Full title: Pregnant women's understanding and conceptualisations of the harms from drinking alcohol: a qualitative study

Short title: How pregnant women conceptualise harm from alcohol use

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Abstract

Background: Despite women's awareness that drinking alcohol in pregnancy can lead to lifelong disabilities in a child, it appears that an awareness alone does not discourage some pregnant women from drinking.

Objectives: To explore influences on pregnant women's decision making around alcohol use in a population with frequent and heavy peer drinking (i.e. in two Indigenous Australian communities) and another of non-Indigenous pregnant women attending antenatal care in a range of socioeconomic settings.

Methods: Individual and group discussions were held with both Indigenous Australian and non-Indigenous pregnant women attending a variety of antenatal care models, including two Indigenous maternity services in Australia. Data were analysed using inductive content analysis.

Results: A total of 14 Indigenous Australian and 14 non-Indigenous pregnant women participated in this study. Analysis identified five main influences on pregnant women's alcohol use: the level and detail of women's understanding of harm; women's information sources on alcohol use in pregnancy; how this information influenced their choices; how women conceptualised their pregnancy; and whether the social and cultural environment supported abstinence.

Conclusions for practice: This study provides insight into how Indigenous Australian and non-Indigenous pregnant women understand and conceptualise the harms from drinking alcohol, including how their social and cultural environments impact their ability to abstain. Strategies for behaviour change need to: correct misinformation about supposed 'safe' timing, quantity and types of alcohol; develop a more accurate perception of Fetal Alcohol Spectrum Disorder; reframe messages about harm to messages about optimising the child's health and cognitive outcomes; and develop a holistic approach encompassing women's social and cultural context.

Introduction

Current research suggests that alcohol use in pregnancy continues to be prevalent despite antenatal guidelines advising against drinking. The 2009 Australian National Guidelines to Reduce Health Risks from Drinking Alcohol recommend that it is safest for women to abstain from drinking alcohol completely throughout the duration of their pregnancy [1]. However, data from two large national surveys of Australian women aged 18 to 45 years found that 34 to 49% of women consumed alcohol in pregnancy [2, 3], and that despite women's awareness that drinking alcohol in pregnancy can lead to lifelong disabilities in a child, nearly one third intended to drink alcohol in a future pregnancy [2]. Whilst knowledge of the potential harms of alcohol consumption during pregnancy is important, it is apparent that an awareness alone does not discourage some women from drinking when pregnant. The relatively high prevalence of alcohol consumption during pregnancy has also been reported in other high-income countries. An international cross-cohort comparison of the prevalence of alcohol use during pregnancy revealed that high rates of alcohol consumption in pregnancy, between 20 and 80%, were evident despite knowledge of the guidelines recommending abstinence [4]. Of additional concern are the levels of alcohol consumed in some sub-populations. For example, an Australian survey reported that of the 55% of Indigenous Australian women who consumed alcohol in pregnancy, nearly half drank at least two to three times per week and almost all consumed a minimum of seven standard drinks per occasion [5]. Similarly, a 2017 systematic review found that around one in five Indigenous women in North America drink at binge levels when pregnant [6].

While it is generally understood that frequent and heavy drinking among peers in populations with a low socioeconomic background is strongly associated with frequent and heavy alcohol use in pregnancy, [7] women who were highly educated, and/or with high incomes are also well represented among those who continue to drink in pregnancy, albeit at lower levels of consumption [2, 8-10]. Women with higher levels of education have more knowledge of the effects of alcohol use in pregnancy [11], however their drinking choices are likely to be based on an individualised

risk perception rather than the advice from guidelines and health professionals. It appears that a single health message to abstain from alcohol in pregnancy is not effective, especially in this population. Advice for pregnant women may need to be tailored to allow for social influences, attitudes, and personal experience, depending on the target population.

The objective of this qualitative study was to explore influences on pregnant women's decision making around alcohol use in a population with frequent and heavy peer drinking (i.e. in two Indigenous Australian communities) and another of non-Indigenous pregnant women from a range of backgrounds. The aim was to better understand why messages to abstain may not always be effective with pregnant women and to inform a more tailored approach to health promotion.

