Journal of Fetal Alcohol Spectrum Disorder

Intervention, Prevention, Diagnosis, Welfare and Justice

ORIGINAL ARTICLE
DOI:10.22374/jfasrp.v4iSP1.13

AT A JUNCTURE: EXPLORING PATTERNS AND TRENDS IN FASD PREVENTION RESEARCH FROM 2015 – 2021 USING THE FOUR-PART MODEL OF PREVENTION

Lindsay Wolfson[1,2]*, Nancy Poole[1,2], Kelly D Harding[2,3], Julie Stinson[1]

[1]Centre of Excellence for Women's Health, Vancouver, BC Canada

[2]Canada FASD Research Network, Vancouver, Canada

[3]Department of Psychology, School of Liberal Arts, Laurentian University, Sudbury, ON, Canada

***Corresponding Author**: **Lindsay Wolfson:** lindsay.wolfson@gmail.com

Submitted: 1 October 2021. Accepted: 20 May 2022. Published: 22 September 2022.

ABSTRACT

Background and objective

Fetal Alcohol Spectrum Disorder (FASD) prevention efforts have grown in the last 25 years to go beyond the moral panic that guided the early public awareness campaigns and policy responses. In Canada, a four-part model of FASD prevention has been developed and used that describes a continuum of multi-sectoral efforts for women, girls, children, and their support networks, including broad awareness campaigns, safe and respectful conversations around pregnancy and alcohol use, and holistic and wraparound support services for pregnant and postpartum women with alcohol, and other health and social concerns. The purpose of this article is to describe the state of the evidence on FASD prevention from 2015 – 2021, including the prevalence and influences on alcohol use during pregnancy, interventions at each of the four levels of the four-part model, as well as systemic, destigmatizing, and ethical considerations.

Materials and methods

Using EBSCO Host, seven academic databases were annually searched for articles related to FASD prevention from 2015 – 2021. English language articles were screened for relevance to alcohol use in pregnancy and FASD prevention. Using outlined procedures for thematic analysis, the findings were categorized within the following key themes: prevalence and influences on women's drinking; Level 1 prevention; Level 2 prevention; Level 3 prevention; Level 4 prevention; and systemic, destigmatizing, and ethical considerations.

Results

From January 2015 – December 2020, 532 (n = 532) articles were identified that addressed the prevalence and influences on alcohol use during pregnancy, interventions at each of the four levels, and systemic, destigmatizing, and ethical considerations. The most recent research on FASD prevention published in English was generated in the United States (US; n = 216, 40.6%), Canada (n = 91, 17.1%), United Kingdom (UK; n = 60, 11.3%), and Australia (n = 58, 10.9%). However, there was an increase in the studies published from other countries over the last six years. The literature heavily focused on the prevalence and influences on alcohol use during pregnancy (n = 182, 34.2%) - with an increase in prevalence research from countries outside of Canada, the US, Australia, and the UK and on Level 2 prevention efforts (n = 174, 32.7%),

specifically around the efficacy and implementation of brief interventions. Across Level 1 and Level 2 prevention efforts, there was an increase in literature published on the role of technology in supporting health promotion, education, screening, and brief interventions. Attention to Levels 3 and 4 demonstrated nuanced multi-service, trauma-informed, relational, and holistic approaches to supporting women and their children. However, efforts are needed to address stigma, which acted as a systemic barrier to care across each level of prevention.

Conclusion

Research and practice of FASD prevention has continued to grow. Through our generated deductive themes, this review synthesized the findings and demonstrated how the work on FASD prevention has been amplified in the recent years and how efforts to support women and children's health are complex and interconnected. The findings highlight the opportunities for prevention through research and evidence-informed policy and practice.

Keywords: fetal alcohol spectrum disorders; women's health; maternal health; pregnancy; alcohol

INTRODUCTION

Early Fetal Alcohol Spectrum Disorder (FASD) prevention efforts were framed by a moral panic that guided the creation of public awareness campaigns and policy responses.[1] These initial responses were framed in the context of shame, tragedy, and blame with the perception that women were, or would be, 'bad' or 'unfit' mothers if they consumed alcohol during pregnancy, and solely targeted women's individual behaviour changes.[1,2] While much of the stigma surrounding FASD and women's alcohol use in pregnancy continues even today,[3] in the last 25 years, FASD prevention efforts have grown beyond providing information about the risks of alcohol use in pregnancy to provide a holistic support system for women and girls in their childbearing years. In Canada, a four-part model of FASD prevention was introduced in 2008, which has been used nationally and internationally to describe a continuum of multi-sectoral efforts for women, girls, children, and their support networks (see Figure 1).[4,5]

Level 1 prevention is focused on broad awareness campaigns and health promotion[4,6] (e.g.,

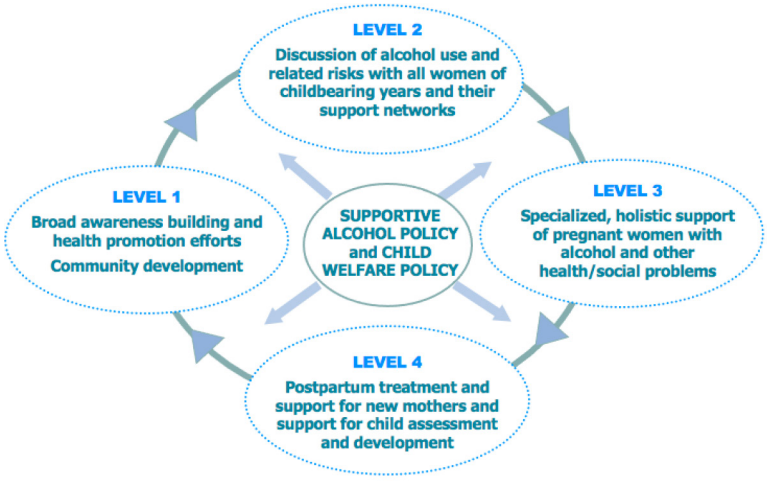

FIGURE 1 Four-part model of FASD prevention.

lower-risk alcohol drinking guidelines,[7] prevention campaigns, warning labels in alcohol establishments or on liquor bottles[8]). Level 2 prevention involves supporting girls and women in having safe, respectful discussions about pregnancy, alcohol use, and related issues with health and social service providers[4,6] (e.g., brief interventions conducted by health and social service providers). Level 3 prevention offers integrated holistic support services to pregnant women with alcohol and other health and social concerns[4,6] (e.g., case management models[9]). Level 4 prevention involves postpartum support for new mothers, assisting them to maintain and initiate changes in their health[4,6] (e.g., home visiting and mentorship programs[10,11]).

In this article, we describe the state of the evidence on FASD prevention from 2015 – 2021, including the prevalence and influences on alcohol use during pregnancy, interventions at each of the four levels described in the four-part model of FASD prevention (herein referred to as the four-part model), as well as systemic, destigmatizing, and ethical considerations. We further explore the salient and shifting research priorities over time, and their implications for future FASD prevention efforts.

METHODS

Annually, researchers associated with the prevention network action team (pNAT) of the Canada FASD Research Network search the academic literature for articles related to FASD prevention, and generate an annotated bibliography summarizing the scope of the FASD prevention literature for that year.[12–17] The findings are organized using the four-part model to describe the wide range of work that comprises FASD prevention. The annual literature search is intended to update those involved in FASD prevention in Canada to further inform them of research, practice, and policy work with current evidence. For this study, seven databases were searched using EBSCO Host: Bibliography of Native North Americans, CINAHL, MEDLINE, PsycINFO, Social Work Abstracts, Urban Studies Abstracts, and Women's Studies International. See Appendix A for the full list of search terms.

Data Analysis and Synthesis

Firstly, English language articles were screened for relevance to alcohol use in pregnancy and FASD prevention. The articles were included if they described the prevalence and factors associated with alcohol use in pregnancy, preconception or FASD prevention interventions, or described other systemic or ethical considerations related to women's alcohol use during pregnancy or FASD prevention efforts. Using the four-part model as an organizational framework for analysis, we drew upon the outlined procedures for thematic analysis,[18] including recommendations for narratively synthesizing qualitative and quantitative evidence,[19] to generate salient and deductive themes and trends in FASD prevention research from literature published from January 2015 – December 2020. Articles and summarized annotated bibliographies[12–17] were reviewed and discussed by all authors prior to commencing independent data analysis. The articles and annotated bibliographies were divided between the authors and independently reviewed (NP: 2015, LW: 2016, 2017, and 2020, KH: 2018, JS: 2019). All authors met regularly to discuss the preliminary themes and their alignment with the four-part model. Disagreements were discussed collectively until consensus was reached. Key themes were identified and agreed upon by all authors, and were subsequently categorized as follows: prevalence and influences on women's drinking; interventions related to each of the levels in the four-part model,[4] as well as systemic, destigmatizing, and ethical considerations.

RESULTS AND DISCUSSION

From January 2015 – December 2020, 532 (n = 532) articles were identified that addressed the prevalence and influences on alcohol use during pregnancy, interventions at each of the four levels, and systemic, destigmatizing, and ethical considerations.

Thirty-two (n = 32, 6%) articles were assigned to more than one category. Appendix B provides an overview of the number of articles published on each topic by country. Most recent research on FASD prevention published in English is generated in the United States (US; n = 216, 40.6%), Canada (n = 91, 17.1%), United Kingdom (UK; n = 60, 11.3%), and Australia (n = 58, 10.9%). There was an increase in studies published from countries such as South Africa, Netherlands, Ethiopia, Brazil, and Sweden over the last six years, potentially demonstrating the emergence of FASD prevention as a priority internationally.

