

## **HEALTH PROFESSIONALS ARE THE PREFERRED SOURCE OF INFORMATION ON ALCOHOL USE DURING PREGNANCY FOR AUSTRALIAN WOMEN: A NATIONAL SURVEY**

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### **ABSTRACT**

#### **Background and Objective**

Prenatal alcohol exposure is a common preventable cause of intellectual disability, but alcohol use remains high during pregnancy. We identified where Australian women obtained information about alcohol during pregnancy, their preferred sources of information, and their perceptions of the role of health professionals in providing information.

#### **Materials and Methods**

In 2006, 1103 nonpregnant Australian women of childbearing age (18–45 years) were interviewed using computer-assisted telephone interview. Information about their actual and preferred sources of information about consuming alcohol during pregnancy and the perceived role of health professionals in pregnancy education were obtained.

#### **Results**

Most (99%) of the Australian women interviewed said information about the effects of consuming alcohol during pregnancy should be readily available, but only half had sighted any such information. Brochures were the most-sighted source (16%), followed by media programs/articles (13%). Women preferred health professionals (52%) as the best source of information, followed by television advertisements (12%). Health professional platforms (e.g., antenatal classes) were preferred by women who had previously given birth, while the Internet was preferred by nulliparous and Australian-born women. Message recall was associated with knowledge that alcohol consumption during pregnancy can cause fetal alcohol spectrum disorder, growth problems, and lifelong disabilities in a child ( $P < 0.05$ ). Women agreed that health professionals should ask pregnant women about alcohol, advise how much alcohol consumption is safe during pregnancy, and advise pregnant women or those planning pregnancy to give up alcohol consumption.

## Conclusion

Australian women use a variety of information sources to learn about use of alcohol during pregnancy but report a strong preference for health professionals as their source of information. Our study suggests that strategies to reduce fetal alcohol exposure should include health professional education and provision of clear public health guidelines regarding the harms of alcohol use during pregnancy and the benefits of abstinence.

**Keywords:** *alcohol consumption; fetal alcohol spectrum disorder; health education; information dissemination; pregnancy*

## INTRODUCTION

Alcohol consumption during pregnancy is common in Australia, with up to 82% women exposed before pregnancy recognition (1–4). Prenatal alcohol exposure is a risk factor for adverse pregnancy and childhood outcomes, including (but not limited to) miscarriage, stillbirth, premature birth, and fetal alcohol spectrum disorder (FASD), and can lead to significant lifelong impairments in development, behavior, and cognition (5).

The National Health and Medical Research Council of Australia (NHMRC) 2009 national guidelines on alcohol use during pregnancy state that abstinence is the safest option (5). Despite broadcasting the message through major newspapers, media coverage, and the NHMRC website, most (72%) pregnant women were noncompliant with the abstinence message (6), although they were not asked whether they were aware of the updated guidelines. Risk factors of consuming alcohol during pregnancy include age, education, tobacco/other drug use (7), and attitudes about alcohol use during pregnancy (8), but two of the most consistent risk factors identified are pre-pregnancy drinking and abuse or exposure to violence (7), highlighting the importance of targeting nonpregnant women in alcohol reduction efforts before they become pregnant.

There is little research indicating where women seek information about alcohol use during pregnancy with inconsistent findings between countries: an American study of 149 nonpregnant women (some of whom were planning a pregnancy) indicated that most women obtained information about alcohol use during pregnancy from the Internet and their doctor (9). Conversely, nonpregnant women in Canada recalled receiving messages about alcohol use during

pregnancy primarily from brochures/pamphlets, media programs, and newspaper/magazine articles (10). Women's preferred source of information about alcohol use during pregnancy differed between study cohorts: the Canadian cohort considered the doctor/doctor's office to be the best source of information (10) whereas women from the American cohort used the Internet to confirm information received from their doctor or for a second opinion (9). Most of the American cohort reportedly preferred to receive information from the television, schools, and sex education classes, followed by advertisements on public transport, radio, and billboards (9). To our knowledge, there are no reports on the preferences of Australian women. The aims of this study were to identify Australian women's current and preferred source of information regarding alcohol use during pregnancy, gauge their levels of support for different information strategies, and explore the perceived role of health professionals.