Methods

This study used data collected as part of a larger ongoing project, which aims to develop nationally consistent and comprehensive maternal and perinatal mortality and morbidity data collections in Australia, the National Maternity Data Development Project (NMDDP) [12]. The NMDDP included individual and group interviews with Indigenous Australian and non-Indigenous pregnant women to explore their views on being asked about alcohol use as part of their routine maternity care and having this information reported at a national level. In this context, participants also reflected on their personal opinions and decisions on alcohol use in pregnancy and their understanding of the related harms. These conversations were analysed in the present study to address our objectives. The study is presented in line with the Consolidated Criteria for Reporting Qualitative Research (COREQ) [13].

Women who were pregnant, aged 18 years or older and able to speak and write in English were invited to participate in the study. Recruitment was based on a convenience sample of women attending antenatal care at a date and time that researchers were in attendance. The sites were three public and one private health service in Victoria, Australia, and included socioeconomically disadvantaged and regional areas, as well as two Indigenous Australian settings; one remote service in the Northern Territory and one regional service in Victoria.

Women who met the selection criteria were approached by a member of the research team while they were waiting for their antenatal clinic appointment. Women who were interested in the study, provided written consent to participate and either took part in an individual interview held at a mutually convenient time (mostly immediately following their antenatal appointment) or in a group discussion later that day. Following consultation with clinic staff in the two Indigenous Australian communities, a personal choice to take part in an individual or group interview was offered. This was to allow for freedom of expression where a young woman may not feel comfortable to express her own thoughts in the presence of an elder or may experience shame discussing the topic with others from their community.

The women taking part in this study had no prior relationship with any of the researchers. All individual and group interviews began with brief introductions to the researchers' background, an explanation of the purpose of the study and an opportunity for the women to introduce themselves with their name and gestational age (e.g. *"Hi, my name is Anne and I am 18 weeks pregnant"*) and ask questions. This was followed by a guided discussion of the women's attitudes towards alcohol use during pregnancy, their understanding of the harms of drinking alcohol in pregnancy, and their views on collecting prenatal alcohol consumption information for clinical management and reporting purposes. Examples of guiding questions were: *What do you know about drinking alcohol in pregnancy? Where would you get your information from about this sort of thing?*; *"What is your experience of being asked by a maternity clinician about your alcohol drinking in pregnancy? What were your reactions? Remember, we don't want to ask you about your actual alcohol consumption, but to reflect on your own situation or that of friends."*; *"How important do you think is it that maternity clinicians ask pregnant women about their alcohol use? Do you think that women in general would understand the reasons for being asked about this?";* and *"How important do you think is it that information about alcohol use in pregnancy is collected and reported for all pregnant women across Australia?"* The facilitator was free to ask follow-up questions to explore more deeply any topics raised in the discussion. The questions were pilot tested in a single

discussion group with a convenience sample of five pregnant, or previously pregnant, women from the researchers host institution. All individual and group discussions were facilitated by a skilled qualitative researcher with expertise in the Indigenous Australian setting (JP). The presence of an experienced Indigenous Australian health researcher (LMcC) further ensured that the interviews in this setting were conducted respectfully and socially and culturally appropriate. In the groups, the facilitator conducted the discussion and ensured all participants were given the opportunity to contribute equally and a note taker was present to record contextual details and nonverbal expressions. All discussions were audiotaped with participants' consent and transcribed verbatim with field notes added where relevant. Participant names and study sites were replaced with pseudonyms. No interviews were repeated and transcripts were not returned to participants. Aboriginal and/ or Torres Strait Islander people are respectively referred to in this paper as Indigenous Australian.