Prevalence, Influences, and Factors Associated with Alcohol Use in Pregnancy

Nearly a third of the published research (n = 183) focused on prevalence of alcohol use in pregnancy, and factors and influences associated with alcohol use in pregnancy, with an increasing number of studies being published internationally.[20–24] In 2017, several national and regional studies were conducted that explored both the prevalence of FASD as well as the prevalence of alcohol use during pregnancy. In one study, the authors reported a global prevalence rate of alcohol use in pregnancy at 9.8%, with the highest rates in the World Health Organization (WHO) European Region (25.2%) and lowest in the WHO Eastern Mediterranean Region (0.2%).[25] The authors of another study noted that in Europe, the lowest prevalence rates were found in Norway (4%), Sweden (7%), and Poland (10%) and the highest prevalence rates were found in UK (29%), Russia (27%), and Switzerland (21%). In this study, women who drank during pregnancy were more likely to be older, employed, more highly educated, and more likely to smoke before pregnancy, but these factors could not fully explain the cross-country differences.[26]

The authors of another study found that a majority (78%) of the countries in Latin America and the Caribbean reported a higher alcohol consumption per capita among women compared to the global average for women. For the 31 countries analyzed, the prevalence rate ranged from 4.8% in Cuba to 23% in Grenada.[27] In 40% of the countries in different WHO regions, over 25% of women who drank in pregnancy binge drank (e.g., Paraguay 77.7%; Benin 77.2%; Seychelles 77.2%). However, in other countries, the rates of binge drinking among pregnant women who was low (e.g., Italy 2.1%; New Zealand 3.0%; Germany 3.5%). The time-trend analysis showed that the rates of binge drinking over time have slightly decreased.[28] However, it is important to note that there is conflicting evidence regarding the prevalence of alcohol use during pregnancy over time. Some studies have indicated a decrease in alcohol use during pregnancy over time,[29] whereas others have pointed to an increase.[30]

From 2015 – 2021, there was an increase in the studies focusing on biomarkers and the accuracy of self-report measures compared to various biological measures of alcohol use (e.g., meconium samples, urine toxicology, blood samples, alcohol metabolite analysis).[20–22,31,32] In some studies, the self-report measures did not align with biological results, with evidence of both under and over reporting of alcohol use.[31] The authors of one study, examining recall bias, found that women's recall for prenatal experiences, behaviours, and outcomes was moderately consistent between 6 months and 8 years postpartum. Mothers' recall was consistent for type of delivery, smoking and cannabis use during pregnancy, specific medical concerns during pregnancy, and medicine used for induction, but mothers' recall was only 'fair' for alcohol use, illicit substance use, and the use of drugs other than an epidural during labour.[33] A Canadian study indicated that interviews conducted at the time of pregnancy carried a higher degree of reliability.[34] The increased research focus on the 'accurate' identification of alcohol use during pregnancy indicates an interest in monitoring maternal health behaviours in a way that is not reflective of the social and structural determinants of health that impact women's continued use or reduction of alcohol during pregnancy, nor the

factors that impact women's (comfort)ability to self-report.

Factors Associated with Alcohol Use in Pregnancy

There are a wide range of factors and influences that impact women's alcohol use during pregnancy, including pregnancy recognition,[35] knowledge of FASD[36] and/or the impacts of alcohol use during pregnancy,[20,23,36–38] marital status,[22,39] planned pregnancy,[23,24,29.35.37.38.40.41] tobacco[20,26,35,39] and other/polysubstance use during the preconception and pregnancy periods,[24,29,41,42] and preconception alcohol use, including preconception binge drinking.[32,39]

Alcohol use in pregnancy was also influenced by adverse childhood experiences,[43,44] trauma,[45,46] residential school histories,[47] and mental health status.[21,23,40] Familial conflict,[21] external stressors (e.g., societal pressure, financial strain),[42,48] social isolation,[49,50] or using alcohol as a coping mechanism to help deal with life stressors[51] or violence and abuse,[21,22,37] also influenced alcohol use in pregnancy. When alcohol was embedded in women's economic[52] or social norms and activities,[32,37,48,51] and pre-pregnancy, women may be at an increased risk of continuing use during pregnancy. Education [20,24,46,38,41,50,53] and maternal age[26,53,54] were described as both protective and risk factors for alcohol use in pregnancy. Similarly, partner's alcohol use was found to both impact women's ability/comfortability to reduce or abstain from alcohol in pregnancy, and also to act as a hindrance to stopping.[20–23,50,52,55]

Other less studied, but still identified risk factors included, but were not limited to attitudes and beliefs such as feelings of judgment, ambivalence, or defensiveness,[56] a perception of invincibility,[37] health insurance requirements,[54,57] food insufficiency,[40] guilt and low self-efficacy,[42] proximity of alcohol and other drugs,[45,55] and religion.[58] Most recently, partner use and pre-pregnancy alcohol consumption remained two of the highest priorities, and the established risk factors for prenatal alcohol consumption.[23,32,50,55] These factors should be considered, and further explored, in efforts to create prevention campaigns that are evidence-based and tailored to the population that they are trying to reach.

Level 1 Prevention

Level 1 prevention efforts include broad awareness raising and health promotion efforts, as well as community development.[59] From 2015 – 2021, the literature primarily focused on alcohol warning labels, prevention education and messaging, media and technology, and alcohol legislation and guidelines.

Alcohol warning labels

Literature on alcohol warning labels predominantly examined the efficacy of warning labels and signage in reducing alcohol use during pregnancy and during the reproductive age, the role of warning labels in multi-tiered campaigns, the influence of the alcohol industry on warning labels, and national and provincial prevalence of warning labels.[60–64] Literature from Canada, UK, US, Australia, and France explored national uptake and approaches, demonstrating mixed evidence that warning labels can contribute to a reduction in alcohol sales. For example, the authors of a Canadian study found that alcohol sales decreased following a shift in warning labels to include a cancer warning, low risk drinking guidelines, and standard drink messages. When pregnancy warning labels were reintroduced, there was an even greater reduction in alcohol sales.[64] However, other researchers have demonstrated that warning labels are only effective if they are a component of multi-level public health strategies.[60]

FASD prevention education and messaging

Articles focusing on prevention education and messaging were most prominent in the years 2015 and 2020. The literature published in the earlier years described the educational materials,[65] the effectiveness of substance use prevention programs,[66,67] and general FASD awareness raising.[68–70] The authors of an Australian study found that despite

the availability of educational materials on alcohol use during pregnancy, there was still a need for higher quality materials. Suggestions to improve the quality of messaging included providing publication dates for referenced materials, simplifying the language, and adding sources for additional information.[65]

Articles published in the years 2018, 2019, and 2020 examined the public knowledge and awareness of FASD,[71] as well as the efficacy of awareness materials in alcohol-serving establishments,[61] and changes in alcohol use messaging over time.[72] The authors of a Canadian study measured FASD awareness, and found in one province that albeit had already very low levels of awareness of FASD, there was a further reduction in awareness from 2011 to 2017 for both men (from 18% to 15%) and women (from 10% to 6%).[71] The authors of a US and Canadian study aimed to determine if placing FASD prevention messaging in women's restrooms in alcohol-serving establishments was effective in promoting informed decisions about alcohol by women who are or may become pregnant, with posters and messages on pregnancy test dispensers. Following the intervention, there was an increased knowledge of FASD, and decreased alcohol consumption among pregnant women at follow-up.[61]

A focus on technology and its importance in disseminating education and messaging was also evident in the literature. We have seen how the incorporation of technology has evolved over the years as a tool for broad awareness building. More recent studies identified that incorporating public health messaging into a combination of new technologies, inclusive of social media, websites, text messages, and traditional communication approaches can best reach women when sharing information about alcohol use in pregnancy.[7,73] This diversity of messaging and mediums offers important directions for future research, policy, and practice in reaching pregnant women and women and girls of childbearing years. There are further opportunities to research this area of FASD prevention, and how messaging and education can be broadened to continually evolve with technology.

Alcohol legislation and guidelines

Research on alcohol legislation and guidelines described a range of topics including state-level policies, the impacts of legal drinking age, and the effects associated with alcohol legislation regarding women who use alcohol during pregnancy, such as increased stigma, use of punitive approaches, and a lack of gender-informed policies.

The authors of a US study found that state-level alcohol and pregnancy policies have increased over time and across states. Legislation has become increasingly punitive and often aims to restrict women's reproductive autonomy, impacting their ability to access prenatal care or substance use treatment.[74] Other studies conducted in the US examining the effects of national and state-level policies also found that many laws and policies were not evidence-based,[63,75,76] and had various effects on birth outcomes.[77] Punitive policies were associated with an increase in alcohol consumption during pregnancy,[63,78] increased odds of low birthweight and premature birth, and decreased odds of obtaining prenatal care compared to women in states without punitive policies.[62]

The literature on alcohol legislation and guidelines emphasizes the need for gender-informed and health promoting approaches that: 1) adequately attends to women's and fetal health, 2) better links alcohol legislation and guidelines with evidence and best practices related to FASD prevention, and 3) promotes treatment/appropriate referral pathways, multi-sectoral approaches, training of service providers, support for parents/individuals with FASD, cultural diversity, collaboration, and addressing the social determinants of health. These have all been seen as the key components to developing and implementing FASD prevention policies[79,80] and could be crucial in disarming the stigma related to FASD and women's alcohol use in pregnancy.

Level 2 Prevention

Level 2 prevention efforts involve women, girls, and their support networks engaging in discussions with health and social service providers about alcohol and other substance use or related issues.[4] A third of the FASD prevention literature from 2015 – 2021 was published on Level 2 prevention (n = 176), namely focused on facilitators and challenges to implementing brief interventions as well as the efficacy of brief interventions.