## METHODS

### *Participants and sampling*

Study methods have been reported previously and are summarized here (8, 11). The survey was conducted as a computer-assisted telephone interview by the Survey Research Centre, School of Population Health, University of Western Australia, in August and September 2006. Staff from the Survey Research Centre used computer-generated national random sampling from the Electronic White Pages of the Australian telephone directories to ask standard questions regarding age, gender, and pregnancy status to screen participants' eligibility. If there was an eligible nonpregnant woman aged 18–45 years at that number, she was invited to participate in the survey. To ensure

a representative national sample, we stratified the sample by age group (18–29 years and 30–45 years) and the state of residence. In 2003, quotas were set to reflect the age distribution of Australian women in the age group of 18–45 years (12), with a minimum of 100 participants from each state. Surveys were administered in English.

### **Questionnaire**

The “Alcohol and Pregnancy Questionnaire” used (8) was based on the Health Canada survey, “Alcohol Use During Pregnancy and Awareness of Fetal Alcohol Syndrome” (10) with language modifications for the Australian context. It was informed by investigators’ consensus and the pilot study with 20 randomly selected women (11). Additional questions were included about current alcohol consumption and previous alcohol use during pregnancy, attitudes, and knowledge about alcohol use during pregnancy (8), and the effectiveness of strategies to inform women about alcohol use during pregnancy.

Demographic data (age, ethnicity, parity, postcode, educational level, employment, and marital status) were collected. Participants were asked open questions about previous sources of information regarding alcohol use during pregnancy and their preferred sources of information. Five-point Likert scales were used to question women about their level of approval for labelling and advertising (“strongly approve” to “strongly disapprove”); the effectiveness of various information strategies (“very effective” to “not at all effective”); their agreement with/knowledge of recommendations about alcohol use during pregnancy and its effects on the unborn child (“strongly agree” to “strongly disagree”); and their agreement with statements regarding the role of health professionals (“strongly agree” to “strongly disagree”). The specific questions can be found in the “Recall of information about the effects of alcohol use” and “Support for initiatives to provide information about the effects of drinking alcohol during pregnancy” sections of the Additional File 1: Alcohol and Pregnancy Questionnaire of Peadon et al. (8). Results of this survey regarding women’s knowledge, attitudes, and alcohol consumption during pregnancy have been published previously (8, 11).

### **Statistical analysis**

A sample size of 1100 was set to provide estimates within 2% for variables with a prevalence of 40 to 50%. Data were analyzed using SPSS (version 15.0, SPSS Chicago, IL, USA). Descriptive statistics of responses to survey questions were reported. Odds ratios and 95% confidence intervals (CI) were calculated for associations between demographic characteristics and sources of information.

### **Ethics**

The study protocol was approved by the Ethics Committees of the Women’s and Children’s Health Service, Perth, Western Australia, The University of Sydney, and the Western Australian Aboriginal Health Information and Ethics Committee.

### **Funding**

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## **RESULTS**

### **Respondent characteristics**

Of the 1603 eligible women contacted, 1103 (68.8%) provided consent and completed the interview. Characteristics of respondents have been reported previously and were similar to the general Australian population with some notable differences (8, 11): The mean age of women in the survey was 32 years, and 700 (63.5% vs 57.8% in the Australian population) (13) had given birth previously. Most participants (63.2% vs. 61.2%) (13) were married or had a de facto or life partner and were employed (63.6% vs. 67.9%) (13). Participants were more likely to have been born in Australia (79.4% vs. 70.4%) (13) and 21 (1.9% vs. 2.4%) (13) identified as Aboriginal or Torres Strait Islander. A higher proportion of respondents (61.4% vs. 46.6%) (14) had a post-school qualification (11).

**Recall of sources of information about the effects of alcohol use**

Over half of the respondents (52.9%) recalled having seen information about alcohol consumption during pregnancy and its effects on the fetus. Brochures (30.5%) and traditional media, such as newspaper/magazine articles (25.5%) and television (18.5%), were the most common sources of information (Table 1). These were followed by health professionals (15.8%), books (14.2%), and schools/special classes (10.1%), with the remaining sources recalled by fewer than 10% (Table 1).

