BMJ Open

Canadian educational resources about cannabis use and fertility, pregnancy and breast feeding: a scoping review protocol

Kira Bombay,[1] Malia S Q Murphy,[1] Kathryn M Denize,[1] Ayni Sharif,[1] Lindsey Sikora,[2] Rebecca Murray,[3] Kelly D Cobey [ID] ,[4,5] Daniel J Corsi [ID] [1,5,6,7,8]

For numbered affiliations see end of article.

Correspondence to
Dr Daniel J Corsi;
dcorsi@ohri.ca

ABSTRACT

Introduction Cannabis use in Canada is becoming more prevalent across all demographic groups due to increases in accessibility and lowered perceptions of harm. These patterns are mirrored among women of reproductive age, including women who are pregnant. Given increasing evidence for detrimental short- and long-term impacts of cannabis exposure on fetal, newborn and child outcomes, there is a need for high-quality, accessible resources providing reliable guidance and recommendations on this topic for both the public and healthcare providers. We will conduct a scoping review to identify and characterise all publicly available online educational resources discussing cannabis use related to fertility, pregnancy and breastfeeding developed by Canadian organisations.

Methods and analysis Using Arksey and O'Malley's scoping review methodology as a guide, we will search Medline (Ovid), Medline in Process (Ovid), Embase (Ovid), ERIC (Ovid), CINAHL (EBSCOhost) and Education Source (EBSCOhost). We will also conduct a grey literature search targeting the websites of national and independent Canadian obstetrical societies and networks, and government and public health offices that provide recommendations or guidance to individuals and their healthcare providers seeking information on cannabis use related to fertility, pregnancy or breastfeeding.

Ethics and dissemination Research ethics approval is not required for scoping review studies. We anticipate that this review's findings will be disseminated through traditional channels, including preprint and peer-reviewed publications and presentations at academic conferences. In addition, the resources and guidelines identified in the study will be gathered and made available online on a single comprehensive public repository.

Protocol registration number osf.io/p24y5.

INTRODUCTION

Canada is the second country to legalise the possession and non-medicinal use of cannabis at the national level.[1] Cannabis use in Canada has grown steadily over the past decade across many demographic groups, including new and expectant parents.[2] In the province of Ontario, the prevalence of cannabis use in pregnancy rose from 1.2% in 2012 to 1.8% in 2017, a relative increase of 61%.[3] These findings are similar to those from other Canadian provinces,[4] and mirror those from other countries, where perinatal cannabis use based on self-reports and toxicology varies from 1% to 7%.[5–10] Further increases in cannabis use are anticipated in the postlegalisation setting due to lowered perceptions of harm and as varied formats for cannabis consumption become more widely available.

Data on the safety and health impacts of cannabis use related to fertility, pregnancy, breastfeeding and the exposed infant are limited. Existing evidence comes from epidemiological data and a handful of cohort studies limited by methodological challenges and small sample sizes.[11 12] A lack of contemporary, high-quality evidence has resulted in non-specific guidance from health organisations about perinatal cannabis use.[13] Furthermore, where clinical guidelines and educational resources are available in various forms from disparate national, provincial and lower level organisations, identifying reliable information based on the most up-to-date evidence is challenging. This is important, as the perceived quality and availability of information about perinatal cannabis use

Strengths and limitations of this study

► The search strategy will identify resources available from both the medical literature and online sources.
► The study design and search strategy are strengthened by guidance and expertise from a methodologist, information specialist, clinicians and a patient partner.
► The review will not consider international resources potentially transferable to the Canadian setting.
► The review will not include an analysis of social media content.

substantially influences women's interpretation about the risks associated with cannabis use for themselves and their infants.[13]

North Americans are increasingly seeking out health-related information online, before or in place of, consulting a healthcare provider.[14] Although guidance from popular or generic online resources may not be evidence-based, women have identified internet searches and anecdotal advice from family and friends as their primary sources of information about the consequences of perinatal cannabis use.[15] Women have also expressed dissatisfaction with the extent and quality of online information.[15] Furthermore, where obstetrical care providers may focus more on legal or social consequences of cannabis use than on possible health risks when providing counselling to patients,[16] patients may be dissuaded from accurately disclosing their cannabis or other drug use habits.

There is a complementary need for supports for healthcare providers to enable patient counselling about cannabis use in the perinatal period. Perinatal healthcare providers find a lack of information regarding the consequences of cannabis use during pregnancy and express discomfort in presenting and discussing the evidence with patients.[17] This is concerning, as women may perceive a lack of discussion or specific counselling about the cannabis use from healthcare providers to indicate that it does not represent a significant risk to their pregnancy or their developing child.[15] Identification and synthesis of guidance on perinatal cannabis use provided by Canadian organisations is warranted to help consolidate the scope of the information supplied to Canadians. This is necessary to lay the foundation for recommendations aimed at improving existing resources and identifying evidence gaps for future research.