Data analysis

Transcripts were analysed by a student researcher (SG) and her supervisor (EM) using inductive content analysis [14] with progressive feedback from the interview facilitator (JP) on interpretation and coding. Content analysis is particularly useful to systematically identify specific messages in any type of social communication. It establishes the existence and frequency of concepts through inclusion or exclusion of content according to consistently applied criteria relevant to the research aims. Analysis involved repeated listening to recordings and reading of transcripts, coding and annotating the text, using the data management software NVivo 11 and on hard copies, with headings which represented manageable content categories. A process of selective reduction then produced an agreed analysis matrix, which consisted of hierarchical flow charts and diagrams to pictorially represent each heading and any possible connections between them. Data were then abstracted into this matrix in a dynamic process by further reviewing and refining headings with similar responses. These formulated categories became the final framework used to report results. Each category was named using a term that was 'content-characteristic' [14]. Using inductive

content analysis enabled researchers to apply and discuss relevant theories to provide meaning and explain results which are included in the discussion section of this paper [15]. Participant feedback on the findings was not sought. A selection of representative quotes, with non-lexical utterances removed, is included in the results to illustrate the categories.

Results

We interviewed 14 Indigenous Australian pregnant women, three of whom took part in a group interview. In the non-Indigenous setting, we conducted one individual and five small group interviews with two to three pregnant women in each group, totalling 14 participants (Table 1). Interviews were undertaken between November 2015 and March 2016. Individual and group interviews ranged between ten and thirty minutes in duration.

Table 1 Participating sites, number and gestation of participants

Site	Code for Table 2	Data collection method	Number of Participants	Gestation (weeks)
Metropolitan public hospital 1	MPUH1	1x individual interview	1	29
Metropolitan public hospital 2 (low SES)	MPUH2	2x group interviews	5	34-39
Rural/regional hospital	RH	2x group interviews	5	15-38
Metro private hospital	MPRH	1x group interview	3	20-31
Remote Aboriginal community controlled health service[a]	RIHS1	3x individual interviews	3	8-20+[b]
Rural Aboriginal community controlled health service	RIHS2	8x individual interviews; 1x group interview	11	8-35

[a] This health service was located in the Northern Territory. All other sites were located in the State of Victoria.
[b] Sometimes women were unsure about their gestational age. Researchers were advised not to specifically ask about this if the information was not volunteered.

The five main categories in our final analysis matrix were: (1) women's understanding of alcohol-related harm (understanding); (2) women's information sources on alcohol use in pregnancy (informing); (3) how this information influenced their choices (choosing); (4) how women conceptualised their pregnancy (conceptualising): and (5) whether their environment was supportive of abstinence from alcohol (enabling). Between three and five subcategories were identified to describe each categorical concept which increased understanding and generated knowledge about the topic. The conceptual framework for understanding the factors which influence drinking choices

168 made by Indigenous Australian and non-Indigenous pregnant women is visualised in the Figure.

169 Table 2 includes a representative set of supporting participant quotes.

170 **Figure** Influences on pregnant women's drinking choices: Conceptual framework.

171 **Figure caption:** Grey rings represent Health Belief Model [16] overlay used in discussion.

172 **Table 2** Conceptual framework: examples of supporting participant quotes

1. Understanding
"I know that there is a number of things, I'm not exactly sure of what can happen but I know it can be dangerous." (Participant 2 RIHS2)
"I know that there's some risks, but I don't know what they are. All I know is that I shouldn't be drinking." (Participant 2 RH)
"From what I've heard, it's not good, there's conditions that can be involved with the development of the baby, and all. Like the actual, when the baby is born, there's serious brain function, cognitive development issues." (Participant 1 MPUH1)
"I do think that probably the general consensus is that people, a lot of people, wouldn't drink in the first twelve weeks at all and people might be more likely to after that." (Participant 2 MPRH)
"I think people will be confused about the standard drinks. I don't think people are clear what a standard drink (is). They think that 'fill up a wine glass' is a standard drink." (Participant 2 MPRH)
"My grandmother drank one glass of red wine each day with my uncles, and yet they turned out perfectly fine. But I think it's the hard stuff that you should avoid, how much percentage is in the actual alcohol or the wine, that's about it." (Participant 3 MPUH2)
"There's a child at our school that has FASD and it's hard to tell with her emotions, because she doesn't know what face to make. So it's just that means smiling and crying and if she sees another kid doing a face she copies like she doesn't really have her own feelings." (Participant 1 RIHS1)