**Preferred sources of information**

All participants were asked the open-ended questions: “What for you would be the best source of information about the effects of drinking alcohol during pregnancy on the unborn child?” and “Are there any other good sources for you to find this information?” (for secondary sources of information). Most of the participants (47.1%) mentioned that the “best” source of information was the doctor/doctor’s office/Aboriginal Medical Service (AMS). The second-most preferred source of information was television advertisements (12.3%).

The most popular secondary sources (“other good sources”) of information mentioned were doctors/doctor’s office/AMS (23.8%), Internet (21.9%), health clinics/hospitals (21.7%), and books/magazines (18.4%) (Table 2). Fewer than 10% mentioned prenatal/antenatal classes, newspapers, and other media; while fewer than 5% mentioned school, friends/family, journals, billboards/posters, alcohol bottle labels/vendors, libraries, or other sources as either their preferred or secondary sources of information (Table 2).

Women who had given birth previously, compared to those who had not, were more likely to prefer health professional platforms such as antenatal classes (OR: 2.1, 95% CI: 1.35 to 3.41, P = 0.001) and hospitals and clinics (OR: 1.5, 95% CI: 1.11 to 1.95, P = 0.008) as their sources of information about alcohol use during pregnancy. Nulliparous women (OR: 2.2, 95% CI: 1.68 to 2.85, P < 0.001) and women who were born in Australia (OR: 1.5, 95% CI: 1.07 to 2.11, P = 0.022) were more likely to prefer the Internet. These associations were similar after adjustment for age (data not shown).

**TABLE 1.** Sources of information recalled by women on the effects of alcohol use during pregnancy on the unborn child (n = 584)

Source of information used	n	%*
Brochure/pamphlet	178	30.5
Media programs/articles in newspapers/magazines	149	25.5
Television advertising	108	18.5
Doctor/health professional	92	15.8
Books	83	14.2
School/special classes	59	10.1
Personal experience/word of mouth	50	8.6
Infant care groups/classes	31	5.3
Magazine advertising	30	5.1
Poster	30	5.1
Other	78	13.4
Don't know	17	2.9

\*Participants could nominate more than one source.

**TABLE 2.** Preferred sources of information on the effects of alcohol use during pregnancy on the unborn child (n = 1103)

Source	Best source n (%)	Other (secondary) good sources n (%) <sup>*</sup>
Doctor/doctor's office/AMS <sup>†</sup>	519 (47.1)	262 (23.8)
Television advertisements	136 (12.3)	180 (16.3)
Flyers and pamphlets	96 (8.7)	153 (13.9)
Internet sources	79 (7.2)	242 (21.9)
Television programs	65 (5.9)	70 (6.3)
Health clinic/hospital	59 (5.3)	239 (21.7)
Books/magazines	52 (4.7)	203 (18.4)
Prenatal/antenatal classes	20 (1.8)	92 (8.3)
Newspapers	15 (1.4)	73 (6.6)
School	11 (1.0)	27 (2.4)
Through friends and family	9 (0.8)	38 (3.4)
Public health organizations/programs	6 (0.5)	43 (3.9)
Other media sources	6 (0.5)	72 (6.5)
Journals	4 (0.3)	3 (0.3)
Alcohol bottles/alcohol vendors	3 (0.3)	17 (1.5)
Posters/billboards	3 (0.3)	34 (3.1)
Pharmacy/chemist	2 (0.2)	38 (3.4)
Library	1 (0.1)	31 (2.8)
Other	14 (1.3)	65 (2.9)
Don't know	3 (0.3)	60 (5.4)

<sup>\*</sup>Participants could nominate more than one source.

<sup>†</sup>Aboriginal Medical Service.