Implementation of screening and brief interventions

The majority of the articles focused on the challenges to healthcare providers implementing screening and brief interventions including knowledge of FASD and the effects of alcohol use in pregnancy,[81–83] workloads and competing priorities,[84–86] availability and implementation of screening tools and alcohol use guidelines,[82,84,85] a lack of continuity of care[84] and/or capacity to refer to supports following screening,[81,82] (in)adequate support and training,[84,85] healthcare provider perceptions of alcohol use,[85,87] underreporting or non-disclosure of substance use on the part of women,[85,86] and confidence and competence to conduct screening and brief interventions.[82,83]

The challenges with implementation related to stigma[88] and unrecognized social determinants of health[89] were further described. Women's education and race continued to have an impact on brief intervention and screening practices, though this topic does remain relatively underexplored. In a recent study of teenage mothers in the US, Black teens were more likely to receive substance use and HIV counselling, and Hispanic teens were more likely to receive counselling on influenza vaccine recommendations compared to white teens.[90]

Despite these barriers, a key facilitator identified by healthcare providers was a motivation and sense of duty to support pregnant women.[84,91] The midwifery model of care was seen as a facilitator to brief interventions because of its collaborative and relational nature that supported women through the pregnancy and postpartum periods.[92]

Similar to the findings on prevalence and patterns of use, there was an increase in research on the use of biomarkers,[93–96] predominantly focused on the reliability of self-reporting when screening for alcohol use in pregnancy. This is an area to be further explored, including the ethical considerations and the need for women's consent when screening for biomarkers, and the inherent contradiction of the use of biomarkers in the context of relationship-based brief interventions, where the goal is to create safety to report alcohol use and share information about supports and options for reducing the use.

Efficacy of brief interventions

Several studies explored the efficacy of screening and brief interventions during the preconception and pregnancy periods. While the available literature demonstrated the cost effectiveness of screening and brief interventions,[97,98] the findings related to the efficacy of the brief interventions themselves were mixed. Studies from the US and Spain reported that brief interventions were ineffective and that increased intensity in delivery is necessary in order to increase their efficacy.[99,100] The authors of an Australian systematic review found that while brief interventions did not significantly influence maternal or neonatal outcomes, there was evidence of effectiveness when partners were involved, and among subgroups of women who consumed larger amounts of alcohol or engaged in polysubstance use.[101]

However, there was also a research that demonstrates the effectiveness of brief interventions. Authors of another systematic review suggested that preconception education and counselling resulted in the improved knowledge and self-efficacy, irrespective of whether the intervention was a single brief intervention or intensive.[102] Further, the authors of two US studies found that assessment alone may be sufficient in encouraging behaviour change,[103] and

that women were more accepting of a referral to home visitation compared to specialized services following brief interventions.[104]

Different delivery settings and modalities of brief interventions were also described, demonstrating new trends in implementation. On college campuses, brief interventions were associated with higher levels of condom use assertiveness.[105] In a study describing the findings from a cultural adaptation of Project CHOICES with the Oglala Sioux Tribe, the authors identified a significant decrease in risk for alcohol exposed pregnancies.[106] Similar to the findings on Level 1 prevention, the literature on technology-based interventions has increased.[103,107–109] Computer-delivered screening and brief interventions have been seen as easy to use, helpful, and have a medium-effect on alcohol abstinence and pregnancy outcomes.[107]

The new trends in implementation, and their published efficacy, demonstrate the capacity to expand brief interventions to be more inclusive of the preconception period, of partners and communities, and of different technological modalities as a means for FASD prevention, though the topics related to privacy and accessibility of technology should be explored further.

Level 3 Prevention

Level 3 prevention is focused on specialized support for pregnant women who have alcohol related problems, and face connected health, social, and financial barriers.[4] At this level of prevention, trauma-informed and women-centered approaches, as well as five different types of interventions were described, including: (1) case management, (2) midwifery services and integrated maternity care pathways, (3) mentoring and home visiting programs, (4) alcohol withdrawal and treatment for pregnant women, and (5) multidisciplinary integrated service delivery.

Trauma-informed and women-centered approaches

Trauma-informed approaches address the experiences of trauma as a barrier to engagement and growth for women, and promote the connection between both women and service providers, and the attachment between mothers and their infants as preventative mechanisms for multi-generational trauma.[110–112]

There was also increased attention to women's perspectives and guidance on what is offered as part of specialized, holistic support, and treatment services. The findings emphasized that women appreciated holistic, relational, non-judgemental, and trauma- and violence-informed approaches to service delivery. These approaches had a positive impact on addressing a range of health and social inequities and in improving cross-sectoral collaboration among service providers. Women also identified access-related concerns such as fear of child removal, not wanting to be away from their families, privacy, stigma, and a lack of childcare and transportation.[113] However, they also described motivators to seeking treatment, such as not wanting to lose custody of their child(ren), wanting to escape violence or homelessness, seeking structure, and readiness to address substance use.[113,114] Both these concerns and motivators can serve well to inform the design and delivery of programming.

Case management

Case management is an approach that involves collaborative planning, coordination, and monitoring of the services needed to meet a client's health and human service needs. Authors of a South African study found that a case management approach for reducing alcohol use in pregnancy that involved motivational interviewing, life management, and a community reinforcement approach reduced heavy drinking during pregnancy (but not in the long-term), and increased scores on a happiness scale that measured women's well-being.[115] A 2018 systematic review demonstrated the benefits of case management paired with Housing First services in addressing the multifaceted needs of pregnant and early parenting women who are experiencing homelessness and addiction concerns.[116]

Midwifery services and integrated maternity care pathways

Midwives, who were described as being best positioned to lead brief interventions in Level 2 prevention research, were also described as being able to provide tailored care beyond screening and brief intervention, and required training to fulfil this role.[117,118] The authors of a 2019 Australian study further illustrated the midwives' role in the development of integrated care pathways for the delivery of an array of maternity services to meet the needs of pregnant women with complex needs.[119]

Mentoring and home visiting programs

Mentors, peers, and volunteers were described as helpful in the provision of support to disadvantaged pregnant and postpartum women through building a trusting relationship, helping women access services and stay safe, acknowledging the small steps taken, and validating them as mothers.[120] The authors of various studies demonstrated health benefits of home visiting support for women with violence, mental health, and substance use concerns,[104,121,122] although not all showed significant changes in alcohol use. South African researchers studying home visitation for high risk pregnant women stressed on the benefits of brief interventions nested within generalist home visitation interventions.[122]

Alcohol withdrawal and treatment for pregnant women

In 2015, two articles described the available evidence for managing alcohol withdrawal in pregnancy and noted that little evidence was available to guide clinical decision-making to support the use of particular pharmacological interventions for alcohol use disorders during pregnancy or to guide the management of alcohol detoxification in pregnant women.[123,124] International guidelines from 2019 recommended the use of low doses of benzodiazepines for a short duration to prevent alcohol withdrawal symptoms in pregnant women when high and chronic alcohol intake was stopped, but not as a pharmacological treatment for abstinence maintenance during pregnancy.[125] In 2020, Canadian guidelines noted that the literature on pharmacological treatments for alcohol withdrawal and relapse prevention with pregnant women remained sparse, and provided guidance for clinicians when that level of care is required.[126]

Multidisciplinary integrated service delivery

Throughout the years, holistic, multi-service care for pregnant women with substance use concerns has been identified as effective, particularly by Canadian researchers. A 2015 systematic review by US authors found that comprehensive, integrated multidisciplinary services using a harm reduction approach have a positive effect on the reduction of prenatal substance use.[127] The authors of several studies from Canada emphasized the need for integrated service delivery that supported change on multiple health and social issues through providing holistic care for mother, baby, and the mother-baby dyad. Critical components included a focus on empowerment, enhanced access to and coordination of care for clients, cross-sectoral collaboration, and individually tailored service delivery across the life course.[42,128,129]

Level 4 Prevention

Level 4 prevention involves supporting new mothers to maintain healthy changes they have been able to make during pregnancy.[4] This maintenance is a challenge, as researchers have found that 80% of women who were abstinent in the last month of pregnancy relapsed to at least one substance postpartum.[130] The state of the literature indicates how important a full continuum of care is for pregnant and postpartum women with substance use problems and how many gaps exist, particularly for racially and ethnically diverse women, those with low incomes, teen mothers, those living in rural locations, and those living in places with punitive policies.[11,90,131] At this level of prevention, three new types of interventions were described. Note that some of the programs described in Level 3 continue

with women postpartum and their benefits are not further described in this section.

Interventions with a parenting focus

The authors of a qualitative Australian study identified the value of interventions that acknowledge the parenting role and its complex inter-relationship with substance dependence. The mothers interviewed reported substantial changes in their understanding of motherhood and their relationship with their children.[132] Findings from a home-based parent-child attachment program delivered as part of live-in treatment found immediate and direct benefits to parenting, including improved child behaviour and parental efficacy, reduction in parental stress, and increased capacity for mothers to communicate and respond to their own, and their children's needs.[133] The authors of a Canadian systematic review found that parenting knowledge, psychosocial risk, and maternal emotional regulation were most commonly addressed in the group programming designed to support the needs of mothers using substances.[134]

Substance focused interventions

The authors of a South African study describing a 36-month home visitation program offered to postpartum women found that alcohol use, depression, and partner violence were significantly related over time, and that even brief alcohol interventions nested within a generalist home visitation program resulted in less problem drinking for new mothers, which in turn had benefits for behaviour outcomes for their children.[122,135] A US study found that in the context of COVID-19, telepsychology services within an integrated addictions program were helpful in addressing barriers to care in the context of pandemic social isolation measures and potentially for ongoing clinic care.[136]

Multifaceted community and home-based supports

Relational and trauma-informed approaches were often mentioned as helpful to women in the transition to the postpartum period and to support women's recovery and parenting as new mothers.[120,121,137] A number of studies explored the previously evidenced parent-child assistance program, which involves the provision of paraprofessional support to new mothers who have used substances in pregnancy, with a focus on helping them connect to a range of local services.[10] A home visiting program, focused on reducing maternal alcohol and other substance use, increasing positive parenting, promoting child and maternal health, and improving family income and family housing was found to be beneficial in retaining women, supporting relational growth, and meeting the complex needs of families with substance exposed pregnancies.[138]

Systemic, Destigmatizing, and Ethical Considerations

Finally, an additional category was established to account for shifting trends in the literature that addressed philosophical and systemic issues that intersect with FASD prevention. Research on systemic, destigmatizing, and ethical considerations included topics such as national and international costs associated with FASD,[139,140] social justice,[141] and ethical considerations,[142,143] the need for community-based FASD prevention strategies,[144,145] and data harmonization and advocacy for a standard measure for alcohol consumption.[146]