2. Informing
"Early on in the pregnancy, I didn't know I was pregnant for the first eight weeks so, I had a bit of alcohol, and I freaked out a little bit once I found out I was pregnant. I asked the GP and they were like 'no, should be fine' and I read a little, re-read over everything just to refresh, and then kind of came to a conclusion, nothing's going to be wrong." (Participant 1 MPUH1)
"Say I have access to a diverse group of mothers, whether it be from nationality, cultural, age group, and everybody has their own opinion on it." (Participant 2 MPUH2)
"I find a lot of stuff from America, and I will ask my mother in law, then my mama, because they both come from big families. If they don't know, I ask my doctor, or a chemist or someone around me. For the young mums especially, I think the internet's the first option for everyone because it's there, you don't have to leave the house." (Participant 4 RIHS2)
"I was told through family, like what happens when you drink during pregnancy and stuff. They educated me before I went to a midwife sort of thing." (Participant 6 RIHS2)
"I've seen a lot of TV ads as well about FASD." (Participant 1 RIHS1)
"Probably the internet. I'd probably look up research myself and I'm part of a couple of mums' groups online as well, so I'd probably to talk to them about it and see where they would think. A good place to get information as well." (Participant 1 MPUH2)
"Mum's been a midwife, she was doing her midwifery course when I was in her belly, so she's always been pretty open about everything and she tells me her views on things." (Participant 2 RIHS1)
3. Choosing
"I think it's very individual. Some people, some of my girlfriends, have had the occasional drink at a wedding or something and I wasn't too concerned about it. But not drinking regularly or frequently or anything." (Participant 1 MPRH)
"My mum, when I'm stressed, says 'it's okay if you have one'. I'm not comfortable doing that, my main reason is, because when I was pregnant with my twins, I was five months before I even

found out, and I had been drinking and smoking that entire time. They came 10 weeks early and I carry an incredible amount of guilt because I didn't pay attention to myself and it feels like it's my fault that they came early." (Participant 2 RIHS2)
"I think there's conflicting information out there, but I will be of the opinion that none is safer, from what I have read." (Participant 2 MPRH)
"There aren't really any good data on it, as far as in 'moderation' either, so…" (Participant MPRH)
You know mothers are probably just thinking about; 'Oh well my mum did it with me, and her mum did it with her…" (Participant 3 RIHS2)
"Yeah, like they always say, "It never hurt your mum, or it never hurt you, we used to smoke all the way through our pregnancy so…'." (Participant 4 RIHS2)
4. Conceptualising
"Whatever you're eating and drinking, that's what your baby is drinking and eating as well... It's going inside your belly where the baby is." (Participant 5 RIHS2)
"Even though they've got an addiction and they need help, you know, who's helping that little baby inside?" (Participant 3 RIHS1)
"I think people understand you're asked questions to assess your health and the health of your pregnancy and I think people understand that. (Participant 2 MPRH)
"I just decided what I wanted for me, that was all." (Participant 2 MPUH2)
5. Enabling
"Whether it's a choice, or peer pressure, or they're following someone else." (Participant 8 RIHS2)
"Especially if they're teenagers, all of their friends are teenagers and all of their friends are out drinking. They want to follow their friends and drink." (Participant 1 RIHS1)
"If they want to just stop, I believe that they'd stop, but then again, it could be like other issues too. Just say that they have a partner, and they see them drink, then they feel like drinking

because they don't want to be left out. There are all other things that come and play with it as well." (Participant 8 RIHS2)
"If you have a safe place to go to, where there's no drinking, then I guess its ok. But it's hard for women that don't have a safe place to go, or somewhere to go where there's not people drinking…." (Participant 1 RIHS1)
"If you have supportive, strong family that are close and help each other, that's really good." (Participant 1 RIHS1)
"Most of the time, if a woman is drinking during pregnancy, she's quite addicted to it. It's an addiction." (Participant 3 RIHS1)
"I guess someone who is drinking really heavily, perhaps they need some help. Maybe they need to see a counsellor or something like that, for an underlying issue, if they do have a problem with substance abuse." (Participant 1 MPUH2)
"Violence, which can lead to maybe the midwife referring on, or like depression or addiction. If something else is going on there as well, which could help with the treatment of, not only the mother, but the baby as well, and keeping the baby safe." (Participant 1 MPUH1)