### ***Predictors of recall of information and sources of information***

Women who had previously given birth were more likely than nulliparous women to recall having seen information regarding alcohol consumption during pregnancy and its effects on the fetus ( $P = 0.021$ ; Table 3). They were also more likely to recall receiving the information from a health professional than nulliparous women (OR 2.5, 95% CI 1.43 to 4.37,  $P = 0.001$ ). Women with a bachelor's degree or higher qualification were more likely to recall having seen information regarding alcohol consumption during pregnancy than women who did not complete year

12 ( $P < 0.001$ ; Table 3). Recall of information on alcohol consumption during pregnancy was associated with knowledge that alcohol consumption during pregnancy can: cause FASD ( $P < 0.001$ ) and growth problems ( $P < 0.001$ ); lead to lifelong disabilities in a child ( $P < 0.001$ ); and affect the unborn child ( $P = 0.009$ ; Table 3). These associations were similar after adjusting for previous births and educational attainment (data not shown). Women's attitudes towards alcohol consumption during pregnancy, their current alcohol consumption, and their past and intended alcohol consumption during pregnancy were not associated with recall of information (data not shown).

**TABLE 3.** Predictors of recall of having seen information regarding alcohol consumption during pregnancy (n = 1103)

Participants' characteristics	Recalled having seen information regarding alcohol consumption during pregnancy OR (95% CI)
Birth history	
Nulliparous women	(Reference)
Previously given birth	1.3 (1.04 to 1.71)*
Women who agree that drinking alcohol during pregnancy can affect the unborn child	1.9 (1.17 to 2.97)**
Women who know that alcohol consumption during pregnancy can cause growth problems	2.0 (1.50 to 2.76)***
Women who agree that drinking alcohol during pregnancy can lead to lifelong disabilities in a child	2.3 (1.66 to 3.22)***
Educational level	
Less than year 12	(Reference)
Completed year 12	1.4 (0.94 to 2.05)
Post-school qualification below bachelor's degree	1.7 (1.18 to 2.44)**
Bachelor's degree or higher	2.9 (1.97 to 4.28)***
Women who know that alcohol consumption during pregnancy can cause FASD	3.6 (2.6 to 5.06)***

\* $P < 0.05$ , \*\* $P < 0.01$ , \*\*\* $P < 0.001$ .

FASD, fetal alcohol spectrum disorder.

### ***Support for initiatives to inform women about the effects of alcohol consumption during pregnancy***

When participants were asked to rate their approval of various public information strategies to warn women about the effects of alcohol use during pregnancy, the majority approved all four strategies. The strongest approval was for government-sponsored awareness campaigns (95.8% approved or strongly approved), followed by messages on alcohol advertising (90.8% approved or strongly approved), and labels on alcohol products warning about the harms of consuming alcohol during pregnancy (86.4% approved or strongly approved). There was also support for signs in restaurants, bars, and clubs (68.2%).

Participants were asked to rate their opinion on the effectiveness of various information strategies to warn women about the effects of alcohol use during pregnancy on a 5-point Likert scale (Table 4). There was strong support for initiatives which involved health professionals and services, including providing information

to doctors and health professionals so they can inform their patients (98.2% effective or very effective) and the use of posters and brochures in waiting rooms (97.9% effective or very effective) and pharmacies (91.9% effective or very effective). Strong support was also given to television advertisements (94.4%) and school education programs (92.4%), followed by advertisements in newspapers, magazines (88.7%), radio (83.6%), and public transport (72.7%) (Table 4).

### ***The role of health professionals***

Almost all participants (99.4%) agreed or strongly agreed that information should be readily available to women about the possible effects of alcohol use during pregnancy on the unborn child; and that health professionals should ask pregnant women about how much and how often they drink alcohol (96.9%). Women agreed or strongly agreed that health professionals should advise women as to how many standard drinks are safe to consume during pregnancy (96.9%); and agreed or strongly agreed that health professionals

**TABLE 4.** Respondents' hypothesized effectiveness of initiatives to inform women about the effects of alcohol use during pregnancy (n = 1103)

Strategy	"Effective" or "Very effective" n (%)
Sending information materials to doctors and health professionals so that they can inform their patients	1083 (98.2)
Posters and brochures in waiting rooms and clinics	1080 (97.9)
Television advertisements	1041 (94.4)
School education programs	1019 (92.4)
Posters and brochures in pharmacies and chemists	1014 (91.9)
Inserts and advertisements in magazines and newspapers	978 (88.7)
Radio advertisements	922 (83.6)
A website with information about the subject	857 (77.7)
Advertisements on buses and bus shelters	802 (72.7)

should advise women who are pregnant or who are thinking of becoming pregnant to give up consuming alcohol (90.7%).

