devices and (substances in some cases), but substance use during pregnancy is an established phenomenon with overarching historical responses and prohibitions. In particular, previous analyses of women's experiences with tobacco smoking offered a basis for our analysis, as vaping nicotine and/or cannabis has similar effects and purposes, such as stress relief, management of negative emotions, and relaxation, and vaping during pregnancy can invoke similar societal stigma [24,25]. However, key differences between vaping and smoking are the (potential for) invisibility and societal ambiguity in responding to vaping. Abductive analyses were useful in linking situational factors to women's data. In the context of prevailing stigma directed toward women who are pregnant who use any substance, women who vape modify their behaviour and engage in private or limited information seeking practices. Stigma surrounding prenatal cannabis use that has been reported in several studies [24,26] along with the inconsistency of information and guidance, both surrounded and underpinned the agency, assessment, and ambivalence that we encountered.

Women who vaped cannabis or nicotine had different concerns, in that those vaping nicotine were often trying to reduce the harm of smoking tobacco cigarettes, and provided a less visible and stigmatizing option, whereas those who vaped cannabis were more often perceiving cannabis as therapeutic and positive for their mental and physical health, and less harmful than nicotine, alcohol, or other drugs, including prescription medications. Nevertheless, they invariably sought information and advice from a range of sources on how vaping affected health, in relation to smoking or other routes of administration, whatever the substance. The result involved taking charge of the assessment process, weighing information, research, advice, against their own experience and coming to decisions about vaping. Most often these decisions were unclear, given the lack of clear research, advice from health care practitioners, inconsistent policies and legislation, and conflicting information, coupled with the inability to have open conversations with providers or others due to stigma and fear.

6. Conclusion

The ongoing dearth of research on vaping during pregnancy and postpartum, confusing, and inconsistent global policy and advice regarding ENDS, cannabis use, tobacco harm reduction and vaping devices creates a spongy platform for women on which to make decisions about vaping. This creates considerable space for individual decision making, unmoored from evidence, clarity from health care providers, or anchored in regulations, clinical guidelines, or policy. Health care providers could address this situation by initiating destigmatizing, open-ended conversations about using cannabis and or nicotine, vaping, and general substance use during pregnancy and postpartum. Responding to this, we created some resources for women and providers [35,36] that recognize the vacuum and inconsistency of research, but realistically support women in making decisions about vaping in the everyday context of their lives. Respectfully addressing women's agency, assessment, and ambivalence in the context of pregnancy, from a strengths-based stance, is a good place to start.

6.1. Limitations

This is an exploratory study utilizing a self-selected convenience sample, derived from advertising on social media, and prompts to organizations and respondents to recommend and recruit other women who vape(d) during pregnancy. The biases in this sample are unknown, but could include women with an interest in defending, learning more about, or seeking help with vaping during pregnancy. Team members exercised reflexivity in large part by reflecting on parallel and prior knowledge of sex and gender related factors regarding vaping nicotine, vaping cannabis, and smoking tobacco. We recognized and built upon overlaps among these activities in our analysis, but it may ultimately emerge that vaping nicotine and/or cannabis during pregnancy is unique, additionally complex and changeable, and reflects contemporary factors such as online gendered marketing, social media influences, provider avoidance and/or other unknown factors, and that some prior learnings do not apply to analysing vaping during pregnancy.

6.2. What this study adds

- Insight into women's decision making and considerations on vaping nicotine and/or cannabis during pregnancy and postpartum.
- Insight into information-seeking, risk assessment processes and responses to stigma and other social influences
- Description of individual decision making in the face of a public health vacuum, or conflicting advice regarding vaping during pregnancy and postpartum.

6.3. Implications for policy and practice

- Highlights the need for developing relevant and realistic information and resources on vaping during pregnancy.
- Identifies some entry points for health care providers to use to begin conversations with pregnant women regarding vaping.
- Amplifies the urgency to develop a global policy position on vaping, and guidelines on vaping during pregnancy.

Authors statements

This study was approved by the University of British Columbia & Children's and Women's Hospital Research Ethics Board (H20-03197). All participants provided informed consent. Funding was provided by the Canadian Institutes for Health Research Grant under the Funding Call Catalyst Grant: Health Effects of Vaping. We acknowledge and thank the women who gave interviews for this project. We declare we have no competing interests.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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