Women's understanding of harm (Understanding)

When asked about the harms of alcohol use in pregnancy, all women displayed an understanding and awareness that drinking alcohol was *"bad",* and generally acknowledged that alcohol use could cause harm to their developing baby. Despite this knowledge, many participants were unclear about the nature of harm to the baby. Some participants were able to describe one or more of the physical, social, emotional or behavioural symptoms such as wide eyes, slow learning and hyperactivity. Others named Fetal Alcohol Syndrome or 'FASD' (for Fetal Alcohol Spectrum Disorder) as the umbrella term for the effects from alcohol on the child, but then did not demonstrate an understanding of the condition's characteristics. Very few participants could both name and explain the disorder. Many non-Indigenous women were aware that the research evidence for harm

184 associated with low or occasional alcohol use was inconsistent and often described low level
185 drinking as being safe.

186 Participants often thought that harm was dependent on the timing of alcohol consumption,
187 suggesting there was a *"dangerous period"* and a *"safe period"*. They generally agreed that it was
188 important not to drink alcohol in the first 12 weeks of pregnancy and following this time, one or
189 two occasional drinks would be unlikely to cause harm to their baby. When thinking about alcoholic
190 drinks, most participants described a drink as being *"one glass of wine"* or *"a beer",* showing only
191 limited understanding of the concept of a 'standard drink'.

192 Some participants also believed that the type of alcoholic drink consumed played a role in the
193 potential for harm, suggesting that drinks with lower alcohol content such as wine or beer, as
194 opposed to spirits, were safer options.

195 ***Where women obtain information about alcohol in pregnancy (Informing)***

196 All participants reported that their knowledge and understanding of harm from drinking alcohol in
197 pregnancy stemmed from a variety of sources and not just from their midwife or doctor. Although
198 clinicians were the primary source of information, the internet, television advertisements, and
199 discussions with family and friends featured prominently. Indigenous Australian participants in
200 particular, reflected on discussions they had with their parents or grandparents about drinking
201 during pregnancy, whereas non-Indigenous participants spoke about observing the social pattern of
202 alcohol use in pregnancy of their family and friends whose children were subsequently unaffected.

203 Almost all Indigenous Australian participants mentioned that they had seen children affected by
204 prenatal alcohol exposure within their community, family or workplace, and that this raised their
205 awareness about the condition.

206 ***How this information influenced their choices (Choosing)***

Study participants used all information available to them to inform their decision-making. Indigenous Australian participants had generally seen evidence of the consequences of drinking in pregnancy and listened to their health practitioner's advice to abstain from drinking alcohol. Most Indigenous Australian participants also voiced that they could not understand why anyone would drink if they knew there was a risk of harming their baby's health. In contrast, many non-Indigenous participants agreed that, while not drinking at all in pregnancy is safest, one or two occasional drinks would not be harmful. They were happy to take on board the information and advice given by their clinicians, but explained that their decision incorporated their own observations and 'research' and that whether to drink alcohol when pregnant was an individual choice.

How women conceptualise their pregnancy (Conceptualising)

When reflecting on their drinking choices, the women in our study spoke about their pregnancy in different ways, which also factored into their decision making. Women who spoke about their health and the health of their pregnancy, were more likely to also talk about making individual choices based on their own observations of the drinking behaviour of other pregnant women whose children developed normally despite having been exposed to some level of alcohol. In contrast, women who used language that was more directly connected to the developing fetus, such as the "little baby inside", tended to emphasise that abstinence was very important. This language was used predominantly by Indigenous Australian women, but also by some women in rural or low socioeconomic settings.