### DISCUSSION

In this national survey, half of the women surveyed recalled having seen information on alcohol use during pregnancy most commonly in brochures, traditional media, and television. Women indicated their preference for health professionals/clinics as the primary ("best") source of information, and strongly supported the role of health professionals in discussing alcohol consumption during pregnancy. However, few women recalled receiving specific information from their health professional. Our results highlight the importance of ongoing education to empower health professionals to provide a clear and consistent message to all women of childbearing age about use of alcohol during pregnancy. Participants strongly supported public health strategies to raise awareness, including government-sponsored warnings about the effects of alcohol use during pregnancy, warning messages in alcohol advertising, and labelling on alcohol products, although fewer than 5% mentioned these strategies as a preferred source of information for themselves. These results support public health campaigns about use of alcohol during pregnancy.

Most (89.4%) women in our national cohort had consumed alcohol in the last 12 months (8). Thirty-two percent intended to continue consuming if planning a pregnancy (either at their usual or reduced level), and 23.7% intended to continue consuming if they became pregnant (8). In this cohort, their intent to consume alcohol during a future pregnancy was associated with alcohol use in a previous pregnancy, neutral/positive attitudes toward alcohol use during pregnancy, and higher and more frequent current alcohol use (8). In the current cohort, the recalled and preferred sources of information of this cohort were explored. Although the sources of information most-recalled were brochures, traditional media, and television, 70.9% women rated their doctor/AMS as their preferred source of information (i.e., "best" and "other good source"). In particular, women who had previously given birth were more likely to: recall and retain information about alcohol use during pregnancy; have received information from a health professional/hospital/clinic; and indicate a preference for antenatal classes and other health professional platforms as sources of information compared to nulliparous women, thus highlighting pregnancy as an opportunity to ask, educate, and support women about alcohol use.

Our findings are in line with the studies from Australia, Russia, the United States and the Netherlands, which showed that health professionals (including midwives, obstetricians, gynaecologists, and nurses) were among the most preferred and influential sources of information for pregnant and nonpregnant women of childbearing age in relation to alcohol use during pregnancy (9, 15–17). This aligns with the opinions of health professionals who feel that they should provide advice on alcohol use during pregnancy, although screening, providing correct advice, and interventions (where indicated) are often inadequate (18–21). Only 16% of women surveyed recalled receiving information from a health professional. This is not surprising as health professionals at the time of the survey (2006) had low levels of knowledge and less than half routinely asked women about alcohol consumption during pregnancy, using a standardized screening tool (22, 23). Even when health professionals had knowledge, they were reluctant to discuss alcohol use during pregnancy due to fears of frightening or stigmatizing women, lack of confidence, and poor knowledge of resources available to assist women and their families (22–24).

Given the preference of Australian women for health professionals to provide the advice on alcohol use during pregnancy, these barriers need to be overcome. Educational resources for health professionals developed for the *Alcohol and pregnancy project* were effective in improving knowledge, attitudes, and practice in relation to fetal alcohol syndrome and provision of advice on alcohol use during pregnancy (21), showing the potential of education to change clinical practice. As a direct result of previously unpublished data from the current survey, the Foundation for Alcohol Research and Education (FARE) launched its *Women want to know* campaign in 2014 to provide practical educational resources for health professionals (<http://fare.org.au/women-want-to-know/>) (25). FARE also developed the *Pregnant pause* campaign to encourage partners of pregnant women to abstain from alcohol during pregnancy (<http://www.pregnantpause.com.au/about/>). Subsequent Australian government-funded initiatives and research included the development of the following: an intervention to improve antenatal care addressing alcohol use during pregnancy (26);

the NHMRC Centre of Research Excellence (FASD Research Australia), the *FASD Hub Australia* online resource (<https://www.fasdhub.org.au/>), and the *Australian guide to the diagnosis of FASD* (27). All provide information for health professionals and women about alcohol use during pregnancy.