In 2016, articles were published with a greater emphasis on ethical and legal issues. The authors of one Australian study found that public and media framing of FASD and FASD prevention elicited shame and sympathy towards children and adults with FASD, and in some cases mothers who consumed alcohol during pregnancy. However, mothers were also described as being deserving of blame along with healthcare providers and the government.[147] Other articles described the discourse surrounding FASD prevention and the impacts of laws and policies on pregnant women's health and access treatment and/or support services.[148,149] In 2017, further articles were published that discussed criminalization of alcohol use during pregnancy[150,151]

In 2018, the literature captured in this section was diverse and included articles on policy and

guideline development for coordinated and consistent FASD prevention,[152] cross-disciplinary and collaborative approaches to FASD research,[153] and the need for equitable, trauma-, and culturally-informed approaches to FASD prevention, particularly among Indigenous communities.[46] One novel study also included a qualitative narrative analysis of women's stories told about drinking on social media, identifying how women socially construct their relationships with alcohol across the lifespan.[154]

Most recently, the articles published in this section emphasized that there is still work to be done to raise awareness of FASD and alcohol-related harms, particularly among healthcare providers, to further prompt efforts to screen and provide brief interventions that are non-judgmental and that promote alcohol reduction and social support.[143] Further, publications reinforced the continued need to situate alcohol use during pregnancy in women's socioeconomic and structural contexts. Authors note that preconception health efforts need to be more expansive to integrate partners and communities, recognizing their influential role in preconception health.[155]

In each year, and across all four levels of prevention, there was an increasing amount of literature on the role of stigma on women's health and FASD prevention. This was also a salient topic within the published research on systemic, destigmatizing, and ethical considerations, particularly in 2018.[156–159] The articles predominately focused on stigma towards women who drank alcohol during pregnancy and mothers of children with FASD, reinforcing the existing 'child over mother' discourse in FASD prevention. The authors of a Canadian study described the dissonance between the moral codes surrounding motherhood (including the duties of a 'good' mother) and the lived experiences of people who use substances.[160] Such literature highlights the need to acknowledge and address the immense impact of stigma on access to preconception health and substance use services, and the need for services that are empowering, attend to diversity, and respond to the complexities of women's lives.[159]

CONCLUSION

Research and practice on FASD prevention continues to grow, and the annual compilation of this literature helps us notice, categorize, and share the key findings more efficiently. The four-part model provides a useful framework for synthesizing our findings and linking and synchronizing FASD prevention work across all levels. In practice, the four-part model continues to act as an integrated continuum of care that draws on multi-sectoral efforts to reach and support women, girls, children, and their support networks in the preconception, perinatal, and postpartum periods. These interdisciplinary collaborations across all levels are essential to FASD prevention and successful care to women, girls, and their support networks.

Several positive trends have been observed from 2015 – 2021. In the past six years, there has been an increase of research in countries outside of Canada, US, Australia, and UK, demonstrating the emergence of FASD prevention as a priority internationally. The focus of research on FASD prevention has helpfully moved beyond a primary focus on prevalence and patterns of alcohol use, to include more research on evidence-based interventions which support positive health outcomes for women and their children. Further, there has been noticeable attention to women's health, rather than a framing of women solely as 'vessels' in pregnancy.

We have seen how virtual technological initiatives have evolved over the years to expand capacity for broad awareness building about alcohol use in pregnancy through websites and social media, as well as for safe, non-stigmatizing virtual support. Yet, the online environment also presents challenges with the dissemination of misinformation and concerns around privacy and accessibility. Thus, the role of technology will be an important area for future research related to alcohol, pregnancy, and FASD.

Furthermore, Level 2 prevention must remain a research priority. We must identify what works for which women in what contexts, and how support on a

range of social determinants of health can be brought into collaborative conversations between women and their health/social care providers about alcohol and pregnancy. Future research should describe how health and social service providers can support this work, and how provider education and knowledge of FASD and alcohol use in pregnancy can be advanced.

Research on Level 3 and 4 prevention will also continue to be vital. The field has moved far from seeing the provision of information about the risks of alcohol use as sufficient to preventing FASD. The challenge now is to continue to build on and advance knowledge and collaborations on trauma-informed case management, home visiting, withdrawal management, and integrated service delivery for and with pregnant women with alcohol problems. The advances in research on Level 4 prevention points to tremendous opportunities for advancing women's recovery, linking children to infant/child development programming, including FASD assessment and diagnosis where necessary, and promoting attachment for mothers and children. There is significant evidence in the parenting, home visiting, and trauma-informed program areas that can be built upon and tailored for women and their children where there have been alcohol-exposed pregnancies.

The findings from this review show that we are at a juncture in the field of FASD prevention where the understanding of how to prevent FASD is much more nuanced, and the opportunities for prevention through research and evidenced-informed practice and policy are unlimited. Continuing to expand research on FASD prevention internationally is needed in order to advance the landscape of FASD prevention and support women's health.

REFERENCES

1. Armstrong EM, Abel EL. Fetal Alcohol Sydrome: The origins of a moral panic Alcohol Alcohol 2000;35(3): 276–282. https://doi.org/10.1093/alcalc/35.3.276
2. Racine E, Bell E, Zizzo N, et al. Public discourse on the biology of alcohol addiction: Implications for stigma, self-control, essentialism, and coercive policies in pregnancy. Neuroethics 2015;8(2):177–186. https://doi.org/10.1007/s12152-014-9228-x
3. Aspler J, Bogossian A, Racine E. "It's ignorant stereotypes": Key stakeholder perspectives on stereotypes associated with fetal alcohol spectrum disorder, alcohol, and pregnancy. J Intellect Dev Disabil 2022;47(1):53–64. https://doi.org/10.3109/13668250.2020.1865649
4. Poole N. Fetal Alcohol Spectrum Disorder (FASD) Prevention:Canadian Perspectives. 2008, Public Health Agency of Canada:Ottawa, ON.
5. Reid N. Fetal alcohol spectrum disorder in Australia: What is the current state of affairs? Drug Alcohol Rev 2018;37(7):827–830. https://doi.org/10.1111/dar.12855
6. Poole N, Schmidt RA, Green C, et al. Prevention of Fetal Alcohol Spectrum Disorder: Current Canadian Efforts and Analysis of Gaps. Substance Abuse: Research and Treatment 2016; 2016(1):1–11. https://doi.org/10.4137/SART.S34545
7. Giglia RC, Reibel T. Has a national policy guideline influenced the practice of raising the topic of alcohol and breastfeeding by maternal healthcare practitioners? Aust J Prim Health 2019;25(3):275–280. https://doi.org/10.1071/PY18103
8. Stockwell T, Wettlaufer A, Vallance K, et al. Strategies to Reduce Alcohol-Related Harms and Costs in Canada: A Review of Provincial and Territorial Policies. 2019, Canadian Institute for Substance Use Research, University of Victoria:Victoria, BC.
9. May PA, Miller JH, Goodhart KA, et al. Enhanced case management to prevent fetal alcohol spectrum disorders in Northern Plains communities. Matern Child Health Journ 2008; 12(6):747–759. https://doi.org/10.1007/s10995-007-0304-2
10. Pei J, Carlson E, Tremblay M, et al. Exploring the contributions and suitability of relational and community-centered fetal alcohol spectrum disorder (FASD) prevention work in First Nation communities. Birth Defects Res 2019; 111(12):835–847. https://doi.org/10.1002/bdr2.1480
11. Shaw MR, Grant T, Barbosa-Leiker C, et al. Intervention with substance-abusing mothers: Are there rural-urban differences? Am J Addict 2015; 24(2):144–152 9p. https://doi.org/10.1111/ajad.12155
12. Schmidt R, Poole N. FASD Prevention: An Annotated Bibliography of Articles Published in 2015. 2016, BC Centre of Excellence for Women's Health. p. 46.

13. Schmidt R, Poole N, Talbot C, et al. FASD Prevention: An Annotated Bibliography of Articles Published in 2016. 2017, Centre of Excellence for Women's Health & CanFASD Research Network. p. 45.
14. Schmidt R, Harding K, Talbot C, et al. FASD Prevention: An Annotated Bibliography of Articles Published in 2017. 2018, Centre of Excellence for Women's Health & CanFASD Research Network. p. 60.
15. Schmidt R, Poole N, Harding K, et al. FASD Prevention: An Annotated Bibliography of Articles Published in 2018. 2019, Centre of Excellence for Women's Health & CanFASD Research Network. p. 32.
16. Schmidt R, Poole N, Harding K, et al. FASD Prevention: An Annotated Bibliography of Articles Published in 2019. 2020, Centre of Excellence for Women's Health & CanFASD Research Network. p. 38.
17. Wolfson L, Poole N, Harding K, et al. FASD Prevention: An Annotated Bibliography of Articles Published in 2020. 2021, Centre of Excellence for Women's Health & CanFASD Research Network.
18. Braun V, Clarke, V. Using thematic analysis in psychology. Qual Res Psychol 2006;3(2):77–101. https://doi.org/10.1191/1478088706qp063oa
19. Mays N, Pope C, Popay J. Systematically reviewing qualitative and quantitative evidence to inform management and policy-making in the health field. J Health Serv Res Policy 2005;10(1):6–20. https://doi.org/10.1258/1355819054308576
20. English L, Mugyenyi GR, Ngonzi J, et al. Prevalence of Ethanol Use Among Pregnant Women in Southwestern Uganda. J Obstet Gynaecol Can 2015;37(10):901–902. https://doi.org/10.1016/S1701-2163(16)30027-5
21. Lamy S, Houivet E, Marret S et al. Risk factors associated to tobacco and alcohol use in a large french cohort of pregnant women. Arch Womens Ment Health 2018;22(2):267–277. https://doi.org/10.1007/s00737-018-0892-4
22. Petersen-Williams P, Mathews C, Jordaan E et al. Predictors of Alcohol Use during Pregnancy among Women Attending Midwife Obstetric Units in the Cape Metropole, South Africa. Subst Use Misuse 2017;1–11. https://doi.org/10.1080/10826084.2017.1408654
23. Addila EA, Bisetegn TA, Gete YK et al., Alcohol consumption and its associated factors among pregnant women in Sub-Saharan Africa: a systematic review and meta-analysis' as given in the submission system. Subst Abuse Treat Prev Policy 2020;15(1):29. https://doi.org/10.1186/s13011-020-00269-3
24. Ishitsuka K, Hanada-Yamamoto K, Mezawa H, et al. Determinants of Alcohol Consumption in Women Before and After Awareness of Conception. Matern Child Health J 2020;24(2):165–176. https://doi.org/10.1007/s10995-019-02840-2
25. Popova S, Lange S, Probst C, et al. Estimation of national, regional, and global prevalence of alcohol use during pregnancy and fetal alcohol syndrome: a systematic review and meta-analysis. Lancet Glob Health 2017;5(3):e290–e299. https://doi.org/10.1016/S2214-109X(17)30021-9
26. Mårdby AC, Lupattelli A, Hensing G, et al. Consumption of alcohol during pregnancy-A multinational European study. Women Birth 2017. https://doi.org/10.1016/j.wombi.2017.01.0032
27. Lange S, Probst C, Heer N, et al. Actual and predicted prevalence of alcohol consumption during pregnancy in Latin America and the Caribbean: systematic literature review and meta-analysis. Pan Am J Public Health 2017;41:e89–e89. https://doi.org/10.26633/RPSP.2017.89
28. Lange S, Probst C, Rehm J, et al. Prevalence of binge drinking during pregnancy by country and World Health Organization region: Systematic review and meta-analysis. Reprod Toxicol 2017;73:214–221. https://doi.org/10.1016/j.reprotox.2017.08.004
29. Romero-Rodríguez E, Cuevas L, Simón L, et al. Changes in Alcohol Intake During Pregnancy in Spain, 1980 to 2014. Alcohol Clin Exp Res 2019;43(11):2367–2373. https://doi.org/10.1111/acer.14193
30. Blaauw Isaksen A, Østbye T, Theophil Mmbaga B, et al. Alcohol consumption among pregnant women in Northern Tanzania 2000-2010: a registry-based study. BMC Pregnancy Childbirth 2015;15(1):1–10. https://doi.org/10.1186/s12884-015-0630-0
31. Abernethy C, McCall KE, Cooper G, et al. Determining the pattern and prevalence of alcohol consumption in pregnancy by measuring biomarkers in meconium. Arch Dis Child Fetal Neonatal Ed 2018;103(3):F216–F220. https://doi.org/10.1136/archdischild-2016-311686