Whether the woman's environment supports abstinence (Enabling)

Whist Indigenous Australian participants acknowledged that some women in the community, particularly first-time mothers and those from remote communities, may not know about the harms of drinking in pregnancy, they believed that an inability to abstain in pregnancy related more directly to the influence of their social environment. Several Indigenous Australian women

232 explained that it was common for pregnant women in their community to have *"other stuff"* going
233 on, such as mental health issues, addiction and domestic violence. They also reflected on having the
234 support of their family and/or partner and the protective value of strong culture. They felt that a lack
235 of community, family and partner support was a clear risk factor for pregnant women to continue
236 their drinking, and that not having a *"safe place"* to stay was also a risk factor. Indigenous
237 Australian participants also thought that young pregnant women in particular were vulnerable to
238 drinking because of a high frequency of unplanned and unwanted pregnancy and trying to keep up a
239 social connection with their friends.

240 Although these points were predominantly raised by the Indigenous Australian women, some non-
241 Indigenous participants also proposed social and environmental factors. For instance, the social
242 importance of alcohol use, peer-pressure, and not being ready to disclose their pregnancy to others,
243 was thought to impact a pregnant woman's ability to abstain from alcohol.

244 **Discussion**

245 This study found some specific influences on pregnant women's alcohol use, which helped to
246 explain why a message promoting abstinence is not always effective. This information may assist
247 clinician's conversations about alcohol use in pregnancy and facilitate women to make healthy
248 decisions. Women appeared to know that drinking alcohol when pregnant can be detrimental to the
249 developing baby, but when asked to describe the nature of harm in relation to alcohol use patterns
250 or the effects on the child, women were usually uncertain. All women used the information
251 available to them to make their decisions, but some placed great importance on individual choice;
252 perhaps rationalising their preference to drink alcohol while pregnant. The decisions to abstain in
253 the other group of women, which predominantly comprised the Indigenous Australian participants,
254 were based on their understanding of the responsibility of having a growing baby inside them,
255 listening to the health care provider, and being exposed to the harmful consequences of drinking
256 alcohol in pregnancy. Additional factors which enabled abstinence in both groups, included the

257 women's social environment and the support of a family or in the Indigenous Australian setting, a
258 strong culture.

259 The Health Belief Model [16] is a useful framework to assist in the understanding of the
260 relationship between health beliefs and health practices and provides a good fit to explain our study
261 findings and propose potential strategies for change below (see Figure). The model addresses: a) a
262 person's perception of a threat posed by a health problem, such as their susceptibility or the severity
263 of the condition (i.e. harm from alcohol use in pregnancy); b) the benefits of, or barriers to,
264 avoiding the threat by taking a recommended action (i.e. abstaining from alcohol in pregnancy); and
265 c) the factors that prompt the recommended health action and a person's ability to take such action
266 (i.e. abstinence within a social and/or cultural context) [17].

267 *Perceived susceptibility to harm*

268 Firstly, the idea that some alcohol was safe to drink after the first trimester, or that spirits were more
269 harmful than wine, influenced women's individual views of their susceptibility to harm.
270 Misconceptions about the safety or supposed health benefits of different types of alcoholic drink are
271 common, whether in the context of pregnancy, [18, 19] or in the general population [20]. Further, it
272 is well established that there are many misconceptions about the 'standard alcoholic drink'. The
273 'standard drink' or 'unit of alcohol' is a concept originally developed by the UK Government for
274 their 1987 guidelines on safe drinking and adopted by the World Health Organisation and many
275 countries around the world [21]. Despite standard drink labelling on alcoholic drink beverages, the
276 women in our study equated one glass of wine or 'a beer' with one single drink, even though for
277 example, a 375millilitres can of full-strength beer contains 1.5 standard drinks of alcohol in
278 Australia.

279 *Perceived severity of harm and benefits from abstaining*

280 Secondly, some women perceived the severity of harm from occasional alcohol use to be low. This
281 was usually based on their personal observations of the behaviour of family and friends, and a
282 perception of a lack of convincing research evidence on harm from low consumption patterns.

Consequently, beliefs about the benefits of abstaining from alcohol completely were also low in this group of (non-Indigenous) women and the barriers to taking such action, for example when at a social event, were seen to outweigh any risks. Together, these perceptions permitted nuanced decisions by individual women about the quantity of alcohol was without risk of harm, even if they received best practice health messages advising abstinence. In contrast to the group of women who were making individual decisions about how much was safe to drink, pregnant women who commonly saw heavy alcohol use in their community were more likely to believe that there could be serious harm from alcohol to their child and that complete abstinence was important.