Recall of information about alcohol use during pregnancy was associated with the knowledge of potential harms of alcohol to the unborn child. However, the knowledge of potential harms was not associated with a negative attitude toward alcohol use or intent to consume during a future pregnancy in our cohort (11). This is consistent with the reviews of public health campaigns that failed to show any decrease in alcohol consumption despite improved knowledge (28, 29). Recently, the Australian government has invested \$25 million in FARE for a national awareness-raising campaign about the potential harms of consuming alcohol during both pregnancy and breastfeeding (<http://fare.org.au/vital-funds-for-protecting-women-and-children-from-alcohol-harm/>). Any prevention efforts must align awareness campaigns with evidence-based behavior-change strategies, such as motivational interviewing (30) and counseling (31). Prevention and support programs should ideally be nonjudgmental, provide women with a sense of community, and have multiple services at one location (e.g., medical, allied health, social welfare services, and grocery and infant supply stores) (32). To facilitate this, systems need to be in place in the antenatal service environment to enable and empower health professionals, for example, electronic systems to prompt and guide them through recommended screening processes and care pathways, educational meetings to support care provision, local opinion leaders, and academic detailing (24).

The study has both strengths and limitations. The response rate was high for this telephone survey (33) and the participants were representative of the Australian population of women of childbearing age (18–45 years), although with a higher level of education than the general population. However, the study design did not address pregnant women and vulnerable populations, including Indigenous women, teenagers younger than 18 years, and women who did not speak English. Electronic sampling of the telephone directory (White Pages) may have led to under-representation

of population groups who are more likely to live in a household without a listed number, such as younger women and women of lower socioeconomic status (33). Additionally, the use of Likert scales instead of free-text responses for questions about the role of health professionals may have resulted in biased responses, as respondents may have chosen answers they felt were socially desirable. These limitations in recruitment and data quality could be overcome in the future studies through different study designs such as focus groups in minority populations, and use of different technology, for example, the Internet.

Since this survey, several education campaigns for health professionals and the general community have been launched with the support of the Australian government. To encourage people to make lifestyle changes and access services, awareness campaigns should be used in concert with evidence-based strategies to change attitudes and behavior (34), and evaluated for their effectiveness. Health providers should also be empowered to provide screening and referral through education and workplace systems.

### CONCLUSION

Half of the participants in our survey recalled having seen information about alcohol consumption during pregnancy, mostly from brochures, traditional media, and television. Women identified a crucial role for health professionals in asking and advising about alcohol use. The reluctance of health professionals to ask and advise women because of concerns of stigmatization could be overcome through undergraduate and postgraduate education of health professionals, and embedded systems at the workplace to improve knowledge and confidence and enable health professionals to seek and record information. In order to increase the efficacy of the future individual and public health efforts in reducing alcohol use during pregnancy, pathways to individualized services for those wishing to reduce or cease their alcohol consumption must be included. With the commitment of funds from the Australian government in this area, the opportunity to design and implement evidence-based campaigns and practices should not be forsaken.

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### REFERENCES

1. Anderson AE, Hure AJ, Forder P, Powers JR, Kay-Lambkin FJ, Loxton DJ. Predictors of antenatal alcohol use among Australian women: A prospective cohort study. *BJOG*. 2013;120(11):1366–74. <http://dx.doi.org/10.1111/1471-0528.12356>
2. Muggli E, O'Leary C, Donath S, Orsini F, Forster D, Anderson PJ, et al. "Did you ever drink more?" A detailed description of pregnant women's drinking patterns. *BMC Public Health*. 2016;16:683. <http://dx.doi.org/10.1186/s12889-016-3354-9>
3. McCormack C, Hutchinson D, Burns L, Wilson J, Elliott E, Allsop S, et al. Prenatal alcohol consumption between conception and recognition of pregnancy. *Alcohol Clin Exp Res*. 2017;41(2):369–78. <http://dx.doi.org/10.1111/acer.13305>
4. Australian Institute of Health and Welfare. National drug strategy household survey 2016: Detailed findings. Canberra, Australia: AIHW; 2017.
5. National Health and Medical Research Council. Australian guidelines to reduce health risks from drinking alcohol. Canberra, Australia: Commonwealth of Australia; 2009.
6. Anderson AE, Hure AJ, Powers JR, Kay-Lambkin FJ, Loxton DJ. Determinants of pregnant women's compliance with alcohol guidelines: A prospective cohort study. *BMC Public Health*. 2012;12(1):777. <http://dx.doi.org/10.1186/1471-2458-12-777>
7. Skagerström J, Chang G, Nilssen P. Predictors of drinking during pregnancy: A systematic review. *J Womens Health*. 2011;20(6):901–13. <http://dx.doi.org/10.1089/jwh.2010.2216>