32. Symon A. Evaluation of a retrospective diary for peri-conceptual and mid-pregnancy drinking in Scotland: a cross-sectional study. Acta Obstet et Gynecol Scand 2017;96(1):53–60. https://doi.org/10.1111/aogs.13050
33. Ramos AM, Marceau K, Neiderhiser JM, et al. Maternal consistency in recalling prenatal experiences at 6 months and 8 years postnatal. J Dev Behav Pediatr 2020;41:698–705. https://doi.org/10.1097/DBP.0000000000000841
34. Fortin M, Muckle G, Jacobson SW, et al. Alcohol use among Inuit pregnant women: Validity of alcohol ascertainment measures over time. Neurotoxicol Teratol 2017;64:73–78. https://doi.org/10.1016/j.ntt.2017.10.007
35. McCormack C, Hutchinson D, Burns L, et al. Prenatal Alcohol Consumption Between Conception and Recognition of Pregnancy. Alcohol Clin Exp Res 2017;41(2):369–378. https://doi.org/10.1111/acer.13305
36. Balachova T, Bard D, Bonner B, et al. Do attitudes and knowledge predict at-risk drinking among Russian women? Am J Drug Alcohol Abuse 2016;42(3):306–315. https://doi.org/10.3109/00952990.2016.1141914
37. Fletcher OV, May PA, Seedat S, et al. Attitudes toward alcohol use during pregnancy among women recruited from alcohol-serving venues in Cape Town, South Africa: A mixed-methods study. Soc Sci Med 2018;215:98–106. https://doi.org/10.1016/j.socscimed.2018.09.008
38. Bitew MS, Zewde M F, Wubetu M, Alemu AA. Consumption of alcohol and binge drinking among pregnant women in Addis Ababa, Ethiopia: Prevalence and determinant factors. PLoS ONE 2020; 15(12). https://doi.org/10.1371/journal.pone.0243784
39. Brittain K, Remien RH, Phillips T, et al. Factors associated with alcohol use prior to and during pregnancy among HIV-infected pregnant women in Cape Town, South Africa. Drug Alcohol Depend 2017;173:69–77. https://doi.org/10.1016/j.drugalcdep.2016.12.017
40. Onah MN, Field S, van Heyningen T, et al. Predictors of alcohol and other drug use among pregnant women in a peri-urban South African setting. Int J Mental Health Syst 2016;10. https://doi.org/10.1186/s13033-016-0070-x
41. Popova S, Lange S, Temple V, et al. Profile of Mothers of Children with Fetal Alcohol Spectrum Disorder: A Population-Based Study in Canada. Int J Environ Res Public Health 2020;17(21). https://doi.org/10.3390/ijerph17217986
42. Latuskie KA, Andrews NCZ, Motz M, et al. Reasons for substance use continuation and discontinuation during pregnancy: A qualitative study. Women Birth 2018. https://doi.org/10.1016/j.wombi.2018.04.001
43. Currie CL, Sanders JL, Swanepoel LM, Davies CM. Maternal adverse childhood experiences are associated with binge drinking during pregnancy in a dose-dependent pattern: Findings from the All Our Families cohort. Child Abuse Negl 2020;101. https://doi.org/10.1016/j.chiabu.2019.104348
44. Racine N, McDonald S, Chaput K, et al. Maternal substance use in pregnancy: Differential prediction by childhood adversity subtypes. Prev Med 2020;141. https://doi.org/10.1016/j.ypmed.2020.106303
45. Shahram SZ, Bottorff JL, Kurtz DLM, et al. Understanding the life histories of pregnant-involved young aboriginal women with substance use experiences in three Canadian cities. Qual Health Res 2017;27(2):249–259. https://doi.org/10.1177/1049732316657812
46. Gonzales KL, Jacob MM, Mercier A, et al. An indigenous framework of the cycle of fetal alcohol spectrum disorder risk and prevention across the generations: Historical trauma, harm and healing. Ethn Health 2018. https://doi.org/10.1080/13557858.2018.1495320
47. Shahram SZ, Bottorff JL, Oelke ND, et al. The cedar project: using indigenous-specific determinants of health to predict substance use among young pregnant-involved aboriginal women. BMC Women's Health 2017;17:1–13. https://doi.org/10.1186/s12905-017-0464-1
48. Shrestha U, Weber TL, Hanson JD. "But Problems Dwell so the Urge Is Constant…" Qualitative Data Analysis of the OST CHOICES Program. Alcohol Clin Exp Res 2018; 42(9):1807–1814. https://doi.org/10.1111/acer.13968
49. Deutsch AR. The Importance of Intimate Partner Violence in Within-Relationship and Between-Person Risk for Alcohol-Exposed Pregnancy. Alcohol Clin Exp Res 2019; 43(4):679–689. https://doi.org/10.1111/acer.13968
50. Tesfaye G, Demlew D, G/tsadik, M, et al. The prevalence and associated factors of alcohol use among pregnant women attending antenatal care at public

hospitals Addis Ababa, Ethiopia, 2019, BMC Psychiatry;2020:20(1):337. https://doi.org/10.1186/s12888-020-02747-1
51. Kelly JF, Ward CL. Women who drank while pregnant: The importance of social context in the lives of South African pregnant women. Drugs: Educ Prev Policy;2017:1-8. https://doi.org/10.1080/09687637.2017.1316703
52. Mpelo M, Kibusi SM, Moshi F, et al. Prevalence and Factors Influencing Alcohol Use in Pregnancy among Women Attending Antenatal Care in Dodoma Region, Tanzania: A Cross-Sectional Study. Journal of Pregnancy 2018;2018:1-7. https://doi.org/10.1155/2018/8580318
53. Kitsantas P, Gaffney KF, Wu H. Identifying high-risk subgroups for alcohol consumption among younger and older pregnant women. J Perinat Medicine 2015;43(1):43–52 10p. https://doi.org/10.1515/jpm-2013-0323
54. Dunney C, Muldoon K, Murphy DJ. Alcohol consumption in pregnancy and its implications for breastfeeding. Br Midwifery 2015;23(2):126–134. https://doi.org/10.12968/bjom.2015.23.2.126
55. Ortega-Garcia JA, López-Hernández FA, Azurmendi Funes, M.L., et al., My partner and my neighbourhood: The built environment and social networks' impact on alcohol consumption during early pregnancy. Health Place 2020;61. https://doi.org/10.1016/j.healthplace.2019.102239
56. Watt MH, Eaton LA, Dennis AC, et al. Alcohol use during pregnancy in a South African community: Reconciling knowledge, norms, and personal experience. Matern Child Health J, 2015. https://doi.org/10.1007/s10995-015-1800-4
57. Brown QL, Hasin DS, Keyes KM, et al. Health insurance, alcohol and tobacco use among pregnant and non-pregnant women of reproductive age. Drug Alcohol Depend 2016;166:116–124. https://doi.org/10.1016/j.drugalcdep.2016.07.001
58. Tran NT, Najman JM, Hayatbakhsh R. Predictors of maternal drinking trajectories before and after pregnancy: evidence from a longitudinal study. Aust N Z J Obstet Gynaecol 2015;55(2):123–130. https://doi.org/10.1111/ajo.12294
59. CanFASD (Canada FASD Research Network). What do we mean by Level 1 Prevention? N.D.; Available from: https://canfasd.ca/topics/prevention/#Level1
60. Bell E, Zizzo N, Racine E. Caution! Warning Labels About Alcohol and Pregnancy: Unintended Consequences and Questionable Effectiveness. Am J of Bioeth 2015;15(3):18–20. https://doi.org/10.1080/15265161.2014.998376
61. Driscoll DL, Barnes VR, Johnston JM, et al. A formative evaluation of two FASD prevention communication strategies. Alcohol Alcohol 2018;53(4):461–469. https://doi.org/10.1093/alcalc/agx122
62. Subbaraman MS, Thomas S, Treffers R, et al. Associations Between State-Level Policies Regarding Alcohol Use Among Pregnant Women, Adverse Birth Outcomes, and Prenatal Care Utilization: Results from 1972 to 2013 Vital Statistics. Alcohol Clin Exp Res 2018;42(8):1511–1517. https://doi.org/10.1111/acer.13804
63. Roberts SCM, Mericle AA, Subbaraman MS, et al. State Policies Targeting Alcohol Use during Pregnancy and Alcohol Use among Pregnant Women 1985–2016: Evidence from the Behavioral Risk Factor Surveillance System. Women's Health Issues 2019;29(3):213–221. https://doi.org/10.1016/j.whi.2019.02.001
64. Zhao J, Stockwell T, Vallance K, et al. The Effects of Alcohol Warning Labels on Population Alcohol Consumption: An Interrupted Time Series Analysis of Alcohol Sales in Yukon, Canada. J Stud Alcohol Drugs 2020;81(2):225–237. https://doi.org/10.15288/jsad.2020.81.225
65. Crawford-Williams F, Fielder A, Mikocka-Walus A, et al. Does the poor quality of Australian health education documentation undermine the message? A review of documents informing pregnant women about alcohol. Evid Based Midwifery 2015;13(2):40–46 7p.
66. Crawford-Williams F, Fielder A, Mikocka-Walus A, et al. A critical review of public health interventions aimed at reducing alcohol consumption and/or increasing knowledge among pregnant women. Drug Alcohol Rev 2015;34(2):154–161. https://doi.org/10.1111/dar.12152
67. Garcia TA, Bacio GA, Tomlinson K, et al. Effects of sex composition on group processes in alcohol prevention groups for teens. Exp Clin Psychopharmacol 2015;23(4):275–283. https://doi.org/10.1037/pha0000032