OBJECTIVE
Our objective is to conduct a scoping review to identify and characterise all publicly available online educational resources and clinical guidelines providing information to the Canadian public and healthcare providers on the short and long-term effects of cannabis use on fertility, pregnancy and breastfeeding.

METHODS AND ANALYSIS
This protocol has been registered on the Open Science Framework.[18] Our scoping review will be guided by the frameworks proposed by Arksey and O'Malley, and Levac *et al.*[19 20] The steps outlined by these frameworks are:
1. Identifying the research question.
2. Identifying relevant literature/resources.
3. Literature/resource selection.
4. Charting the data.
5. Collating, summarising and reporting the results.

Step 1: identifying the research question
The main research question for this scoping review is as follows:

What is the current scope of available Canadian online resources on the potential short- and long-term effects of cannabis use on fertility, during pregnancy and while breastfeeding for mothers and their infants?

Step 2: identifying relevant literature/resources
Our search strategy will be developed by a trained information specialist (LS) and peer reviewed by an external information specialist using the Peer Review of electronic Search Strategies (PRESS) guideline.[21] A preliminary search will be conducted in Medline (Ovid) to inform our final search strategy. The following databases will be searched: Medline (Ovid), Embase (Ovid), ERIC (Ovid), CINAHL (EBSCOhost) and Education Source (EBSCOhost). The finalised search strategy for Medline (Ovid) is provided in the online supplemental appendix 1. Target literature will include clinician guidelines and recommendations, and resources designed for non-clinicians seeking information on how cannabis may affect male or female fertility, pregnancy and the developing child, and breast milk and the breastfeeding infant. As our focus will be contemporary resources, the publication year will be limited to the most recent 10 years. Primary research studies reporting on human or animal data will be excluded as will literature reviews and editorials or opinion pieces.

We will also perform a grey literature search of Canadian organisations known to provide guidance on pregnancy and breastfeeding. Target organisations include national and independent Canadian obstetrical and perinatal societies and networks, and the federal and provincial government and public health offices that provide recommendations for safe cannabis use. We have identified relevant organisations in consultation with stakeholders in our professional networks (online supplemental appendix 2). Regional or local resources specifically recommended by project stakeholders are included. Eligible records within these organisations' web pages will be identified through internal searches of the parent organisation for key search terms (online supplemental appendix 3). Two independent reviewers will complete this work (KB, AS). One reviewer will conduct searches, and a second reviewer will independently validate the searches. Identification of eligible records will be documented using the screening tool provided in the online supplemental appendix 4. Eligible records identified through the grey literature search will proceed directly to data extraction.

We will only include resources from the two official languages in Canada (English and French), which will be identified during the screening process. A cited reference search of included documents will be done to identify relevant records from their bibliographies that may have been missed by our search strategy.

Step 3: literature/resource selection
The titles and abstracts of all documents obtained from the database search will be screened independently by

Table 1 Population-concept-context framework

Category	Description
Population	Documents developed for Canadian clinicians or lay public.
Concept	Documents providing recommendations, guidance, or reporting on the safety or use of cannabis for male and female fertility, pregnancy and the developing child, or breast milk and the breastfeeding infant.
Context	Documents developed by Canadian organisations (obstetrical societies, networks as well as government and public health agencies). We will include English and French language records. The time frame will not be limited from 2010 to present.

two reviewers (KB, AS). We will use the liberal accelerated approach to screening for titles and abstracts of records retrieved through the database search, whereby all documents in conflict will proceed to full-text screening.[22] Screening questions that will be applied to titles and abstracts are provided in the online supplemental appendix 5. The full texts of all potentially relevant documents will be retrieved and independently reviewed by two team members for eligibility using the screening questions provided in the online supplemental appendix 6. The two independent reviewers will discuss any discrepancies at full-text screening until a consensus is reached. If the reviewers are unable to resolve disagreements through discussion, a third reviewer will be consulted. In cases where the reviewers are unable to retrieve the full text of an article (in the case of clinical guidelines and recommendations), efforts to obtain the full text will be made via a request to the corresponding author or an interlibrary loan placed through our local library system. If efforts to retrieve the full text fail, the document will be excluded from the scoping review.

We will include documents that meet our population, concept and context of interest (table 1).[23] Specifically, we will include resources that target Canadian clinicians or lay public (population) and provide recommendations, guidance or reports on the safety or impacts of cannabis use on male and female fertility, pregnancy and the developing child, and breast milk and the breastfeeding infant (concept). Included literature must be available in either English or French and developed by Canadian organisations (obstetrical societies or networks, government organisations and public health agencies) (context). If the literature directs users to external web pages/resources, this will be noted, and the linked web page/resource will be screened for eligibility for inclusion in this review.