8. Peardon E, Payne J, Henley N, D'Antoine H, Bartu A, O'Leary C, et al. Attitudes and behaviour predict women's intention to drink alcohol during pregnancy: The challenge for health professionals. *BMC Public Health*. 2011;11(1):584. <http://dx.doi.org/10.1186/1471-2458-11-584>
9. Elek E, Harris SL, Squire CM, Margolis M, Weber MK, Dang EP, et al. Women's knowledge, views, and experiences regarding alcohol use and pregnancy: Opportunities to improve health messages. *Am J Health Educ*. 2013;44(4):177–90. <http://dx.doi.org/10.1080/19325037.2013.768906>
10. Environics Research Group Limited. Awareness of the effects of alcohol use during pregnancy and fetal alcohol syndrome: Results of a national survey—Final report. Ontario, Canada: Public Health Agency of Canada for Health Canada; 2000.
11. Peardon E, Payne J, Henley N, D'Antoine H, Bartu A, O'Leary C, et al. Women's knowledge and attitudes regarding alcohol consumption in pregnancy: A national survey. *BMC Public Health*. 2010;10:510. <http://dx.doi.org/10.1186/1471-2458-10-510>
12. Australian Bureau of Statistics. Australian historical population statistics (Cat. No. 3105.0.65.001) [Internet]. 2004. Available from: [http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/CA2568A90021A807CA256DB000025315/\\$File/3105065001\\_table19.xls](http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/CA2568A90021A807CA256DB000025315/$File/3105065001_table19.xls) [Access date: 30 Oct 2019]
13. Australian Bureau of Statistics. Census of population and housing Australia 2007 (Cat. No. 2068.0—2006) [Internet]. Available from: <http://www.censusdata.abs.gov.au> [Access date: 2 Feb 2014]
14. Australian Bureau of Statistics. Summary of results, education and training experience, Australia, 2005, state tables (Cat. No. 6278.0) [Internet]. 2006. Available from: <https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6278.020052014> [Access date: 10 Mar 2014]
15. Anderson AE, Hure AJ, Kay-Lambkin FJ, Loxton DJ. Women's perceptions of information about alcohol use during pregnancy: A qualitative study. *BMC Public Health*. 2014;14(1):1048. <http://dx.doi.org/10.1186/1471-2458-14-1048>
16. Balachova T, Bonner B, Bard D, Chaffin M, Isurina G, Owora A, et al. Women's receptivity to fetal alcohol spectrum disorders prevention approaches: A case study of two regions in Russia. *Int J Alcohol Drug Res*. 2014;3(1):5–15. <http://dx.doi.org/10.7895/ijadr.v3i1.158>
17. Baron R, Heesterbeek Q, Mannien J, Hutton EK, Brug J, Westerman MJ. Exploring health education with midwives, as perceived by pregnant women in primary care: A qualitative study in the Netherlands. *Midwifery*. 2017;46:37–44. <http://dx.doi.org/10.1016/j.midw.2017.01.012>
18. Jones SC, Telenta J, Shorten A, Johnson K. Midwives and pregnant women talk about alcohol: What advice do we give and what do they receive? *Midwifery*. 2011;27(4):489–96. <http://dx.doi.org/10.1016/j.midw.2010.03.009>
19. Crawford-Williams F, Steen M, Esterman A, Fielder A, Mikocka-Walus A. “If you can have one glass of wine now and then, why are you denying that to a woman with no evidence”: Knowledge and practices of health professionals concerning alcohol consumption during pregnancy. *Women Birth*. 2015;28(4):329–35. <http://dx.doi.org/10.1016/j.wombi.2015.04.003>
20. Payne JM, Watkins RE, Jones HM, Reibel T, Mutch R, Wilkins A, et al. Midwives' knowledge, attitudes and practice about alcohol exposure and the risk of fetal alcohol spectrum disorder. *BMC Pregnancy Childbirth*. 2014;14:377. <http://dx.doi.org/10.1186/s12884-014-0377-z>
21. Payne J, France K, Henley N, D'Antoine H, Bartu A, O'Leary C, et al. Changes in health professionals' knowledge, attitudes and practice following provision of educational resources about prevention of prenatal alcohol exposure and fetal alcohol spectrum disorder. *Paediatr Perinat Epidemiol*. 2011;25(4):316–27. <http://dx.doi.org/10.1111/j.1365-3016.2011.01197.x>
22. Elliott EJ, Payne J, Haan E, Bower C. Diagnosis of foetal alcohol syndrome and alcohol use in pregnancy: A survey of paediatricians' knowledge, attitudes and practice. *J Paediatr Child Health*. 2006;42(11):698–703. <http://dx.doi.org/10.1111/j.1440-1754.2006.00954.x>
23. Payne J, Elliott E, D'Antoine H, O'Leary C, Mahony A, Haan E, et al. Health professionals' knowledge, practice and opinions about fetal alcohol syndrome and alcohol consumption in pregnancy. *Aust NZ J Public Health*. 2005;29(6):558–64. <http://dx.doi.org/10.1111/j.1467-842X.2005.tb00251.x>
24. Doherty E, Kingsland M, Wiggers J, Anderson AE, Elliott EJ, Symonds I, et al. Barriers to the implementation of clinical guidelines for maternal alcohol consumption in antenatal services: A survey using the theoretical domains

