

## **UNDERSTANDING CONTRACEPTIVE BEHAVIOUR TO PREVENT UNINTENDED ALCOHOL-EXPOSED PREGNANCIES**

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### **ABSTRACT**

#### **Background and Objective**

The combined behaviours of alcohol consumption and ineffective or non-use of contraception could place sexually active individuals of reproductive age at risk of unintended alcohol-exposed pregnancy. The first aim of the current study was to assess levels of contraceptive use in a sample of university students who reported using alcohol. The second aim was to assess knowledge of contraception, reproduction, risks of alcohol use while pregnant, and attitudes regarding contraception compared with reported contraceptive use behaviour.

#### **Materials and Methods**

Participants were recruited through the university research participation website where a link to an online survey was made available to first-year undergraduate psychology students. The online questionnaire included questions on contraceptive and alcohol consumption behaviours in the past month and questions that assessed participants' knowledge and attitudes. A total of 106 participants were included in the current study.

#### **Results**

The majority of participants reported using contraception when having sex in the past month. The most common form of contraceptive used was male condoms (~60%), followed by the oral contraceptive pill (~46%). There was a significant difference in one of the knowledge scales between the 2 contraceptive groups: participants who reported Never/Sometimes using contraception had higher knowledge of reproduction compared to those who reported using contraception more often. The proportion of participants who used contraception more frequently reported having more positive attitudes towards contraception compared to those who reported Never or Sometimes using contraception.

#### **Conclusion**

Given the lifelong impacts that can be experienced for individuals with fetal alcohol spectrum disorder (FASD), prevention of unintended alcohol-exposed pregnancies is an area that requires serious attention. If the high prevalence rates of FASD are to be reduced, prevention needs to take place for people of reproductive age, particularly in Australia where we have high rates of unplanned pregnancies and a binge drinking culture.

**Key Words:** *fetal alcohol spectrum disorders; prevention; contraception; pregnancy; unplanned*

Alcohol is teratogenic and its use during fetal development may result in a range of adverse effects including prematurity, growth restriction, and fetal alcohol spectrum disorder (FASD), a neurodevelopmental disorder associated with exposure to alcohol in utero. The combined behaviours of alcohol consumption and the ineffective or non-use of contraception could place sexually active individuals of reproductive age at risk of an unplanned alcohol-exposed pregnancy (AEP).<sup>1</sup> An AEP can occur either before or after pregnancy recognition.<sup>2</sup> Previous Australian research has found that 30% of women attending an antenatal clinic re-ported that their pregnancy was “unintended.” Another Australian study collected data from 3795 women aged 18 to 23 years. This study found that 21.1% of women reported ever being pregnant, of whom 84.6% reported that this was an ‘accidental’ pregnancy. Of these, 73.4% indicated that they were using contraception at the time of the unintended pregnancy and the contraceptive pill was the most frequently used form (39.1%).<sup>3</sup> Notably, international evidence suggests that long-acting reversible contraceptives (LARCs) can reduce the rates of unintended pregnancies, compared to short-acting reversible contraceptives (SARCs). LARCs are defined as any contraceptive that requires administration less than once per cycle. This includes intrauterine devices (IUDs), progesterone injections and implants. However, uptake of LARCs in Australia has been comparatively low (e.g., progesterone injection: 1.5%, implant: 4.9%, IUDs: 6.1%).<sup>4</sup>

The high rates of unintended pregnancies are particularly concerning when considered in the context of alcohol use being embedded within Australian culture. Many Australians report consuming alcohol above the levels recommended by the National Health and Medical Research Council guidelines and consequently, alcohol misuse is a major social and public health issue in Australia.<sup>5</sup> Rates of AEPs in Australia range from 37 to 72% depending on the methodologies, samples, and definitions of alcohol use that are used.<sup>6</sup> It is often unclear whether alcohol consumption prior to pregnancy recognition is taken into account in the estimates.<sup>6</sup> A recent large Australian study found that rates of alcohol-exposure were higher than previous estimates when the period prior to pregnancy recognition was included. Most women (60.6%) reported

consuming alcohol between conception and pregnancy recognition and patterns of binge and heavy drinking were more common than low-level drinking.<sup>6</sup>

One specific population that may be at high risk of having an unplanned AEP are university students. Previous research has highlighted 3 findings supporting this notion: rates of alcohol consumption are known to be higher among university students than non-student peers, alcohol consumption among female university students is increasing and although most university students reported using contraceptives, alcohol consumption is associated with ineffectual use of contraception.<sup>7</sup> Consequently, we were interested in investigating contraceptive use behaviour in a population of Australian university students who also reported consuming alcohol.