Perceived barriers to abstaining

Thirdly, despite an understanding of the potential harm from alcohol consumption and the clinician's advice, a pregnant woman's social environment may limit her ability to abstain. Previous research with Indigenous Australian communities indicates that while Indigenous Australian women are less likely to drink alcohol in pregnancy than non-Indigenous women, if they do drink, it is done so at risky levels [3, 5]. This was supported by our conversations with Indigenous Australian women who spoke about the need for a strong, supportive family in environments such as public housing town camps, where high-risk alcohol use is common.

All women in our study perceived that there was an expectation on them to drink alcohol in social situations when not pregnant and explained that this influenced their decision or ability to abstain during pregnancy. The pressure to comply with such social norms, especially in early gestation and before the pregnancy is disclosed to others, are well documented in Australian and other Western countries with a similar alcohol use culture [22, 23].

Cues to action and self-efficacy

Lastly, the outcomes from discussions with pregnant women in our study illustrate that abstinence from alcohol has many facets, rendering a simple abstinence message ineffective in many instances. To improve women's knowledge of the harms from alcohol and their own susceptibility, health

advice should include specific education to correct misinformation about 'safe' gestational timing, and increase understanding of the 'standard alcoholic drink' concept to address the mistaken belief that some types of drink are less harmful or even beneficial to one's health. Further, we need to help develop a more accurate perception of FASD and provide a clear message that is evidence-based. Many women are aware of the current lack of evidence for harm associated with low or occasional alcohol use and infer from this that it is safe to drink some alcohol. It is not currently known if there is a 'safe' threshold of exposure, but alcohol is an established teratogen, acting either directly, or through its metabolites, and affecting the regulation of cellular functions [24]. While exposure may not necessarily result in adverse clinical outcomes for the child, it does mean that fetal development is influenced at a biological level in response to alcohol. Women may think about avoiding potential adverse cognitive outcomes in their child when making decisions about how much to drink when pregnant, but prenatal alcohol exposure may also result in increased vulnerabilities to less clearly defined later mental health problems, such as depression and anxiety [25]. Further, our own research showed an association between any prenatal alcohol exposure and facial shape of one year-old children, resulting in imperceptible, yet measurable, flattening of the midface and upturning of the nose, and adding weight to the growing body of evidence on the influence of alcohol on all stages of fetal development [26]. In light of this, we may need to reframe discussions around harm prevention or whether there is a potentially 'safe' threshold, to messages about the importance of alcohol abstinence in optimising health and cognitive outcomes for the unborn child. At the population level, FASD-specific mass media campaigns, based on proven behaviour change principles and with messages which combine threat (addressing perceived susceptibility and severity) and self-efficacy (promoting confidence in ability to abstain) have been shown to be effective in the past [27, 28].

For women with unsafe alcohol use or whose social and cultural environment makes abstinence difficult, clinicians can play an important role in supporting and encouraging reduction in intake. There is good evidence that brief interventions can be effective. These usually follow the '3 As' of

334 'Assess, Advise and Assist' and include building rapport, verbal reinforcement, goal setting to build
335 confidence, and assisting with personal circumstances [29, 30]. Building rapport and providing
336 culturally safe and holistic antenatal care is especially important for Indigenous Australian women
337 who may experience a disproportionate number of adverse circumstances [31, 32].

338 **Methodological considerations**

339 This was a qualitative research study comprising a convenience sample of pregnant women at low
340 risk of complications, attending a variety of antenatal care settings and this need to be considered in
341 the transferability of our findings. The findings presented arose from data generated in both group
342 and individual discussions with pregnant women, which may have affected the nature of
343 conversations. However, the combination of both types of data collection allowed for topics to arise
344 in a group interaction as well as the voicing of opinions in private, neither of which evoked
345 distinguishable content. While findings may be specific to the 28 women taking part and possibly
346 their broader interactions, our data analysis confirmed that data saturation was reached, and no new
347 topics arose that warranted further investigation.
348 The influence of unintended pregnancy, or the time period before pregnancy awareness in general,
349 on alcohol use was not considered specifically in this study and may require additional approaches,
350 such as FASD-specific public health initiatives.