- framework. *Health Promot J Aust.* 2019; 31(1):133–139. <http://dx.doi.org/10.1002/hpja.258>
25. Hall & Partners Open Mind. Women want to know project evaluation. Canberra, Australia: Foundation for Alcohol Research and Education (FARE); 2016.
26. Kingsland M, Doherty E, Anderson AE, Crooks K, Tully B, Tremain D, et al. A practice change intervention to improve antenatal care addressing alcohol consumption by women during pregnancy: Research protocol for a randomised stepped-wedge cluster trial. *Implement Sci.* 2018;13(1):112. <http://dx.doi.org/10.1186/s13012-018-0806-x>
27. Bower C, Elliott EJ, on behalf of the Steering Group. Report to the Australian Government Department of Health: “Australian guide to the diagnosis of Fetal Alcohol Spectrum Disorder (FASD)”. Canberra, Australia: Australian Government Department of Health; 2016.
28. Young B, Lewis S, Katikireddi SV, Bauld L, Stead M, Angus K, et al. Effectiveness of mass media campaigns to reduce alcohol consumption and harm: A systematic review. *Alcohol Alcohol.* 2018;53(3):302–16. <http://dx.doi.org/10.1093/alcalc/agx094>
29. Crawford-Williams F, Fielder A, Mikocka-Walus A, Esterman A. 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):154–61. <http://dx.doi.org/10.1111/dar.12152>
30. Ingersoll K, Frederick C, MacDonnell K, Ritterband L, Lord H, Jones B, et al. A pilot RCT of an internet intervention to reduce the risk of alcohol-exposed pregnancy. *Alcohol Clin Exp Res.* 2018;42(6):1132–44. <http://dx.doi.org/10.1111/acer.13635>
31. O’Connor EA, Perdue LA, Senger CA, Rushkin M, Patnode CD, Bean SI, et al. Screening and behavioral counseling interventions to reduce unhealthy alcohol use in adolescents and adults: Updated evidence report and systematic review for the US Preventive Services Task Force. *JAMA.* 2018;320(18):1910–28. <http://dx.doi.org/10.1001/jama.2018.12086>
32. Rutman D, Hubberstey C. National evaluation of Canadian multi-service FASD prevention programs: Interim findings from the co-creating evidence study. *Int J Environ Res Public Health.* 2019;16(10):18. <http://dx.doi.org/10.3390/ijerph16101767>
33. O’Toole J, Sinclair M, Leder K. Maximising response rates in household telephone surveys. *BMC Med Res Methodol.* 2008;8(1):71. <http://dx.doi.org/10.1186/1471-2288-8-71>
34. Floyd RL, Weber MK, Denny C, O’Connor MJ. Prevention of fetal alcohol spectrum disorders. *Dev Disabil Res Rev.* 2009;15(3):193–9. <http://dx.doi.org/10.1002/ddrr.75>