68. Mukherjee, R., Wray, E., Hollins, S., et al., What does the general public in the UK know about the risk to a developing foetus if exposed to alcohol in pregnancy? Findings from a UK mixed methodology study. Child: Care Health Deve 2015;41(3):467–474 8p. https://doi.org/10.1111/cch.12187
69. Lee E, Sutton RM, Hartley BL. From scientific article to press release to media coverage: advocating alcohol abstinence and democratising risk in a story about alcohol and pregnancy. Health Risk Soc 2016;18(5/6):247–269. https://doi.org/10.1080/13698575.2016.1229758
70. Parackal M, Parackal S, Eusebius S, et al. The Use of Facebook Advertising for Communicating Public Health Messages: A Campaign Against Drinking During Pregnancy in New Zealand. JMIR Public Health Surveill 2017;3(3):e49. https://doi.org/10.2196/publichealth.7032
71. Choate P, Badry D, MacLaurin B, et al. Fetal Alcohol Spectrum Disorder: What does Public Awareness Tell Us about Prevention Programming? Int J Environ Res Public Health 2019;16(21):4229. https://doi.org/10.3390/ijerph16214229
72. Cook ML, Geoffrey-Pennay, Amy. Change Over Time in Australian Newspaper Reporting of Drinking During Pregnancy: A Content Analysis (2000–2017). Alcohol Alcohol 2020;55(6). https://doi.org/10.1093/alcalc/agaa072
73. Parackal M, Parackal S. A renewed media-mix, based on the dynamic transactional model, for communicating the harms of alcohol to women in New Zealand. Health Promot Int 2019;34(5)921–930. https://doi.org/10.1093/heapro/day033
74. Roberts SCM, Thomas S, Treffers R, et al. Forty Years of State Alcohol and Pregnancy Policies in the USA: Best Practices for Public Health or Efforts to Restrict Women's Reproductive Rights? Alcohol Alcohol 2017;52(6):715–721. https://doi.org/10.1093/alcalc/agx047
75. Roberts SCM, Berglas NF, Subbaraman MS, et al. Racial differences in the relationship between alcohol/pregnancy policies and birth outcomes and prenatal care utilization: A legal epidemiology study. Drug Alcohol Depend 2019;201:244–252. https://doi.org/10.1016/j.drugalcdep.2019.04.020
76. Woodruff K, Roberts SCM. "Alcohol During Pregnancy? Nobody Does That Anymore": State Legislators' Use of Evidence in Making Policy on Alcohol Use in Pregnancy. J Stud Alcohol Drugs 2019;80(3):380–388. https://doi.org/10.15288/jsad.2019.80.380
77. Barreca A, Page, M. A pint for a pound? Minimum drinking age laws and birth outcomes. Health Econ 2015;24(4):400–418. https://doi.org/10.1002/hec.3026
78. Hui K, Angelotta C, Fisher CE. Criminalizing substance use in pregnancy: Misplaced priorities. Addiction 2017;112(7):1123–1125. https://doi.org/10.1111/add.13776
79. Adebiyi BO, Mukumbang FC, Erasmus C. The Distribution of Available Prevention and Management Interventions for Fetal Alcohol Spectrum Disorder (2007 to 2017): Implications for Collaborative Actions. Int J Environ Res Public Health 2019;16(12):2244. https://doi.org/10.3390/ijerph16122244
80. Adebiyi BO, Mukumbang FC, Beytell AM. A guideline for the prevention and management of Fetal Alcohol Spectrum Disorder in South Africa. BMC Health Services Res 2019;19(1):1-13. https://doi.org/10.1186/s12913-019-4677-x
81. Olusanya OA, Olokunlade, Temitope, Rossheim, Matthew E, Greene, Kaylin, Barry, Adam E. Alcohol messages disseminated to pregnant women by midwives. Am J Drug Alcohol Abuse 2020;11:1–10.
82. Oni HT, Buultjens M, Blandthorn J, Davis D, Abdel-Iatif M, Islam MM. Barriers and facilitators in antenatal settings to screening and referral of pregnant women who use alcohol or other drugs: A qualitative study of midwives' experience. Midwifery 2020;81. https://doi.org/10.1016/j.midw.2019.102595
83. Sword W, Green C, Akhtar-Danesh N et al. Screening and Intervention Practices for Alcohol Use by Pregnant Women and Women of Childbearing Age: Results of a Canadian Survey. J of Obstet Gynaecol Canada 2020;42(9):1121–1128. https://doi.org/10.1016/j.jogc.2020.02.114
84. McLellan JM, O'Carroll RE, Cheyne H, et al. Investigating midwives' barriers and facilitators to multiple health promotion practice behaviours: a qualitative study using the theoretical domains framework. Implement Sci 2019;14(1):N.PAG-N.PAG. https://doi.org/10.1186/s13012-019-0913-3
85. Oni HT, Buultjens M, Abdel-Latif ME et al. Barriers to screening pregnant women for alcohol or other

drugs: A narrative synthesis. Women Birth 2019; 32(6):479–486. https://doi.org/10.1016/j.wombi.2018.11.009
86. Petersen-Williams P, Petersen Z, Sorsdahl K, et al. Screening and brief interventions for alcohol and other drug use among pregnant women attending midwife obstetric units in Cape Town, South Africa: A qualitative study of the views of health care professionals. J Midwifery Wom Health 2015;60(4):401–409. https://doi.org/10.1111/jmwh.12328
87. Bagley K, Badry D. How Personal Perspectives Shape Health Professionals' Perceptions of Fetal Alcohol Spectrum Disorder and Risk. Int J Environ Res Public Health 2019;16(11):1936. https://doi.org/10.3390/ijerph16111936
88. Zizzo N, Racine E. Ethical challenges in FASD prevention: Scientific uncertainty, stigma, and respect for women's autonomy. Can J Public Health 2017;108(4): e414. https://doi.org/10.17269/CJPH.108.6048
89. Nikoo N, Nikoo M, Song M et al. Effectiveness of prenatal screening for substance use: Critical consciousness, a promising curriculum for compassionate screening. Ment Health Fam Med 2017;13:401–406. https://doi.org/10.25149/1756-8358.1301003
90. Shah PV, Tong S, Hwang SS et al. Racial/Ethnic Differences in Prenatal and Postnatal Counseling About Maternal and Infant Health-Promoting Practices Among Teen Mothers. J Pediatr Adolesc Gynecol 2021;34(1):40–46. https://doi.org/10.1016/j.jpag.2020.10.002
91. Schölin L, Hughes K, Bellis MA, et al. "I think we should all be singing from the same hymn sheet" – English and Swedish midwives' views of advising pregnant women about alcohol. Drugs: Ed Prev Policy 2019;26(5):394–400. https://doi.org/10.1080/09687637.2018.1478949
92. Nathoo T, Wolfson L, Gelb K, Poole N. New approaches to brief intervention on substance use. Can J Midwifery Res Prac 2019;18(1):10–21.
93. Chiandetti A, Hernandez G, Mercadal-Hally M, et al. Prevalence of prenatal exposure to substances of abuse: questionnaire versus biomarkers. Reprod Health 2017;14:1–12. https://doi.org/10.1186/s12978-017-0385-3
94. Ferraguti G, Ciolli P, Carito V, et al. Ethylglucuronide in the urine as a marker of alcohol consumption during pregnancy: Comparison with four alcohol screening questionnaires. Toxicol Lett 2017;275:49–56. https://doi.org/10.1016/j.toxlet.2017.04.016
95. Howlett H, Abernethy S, Brown NW, et al. How strong is the evidence for using blood biomarkers alone to screen for alcohol consumption during pregnancy? A systematic review. Eur J Obstet Gynecol Reprod Biol 2017;213:45–52 https://doi.org/10.1016/j.ejogrb.2017.04.005
96. Eichler A, Grunitz J, Grimm J, et al. Did you drink alcohol during pregnancy? Inaccuracy and discontinuity of women's self-reports: On the way to establish meconium ethyl glucuronide (EtG) as a biomarker for alcohol consumption during pregnancy. Alcohol 2016;54:39–44. https://doi.org/10.1016/j.alcohol.2016.07.002
97. Olmstead TA, Yonkers KA, Ondersma SJ, et al. Cost-effectiveness of electronic- and clinician-delivered screening, brief intervention and referral to treatment for women in reproductive health centers. Addiction 2019;114(9):1659–1669. https://doi.org/10.1111/add.14668
98. Xu, X., Yonkers, K.A., Ruger, J.P., et al., Economic evaluation of a behavioral intervention versus brief advice for substance use treatment in pregnant women: results from a randomized controlled trial. BMC Pregnancy Childbirth 2017;17:1–8. https://doi.org/10.1186/s12884-017-1260-5
99. Joya X, Mazarico E, Ramis J, et al. Segmental hair analysis to assess effectiveness of single-session motivational intervention to stop ethanol use during pregnancy. Drug Alcohol Depend 2016;158:45–51. https://doi.org/10.1016/j.drugalcdep.2015.10.028
100. Babor TF, Del Boca F, Bray JW. Screening, Brief Intervention and Referral to Treatment: implications of SAMHSA's SBIRT initiative for substance abuse policy and practice. Addiction 2017;112:110–117. https://doi.org/10.1111/add.13675
101. Erng MN, Smirnov A, Reid N. Prevention of alcohol-exposed pregnancies and fetal alcohol spectrum disorder among pregnant and postpartum women: A systematic review. Alcohol Clin Exp Res 2020;44(12). https://doi.org/10.1111/acer.14489
102. Hussein N, Kai J, Qureshi N. The effects of preconception interventions on improving reproductive health and pregnancy outcomes in primary care: A systematic review. Eur J Gen Prac 2015;1–11. https://doi.org/10.3109/13814788.2015.1099039