Step 4: charting the data

Data extraction will be completed by two independent reviewers (KB, AS) and facilitated by a data extraction form (online supplemental appendix 7). One reviewer will extract the data, and a second reviewer will validate their work.

Bibliometric details will be extracted from the included resources. For clinical guidelines and recommendations published in peer-reviewed journals, extracted bibliometric information will include:
- Name and email of the corresponding author.
- Journal name and date (month, year) of publication.
- The organisation, group or society that developed the document (if applicable).

For other online resources (web pages, PDF documents or similar), we will extract the URL, date of publication (month, year, if available) and date accessed (day, month, year), the title of the document, and the organisation, group or society that developed the resource. We will also document the format in which the resource is available (web page, PDF document) and aesthetic features (the extent to which it includes images or videos, if any).

From the included resources, we will also chart the following characteristics: target population (general public, healthcare providers), the language of publication (English, French, both) and the scope of the information presented on cannabis use (ie, related to fertility, pregnancy or breast feeding), and recommendations conveyed as it relates to cannabis use and fertility, pregnancy or breast feeding. Accessibility of online resources (web pages, PDF documents or similar) will be scored as reviewer's perception of how easy it was to find the resource from the parent website home page. Readability of online resources will be evaluated using the Simple Measure of Gobbledygook to determine the reading level.[24]

Both reviewers will complete data extraction simultaneously with a full-text review on all included literature. Modifications to the data charting strategy, if needed, will be fully reported.

Step 5: collating, summarising and reporting the results

We will present our results in graphic and tabular formats, with key characteristics, concepts and themes summarised and explained in keeping with scoping review methodologies. We will collate results distinctly for resources targeting healthcare providers versus the lay public and comment on consistency in messaging between these resources. Key characteristics will include bibliometric details, level of jurisdiction of the authoring organisation (local, provincial, federal), language and format of publication, use of cannabis-related terminology, readability and aesthetic features. Key concepts will include the type of cannabis use addressed (medicinal, recreational) and potential health impacts/outcomes discussed (ie, related to male or female fertility, pregnancy and the developing child, breast milk and the breastfeeding infant). Extracted themes will focus on the recommendations made to the reader, the language used to make those recommendations (with quotes provided as examples) and evidence gaps cited by the included resources. A subanalysis of resources specific to short-term versus longer-term (e.g., neurodevelopmental) outcomes of exposed infants

will also be presented. We will synthesise dominant concepts and themes in the form of a visual figure, and consolidate the identified resources into a searchable database. We will adhere to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews checklist to report the results of this scoping review.[25]

PATIENT AND PUBLIC INVOLVEMENT

This protocol was developed in collaboration with a partner from the lay community with recent pregnancy and breast-feeding experience (RM). This partner will be invited to participate in the synthesis of outcomes and interpretation of the results and contribute to the writing or editing of the final scoping review for readability or accuracy.

ETHICS AND DISSEMINATION

Research ethics board approval is not required for scoping reviews. We anticipate that the findings of this review will be disseminated through traditional channels, including peer-reviewed publications and presentations at academic conferences. Additionally, the resources and guidelines included in the study will be gathered and made available online for the public to access.

Generating a complete picture of currently available Canadian resources for the lay public and healthcare providers on the short-term and long-term effects of cannabis use on fertility, pregnancy and breast feeding is a necessary first step to improving these resources' scope and quality. The proposed scoping review will identify and synthesise Canadian clinical guidelines and educational resources related to cannabis use and fertility, pregnancy and breast feeding. We will summarise the strengths and weaknesses of resources developed for healthcare providers and the public, consolidate cited evidence gaps, identify possible inconsistencies in messaging and make recommendations for improvement. Although we will not consider information distributed through social media platforms, social media is a primary source of health-related information for many consumers, which will be a subject of future work. Through this work, we will generate a comprehensive list and searchable repository of currently available educational resources that can be made available for anyone seeking information on the safety of cannabis use before and during pregnancy and while breastfeeding.

Author affiliations
[1]OMNI Research Group, Clinical Epidemiology Program, Ottawa Hospital Research Institute, Ottawa, Ontario, Canada
[2]Health Sciences Library, University of Ottawa, Ottawa, Ontario, Canada
[3]Patient Partner with the OMNI Research Group, Clinical Epidemiology Program, Ottawa Hospital Research Institute, Ottawa, Ontario, Canada
[4]Centre for Journalology, Ottawa Hospital Research Institute, Ottawa, Ontario, Canada
[5]School of Epidemiology and Public Health, University of Ottawa, Ottawa, Ontario, Canada
[6]BORN Ontario, Children's Hospital of Eastern Ontario, Ottawa, Ontario, Canada
[7]Children's Hospital of Eastern Ontario Research Institute, Ottawa, Ontario, Canada
[8]Obstetrics and Gynecology, University of Ottawa, Ottawa, Ontario, Canada