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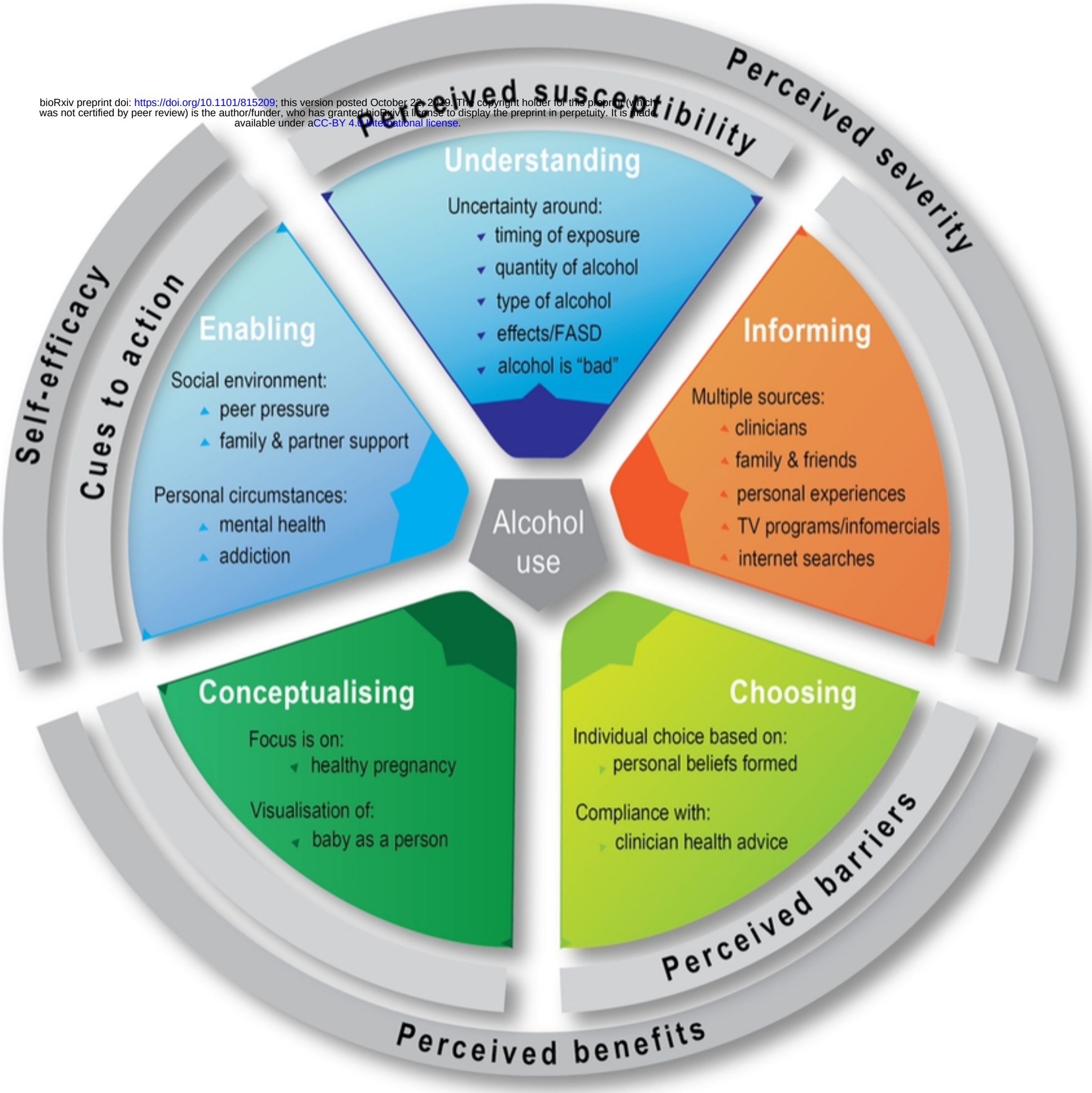

Figure