103. Montag AC, Brodine SK, Alcaraz JE, et al. Preventing alcohol-exposed pregnancy among an American Indian/Alaska Native population: Effect of a screening, brief intervention, and referral to treatment intervention. Alcohol Clin Exp Res 2015;39(1): 126–135. https://doi.org/10.1111/acer.12607
104. Price SK, Coles DC, Wingold T. Integrating Behavioral Health Risk Assessment into Centralized Intake for Maternal and Child Health Services. Health Soc Work 2017;42(4): 231–238. https://doi.org/10.1093/hsw/hlx037
105. Bountress KE, Metzger IW, Maples-Keller JL, et al. Reducing sexual risk behaviors: secondary analyses from a randomized controlled trial of a brief web-based alcohol intervention for underage, heavy episodic drinking college women. Addict Res Theory 2017; 25(4):302–309. https://doi.org/10.1080/16066359.2016.1271416
106. Hanson JD, Nelson ME, Jensen JL, et al. Impact of the CHOICES Intervention in Preventing Alcohol-Exposed Pregnancies in American Indian Women. Alcohol Clin Exp Res 2017;41(4):828–835. https://doi.org/10.1111/acer.13348
107. Ondersma SJ, Beatty JR, Svikis DS, et al. Computer-Delivered Screening and Brief Intervention for Alcohol Use in Pregnancy: A Pilot Randomized Trial. Alcohol Clin Exp Res 2015; 39(7):1219–1226 8p. https://doi.org/10.1111/acer.12747
108. van Dijk MR, Oostingh EC, Koster MPH, et al. The use of the mHealth program Smarter Pregnancy in preconception care: rationale, study design and data collection of a randomized controlled trial. BMC Pregnancy Childbirth 2017;17(1):46–46. https://doi.org/10.1186/s12884-017-1228-5
109. Lee Y, Cho S. Technology-Supported Interventions for Pregnant Women: A Systematic Review. Comput Inform Nurs 2019;37(10):501–512. https://doi.org/10.1097/CIN.0000000000000535
110. Milligan K, Usher AM, Urbanoski KA. Supporting pregnant and parenting women with substance-related problems by addressing emotion regulation and executive function needs. Addict Res Theory 2017;25(3):251–261. https://doi.org/10.1080/16066359.2016.1259617
111. Motz M, Andrews NCZ, Bondi BC, et al. Addressing the impact of interpersonal violence in women who struggle with substance use through developmental-relational strategies in a community program. Int J Environ Res Public Health 2019;16(21). https://doi.org/10.3390/ijerph16214197
112. Hubberstey C, Rutman D, Schmidt RA, et al. Multi-service programs for pregnant and parenting women with substance use concerns: women's perspectives on why they seek help and their significant changes. Int J Environ Res Public Health, 2019;16(18). https://doi.org/10.3390/ijerph16183299
113. Frazer Z, McConnell K, Jansson LM. Treatment for substance use disorders in pregnant women: Motivators and barriers. Drug Alcohol Depend 2019; 205:107652. https://doi.org/10.1016/j.drugalcdep.2019.107652
114. Rutman D, Hubberstey C, Poole N, et al. Multi-service prevention programs for pregnant and parenting women with substance use and multiple vulnerabilities: Program structure and clients' perspectives on wraparound programming. BMC Pregnancy Childbirth 2020;20(1). https://doi.org/10.1186/s12884-020-03109-1
115. de Vries MM, Joubert B, Cloete M, et al. Indicated Prevention of Fetal Alcohol Spectrum Disorders in South Africa: Effectiveness of Case Management. Int J Environ Res Public Health 2015;13(1). https://doi.org/10.3390/ijerph13010076
116. Krahn J, Caine V, Chaw-Kant J, et al. Housing interventions for homeless, pregnant/parenting women with addictions: a systematic review. J Soc Distress Homeless 2018. 27(1):75–88. https://doi.org/10.1080/10530789.2018.1442186
117. Doi L, Jepson R, Cheyne H. A realist evaluation of an antenatal programme to change drinking behaviour of pregnant women. Midwifery 2015; 31(10):965–972. https://doi.org/10.1016/j.midw.2015.06.007
118. Baron R, Heesterbeek Q, Manniën J, et al. Exploring health education with midwives, as perceived by pregnant women in primary care: A qualitative study in the Netherlands. Midwifery 2017;46:37–44. https://doi.org/10.1016/j.midw.2017.01.012
119. Geraghty S, Doleman G, De Leo A. Midwives' attitudes towards pregnant women using substances: Informing a care pathway. Women Birth 2019; 32(4):e477–e482. https://doi.org/10.1016/j.wombi.2018.09.007

120. McLeish J, Redshaw, M. "I didn't think we'd be dealing with stuff like this": A qualitative study of volunteer support for very disadvantaged pregnant women and new mothers. Midwifery 2017;45: 36–43. https://doi.org/10.1016/j.midw.2016.12.003
121. Damashek A, Kothari C, Berman A, et al. Engagement in home visiting services during the transition from pregnancy to postpartum: A prospective mixed methods pilot study. J Child Fam Stud 2020;29(1). https://doi.org/10.1007/s10826-019-01641-z
122. Rotheram-Borus MJ, Arfer KB, Christodoulou J, et al. The association of maternal alcohol use and paraprofessional home visiting with children's health: A randomized controlled trial. J Cons Clin Psychol 2019;87(6):551–562. https://doi.org/10.1037/ccp0000408
123. Bhat A, HadleyA. The management of alcohol withdrawal in pregnancy — case report, literature review and preliminary recommendations. Gen Hosp Psychiatry 2015;37(3):273.e1-3 1p. https://doi.org/10.1016/j.genhosppsych.2015.02.001
124. DeVido J, Bogunovic O, Weiss RD. Alcohol Use Disorders in Pregnancy. Harv Rev Psychiatry 2015;23(2):112–121. https://doi.org/10.1097/HRP.0000000000000070
125. Thibaut F, Chagraoui A, Buckley L, et al. WFSBP and IAWMH Guidelines for the treatment of alcohol use disorders in pregnant women. World J Biol Psychiatry 2019. 20(1):17–50. https://doi.org/10.1080/15622975.2018.1510185
126. Graves L, Carson G, Poole N, et al. Guideline No. 405: Screening and Counselling for Alcohol Consumption During Pregnancy. J obstet gynaecol Can 2020;42. https://doi.org/10.1016/j.jogc.2020.03.002
127. Kramlich D, Kronk R.. Relational care for perinatal substance use: A systematic review. MCN. Am J Matern Child Nurs 2015;40(5):320–326. https://doi.org/10.1097/NMC.0000000000000160
128. Marcellus L, MacKinnon K, Benoit C, et al. Reenvisioning success for programs supporting pregnant women with problematic substance use. Qual Health Res 2015. 25(4):500–512. https://doi.org/10.1177/1049732314551058
129. Meixner T, Milligan K, Urbanoski K, et al. Conceptualizing integrated service delivery for pregnant and parenting women with addictions: Defining key factors and processes. Can J Addict 2016;7(3):49–57. https://doi.org/10.1097/02024458-201609000-00008
130. Forray A, Merry B, Lin H, et al. Perinatal substance use: A prospective evaluation of abstinence and relapse. Drug Alcohol Depend 2015;150:147–155. https://doi.org/10.1016/j.drugalcdep.2015.02.027
131. Specker BL, Wey HE, Minett M, et al. Pregnancy Survey of Smoking and Alcohol Use in South Dakota American Indian and White Mothers. Am Prev Med 2018;55(1):89–97. https://doi.org/10.1016/j.amepre.2018.03.016
132. Fowler C, Rossiter C, Sherwood J, et al. New understandings of mothering: mothers in an abstinence-based drug treatment program. Int J Ment Health Addict 2015;13(2):173–184. https://doi.org/10.1007/s11469-014-9518-x
133. Hanlon-Dearman A, Malik S, Wellwood J, et al. A descriptive study of a community-based home-visiting program with preschool children prenatally exposed to alcohol. Can J Clin Pharmacol 2017; 24(2):e61–e71. https://doi.org/10.22374/1710-6222.24.2.3
134. Milligan K, Meixner T, Tremblay M, et al. Parenting interventions for mothers with problematic substance use: A systematic review of research and community practice. Child Maltreat 2019. https://doi.org/10.1177/1077559519873047
135. Rotheram-Borus MJ, Tomlinson M, Roux IL, et al. Alcohol use, partner violence, and depression: A cluster randomized controlled trial among urban South African mothers over 3 years. Am J Prev Med 2015;49(5):715–725. https://doi.org/10.1016/j.amepre.2015.05.004
136. Sadicario JS, Parlier-Ahmad AB, Brechbiel JK, et al. Caring for women with substance use disorders through pregnancy and postpartum during the COVID-19 pandemic: Lessons learned from psychology trainees in an integrated OBGYN/substance use disorder outpatient treatment program. J Subst Abuse Treat 2021;122:108200. https://doi.org/10.1016/j.jsat.2020.108200
137. Marcellus L. A Grounded Theory of Mothering in the Early Years for Women Recovering From Substance Use. J Fam Nurs 2017;23(3):341–365. https://doi.org/10.1177/1074840717709366