ORCID iDs
Kelly D Cobey http://orcid.org/0000-0003-2797-1686
Daniel J Corsi http://orcid.org/0000-0001-7063-3354

REFERENCES

1 Cannabis Legalization and Regulation, 2019Government of Canada. Available: https://www.justice.gc.ca/eng/cj-jp/cannabis/
2 Lowry DE, Corsi DJ. Trends and correlates of cannabis use in Canada: a repeated cross-sectional analysis of national surveys from 2004 to 2017. *CMAJ Open* 2020;8:E487–95.
3 Corsi DJ, Hsu H, Weiss D, *et al.* Trends and correlates of cannabis use in pregnancy: a population-based study in Ontario, Canada from 2012 to 2017. *Can J Public Health* 2019;110:76–84.
4 Luke S, Hutcheon J, Kendall T. Cannabis use in pregnancy in British Columbia and selected birth outcomes. *J Obstet Gynaecol Can* 2019;41:1311–7.
5 Saurel-Cubizolles M-J, Prunet C, Blondel B. Cannabis use during pregnancy in France in 2010. *BJOG* 2014;121:971–7.
6 Leemaqz SY, Dekker GA, McCowan LM, *et al.* Maternal marijuana use has independent effects on risk for spontaneous preterm birth but not other common late pregnancy complications. *Reprod Toxicol* 2016;62:77–86.
7 Hayatbakhsh MR, Flenady VJ, Gibbons KS, *et al.* Birth outcomes associated with cannabis use before and during pregnancy. *Pediatr Res* 2012;71:215–9.
8 El Marroun H, Tiemeier H, Steegers EAP, *et al.* Intrauterine cannabis exposure affects fetal growth trajectories: the generation R study. *J Am Acad Child Adolesc Psychiatry* 2009;48:1173–81.
9 Ko JY, Farr SL, Tong VT, *et al.* Prevalence and patterns of marijuana use among pregnant and nonpregnant women of reproductive age. *Am J Obstet Gynecol* 2015;213:201.e1-201.e10.
10 Young-Wolff KC, Tucker L-Y, Alexeeff S, *et al.* Trends in self-reported and biochemically tested marijuana use among pregnant females in California from 2009-2016. *JAMA* 2017;318:2490–1.
11 McLemore GL, Richardson KA. Data from three prospective longitudinal human cohorts of prenatal marijuana exposure and offspring outcomes from the fetal period through young adulthood. *Data Brief* 2016;9:753–7.
12 Corsi DJ. Epidemiological challenges to measuring prenatal cannabis use and its potential harms. *BJOG* 2020;127:17.

13 Bayrampour H, Zahradnik M, Lisonkova S, *et al*. Women's perspectives about cannabis use during pregnancy and the postpartum period: An integrative review. *Prev Med* 2019;119:17–23.

14 Fox S, Duggan M. *Health online 2013*, 2013.

15 Jarlenski M, Tarr JA, Holland CL, *et al*. Pregnant women's access to information about perinatal marijuana use: a qualitative study. *Womens Health Issues* 2016;26:452–9.

16 Holland CL, Nkumsah MA, Morrison P, *et al*. "Anything above marijuana takes priority": Obstetric providers' attitudes and counseling strategies regarding perinatal marijuana use. *Patient Educ Couns* 2016;99:1446–51.

17 Holland CL, Rubio D, Rodriguez KL, *et al*. Obstetric health care providers' counseling responses to pregnant patient disclosures of marijuana use. *Obstet Gynecol* 2016;127:681–7.

18 Corsi D. Canadian educational resources about cannabis use and fertility, pregnancy and breastfeeding: a scoping review protocol. *OSF* 2020. doi:10.17605/OSF.IO/P24Y5

19 Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *Int J Soc Res Methodol* 2005;8:19–32.

20 Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. *Implement Sci* 2010;5:69.

21 McGowan J, Sampson M, Salzwedel DM, *et al*. PRESS peer review of electronic search strategies: 2015 guideline statement. *J Clin Epidemiol* 2016;75:40–6.

22 Garcia Garcia J, Campistol Mas E, López-Vilchez María Ángeles, *et al*. [Analysis of prenatal abuse in catalonia between the years 2011 and 2014]. *An Pediatr* 2018;88:150–9.

23 Aromataris E*et al*. Chapter 11: Scoping reviews. In: *JBI reviewer's manual*, 2019.

24 McLaughlin GH. SMOG grading-a new readability formula. *Journal of Reading* 1969;12:639–46 http://www.jstor.org/stable/40011226

25 McGowan J, Straus S, Moher D, *et al*. Reporting scoping reviews-PRISMA SCR extension. *J Clin Epidemiol* 2020;123:177–9.