138. O'Malley D, Chiang Danielle F, Siedlik Emily A, Ragon Katharine, Dutcher Marcia, Templeton Oneta. A promising approach in home visiting to support families affected by maternal substance use. Matern Child Health J 2020;25:42–53. https://doi.org/10.1007/s10995-020-03015-0
139. Popova S, Lange S, Burd L, et al. The economic burden of fetal alcohol spectrum disorder in canada in 2013. alcohol alcohol 2015;51(3):367–375. https://doi.org/10.1093/alcalc/agv117
140. Greenmyer JR, Popova S, Klug MG, Burd L. Fetal alcohol spectrum disorder: a systematic review of the cost of and savings from prevention in the United States and Canada. Addiction 2020;115. https://doi.org/10.1111/add.14841
141. Cherry AL. Shifting our Focus from Retribution to Social Justice: An Alternative Vision for the Treatment of Pregnant Women Who Harm Their Fetuses. J Law Health 2015;28:5–61.
142. Abadir, A.M. and Ickowicz, A., Fetal alcohol spectrum disorder: reconsidering blame. Can Med Assoc J 2016;188(3):171–172. https://doi.org/10.1503/cmaj.151425
143. Martin R, Bruxner G, Ng G, Brewster C, Kothari A. Drowning our sorrows: clinical and ethical considerations of termination in alcohol-affected pregnancy. BMC Pregnancy Childbirth 2020;20(1). https://doi.org/10.1186/s12884-020-03012-9
144. Fitzpatrick JP, Oscar J, Carter M, et al. The Marulu Strategy 2008-2012: overcoming Fetal Alcohol Spectrum Disorder (FASD) in the Fitzroy Valley. Aus N Z J Public Health 2017;41(5):467–473.
145. Wolfson L, Poole N, Morton Ninomiya M, et al. Collaborative Action on Fetal Alcohol Spectrum Disorder Prevention: Principles for Enacting the Truth and Reconciliation Commission Call to Action #33. Int J Environ Res Public Health 2019; 16(9):1589. https://doi.org/10.3390/ijerph16091589
146. Poole N, Schmidt RA, Bocking A, et al. The Potential for Fetal Alcohol Spectrum Disorder Prevention of a Harmonized Approach to Data Collection about Alcohol Use in Pregnancy Cohort Studies. Int J Environ Res Public Health 2019; 16(11):2019. https://doi.org/10.3390/ijerph16112019
147. Eguiagaray I, Scholz B, Giorgi C. Sympathy, shame, and few solutions: News media portrayals of fetal alcohol spectrum disorders. Midwifery 2016; 40:49–54. https://doi.org/10.1016/j.midw.2016.06.002
148. Stewart M. Fictions of Prevention: Fetal Alcohol Spectrum Disorder and Narratives of Responsibility. North American Dialogue 2016;19(1):55–66. https://doi.org/10.1111/nad.12040
149. Wilkinson D, Skene L, De crespigny L, et al. Protecting Future Children from In-Utero Harm. Bioethics 2016;30(6):425–432. https://doi.org/10.1111/bioe.12238
150. Lewis MS. Criminalizing Substance Abuse and Undermining Roe v. Wade: The Tension between Abortion Doctrine and the Criminalization of Prenatal Substance Abuse. J Women Law 2016; 23:185–218.
151. Lollar CE. Criminalizing pregnancy. Ind L J 2017;92(3):947.
152. Adebiyi BO, Mukumbang FC, Cloete LG, et al. Exploring service providers' perspectives on the prevention and management of fetal alcohol spectrum disorders in South Africa: a qualitative study. BMC Public Health 2018;18(1):1–18. https://doi.org/10.1186/s12889-018-6126-x
153. Badry D, Coons-Harding KD, Cook J, et al. Finding answers, improving outcomes: a case study of the Canada fetal alcohol spectrum disorder research network. Adv Dual Diagn 2018. https://doi.org/10.1108/ADD-05-2018-0006
154. Yang Y, Tang L. Understanding women's stories about drinking: implications for health interventions. Health Ed Res 2018;33(4):271–279. https://doi.org/10.1093/her/cyy016
155. Mello S, Stifano S, Tan A, Sanders-Jackson, A Bigman CA. Gendered conceptions of preconception health: A thematic analysis of men's and women's beliefs about responsibility for preconception health behavior. J Health Comm 2020;25(5): 374–384. https://doi.org/10.1080/10810730.2020.1775728
156. Corrigan PW, Shah BB, Lara JL, et al. Addressing the public health concerns of Fetal Alcohol Spectrum Disorder: Impact of stigma and health literacy. Drug Alcohol Depend 2018; 185:266–270. https://doi.org/10.1016/j.drugalcdep.2017.12.027
157. Corrigan PW, Shah BB, Lara JL, et al. Stakeholder perspectives on the stigma of fetal alcohol

spectrum disorder. Addict Res Theory 2018. https://doi.org/10.1080/16066359.2018.1478413

158. Key KD, Ceremony HN, Vaughn AA. Testing two models of stigma for birth mothers of a child with fetal alcohol spectrum disorder. Stigma health 2018. https://doi.org/10.1037/sah0000134
159. Roozen S, Stutterheim SE, Bos AER. et al. Understanding the Social Stigma of Fetal Alcohol Spectrum Disorders: From Theory to Interventions. Found Sci 2020. https://doi.org/10.1007/s10699-020-09676-y
160. Benoit C, Magnus S, Phillips R, et al. Complicating the dominant morality discourse: mothers and fathers' constructions of substance use during pregnancy and early parenthood. Int J Equity Health 2015;14(1): 1–11. https://doi.org/10.1186/s12939-015-0206-7

APPENDIX A

Search Strategy

Seven databases, i.e., Bibliography of Native North Americans, CINAHL, MEDLINE, PsycINFO, Social Work Abstracts, Urban Studies Abstracts, and Women's Studies International were searched using the following search terms:

1) Fetal alcohol syndrome OR Fetal Alcohol Spectrum Disorder OR FASD OR fetal alcohol spectrum disorder OR alcohol related fetal damage
2) [FASD OR fetal alcohol OR fetal alcohol OR alcohol exposed pregnancy OR alcohol] + [pregnancy] + [prevention OR preventing OR preventative]
3) [Fetal OR fetus OR fetus OR fetal] + alcohol
4) [Alcohol OR drink*] + [pregnancy OR pregnant OR prenatal OR antenatal OR perinatal or maternal] + prevention
5) [Pregnan* OR conception OR preconception OR post-partum] + [alcohol OR drink*]
6) [Alcohol OR drink*] + prevention + [women OR girls OR youth OR teen* OR Aboriginal OR First Nation*]
7) [Alcohol OR drink*] + awareness
8) FASD + awareness
9) [Alcohol OR drink*] + intervention* + [women OR girls OR female]
10) [Alcohol OR drink*] + [motivational interviewing OR Screening OR brief intervention OR SBIR OR SBIRT] + [women OR girls OR gender OR female]
11) [Alcohol or drink*] + [home visit* OR NICU OR neonatal intensive care unit OR midwives or midwife or midwifery]
12) [Parent child assistance program OR PCAP]
13) [Pregnan* OR conception OR preconception OR post-partum] + [substance use treatment OR harm reduction].

APPENDIX B

TABLE A2 English-language studies identified on FASD prevention by topic and country.

	Number of Studies						
Country	**Prevalence and influences**	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Ethical, destigmatizing, and systemic considerations**	**Total**
Argentina	2	0	0	0	0	0	2
Australia	15	11	18	5	2	7	58
Belgium	0	0	1	0	0	0	1
Brazil	4	0	0	1	0	1	6
Canada	23	9	18	18	9	14	91
Denmark	3	1	3	0	0	0	7
Ethiopia	4	0	0	0	0	0	4
Finland	1	0	0	0	0	0	1
France	4	2	1	0	0	0	7
Germany	0	1	1	0	0	0	2
Ghana	1	0	0	0	0	0	1
India	1	0	0	0	0	0	1
Italy	1	2	1	0	0	1	5
Japan	1	0	0	0	0	0	1
Lithuania	0	0	1	0	0	0	1
Malaysia	0	0	1	0	0	0	1
Nepal	1	0	0	0	0	0	1
New Zealand	1	2	4	0	0	1	8
Nigeria	2	0	0	0	0	0	2
Northern Ireland	0	0	1	0	0	0	1
Norway	2	0	1	1	0	0	4
Poland	1	0	0	0	0	0	1
Republic of the Congo	1	0	0	0	0	0	1
Russia	3	0	3	0	0	0	6
South Africa	16	2	4	2	2	1	27
South Korea	1	0	0	0	0	0	1
Spain	5	0	4	0	0	0	9
Sweden	4	0	5	2	1	1	13
Switzerland	2	0	1	0	0	0	3

TABLE A2 Continued.

	Number of Studies						
Country	**Prevalence and influences**	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Ethical, destigmatizing, and systemic considerations**	**Total**
Tanzania	2	0	0	0	0	0	2
The Netherlands	3	1	4	1	0	1	10
Uganda	2	0	0	0	0	0	2
UK	18	7	21	6	5	3	60
US	56	18	82	24	10	28	216
Uruguay	1	0	0	0	0	0	1
Region							
Europe	1	0	0	0	0	1	2
Sub-Saharan Africa	1	0	0	0	0	0	1
International	0	0	1	1	0	0	2
	183	**56**	**176**	**61**	**29**	**60**	**564**