We were also interested in investigating other factors that could be associated with unplanned AEPs; for instance, knowledge of potential risks regarding exposure to alcohol while pregnant, including FASD. A previous study from the United States found adequate knowledge of risks about FASD among university students; however, the study did not examine whether this translated to a reduction in risky health behaviours.<sup>7</sup> Some previous studies on this topic have found that knowledge could influence behaviour. For example, research conducted with women in Russia found that accurate knowledge regarding the risks of alcohol consumption, including FASD during pregnancy, was associated with reduced alcohol consumption for pregnant women, but not for non-pregnant women.<sup>8</sup> However, other studies have found no relationship between knowledge and behaviour. For instance, a study of pregnant women in Denmark found that 85% of participants recognized that alcohol could be harmful during pregnancy; however, this did not predict reduced alcohol consumption.<sup>9</sup> Thus, we were interested in investigating the relationship between knowledge and behaviour among university students of reproductive age who consume alcohol.

Another factor that has been explored in the literature is attitudes. Some studies have found that attitudes towards alcohol use during pregnancy were more impactful on drinking behaviour or intentions than knowledge about FASD.<sup>10,11</sup> For instance, women with more favourable attitudes toward

consuming alcohol were more likely to drink at risky levels when not pregnant and to use alcohol during pregnancy.<sup>8</sup> Therefore, we were interested in investigating if this relationship would also apply to attitudes towards contraceptive use for a sample of university students of reproductive age.

The first aim of the current study was to assess levels of contraceptive use in a sample of university students who reported using alcohol. The second aim was to assess knowledge of contraception, reproduction, risks of alcohol use while pregnant, and attitudes regarding contraception compared with reported contraceptive use behaviour.

## METHODS

### *Participants and Procedure*

The inclusion criteria of the current study were that participants: (1) were between the ages of 18 to 45 years (i.e., childbearing age for women/legal drinking age); (2) consumed alcohol; (3) and were sexually active. Women who were currently pregnant were not eligible to participate. Ethics approval was obtained from the university research ethics committee. Participants were recruited through the university research participation website where a link to an online survey was made available to first-year undergraduate psychology students. A total of 106 participants were included in the current study. Data were collected using Qualtrics survey software.

### *Measures*

The online questionnaire included basic demographic information (e.g. age, gender), questions on contraceptive and alcohol consumption behaviours in the past month, and questions that assessed participants' knowledge and attitudes, as described below. See the Supplementary Table in the Appendix for a copy of the survey questions.

*Alcohol and contraceptive behaviour* was measured using a Timeline Follow-back (TLFB) procedure.<sup>12</sup> The original TLFB is completed as an interview. For the current study, a protocol that was easily followed as part of the online survey was administered. As in the standard TLFB procedure, participants were required to use a calendar and the aid of any important events to assist in recalling their behaviour. Participants were asked the number of days in the past month they had

consumed alcohol, to record the typical and highest number of drinks consumed, using units of standard drinks for which they were provided a visual aid. Participants were also asked how often when having sex in the past month they used contraception and to select the types of contraception they used from a range of options.

*Knowledge* was assessed with 19 multiple-choice items. The questions were based on previous studies,<sup>7-9</sup> with 2 questions focusing on *reproduction*, 7 on *contraception*, 6 on *alcohol use and pregnancy* and 4 focusing on *FASD*. An overall score was created for each of the 4 areas mentioned above by summing the total number of correct answers given per item and dividing by the total number of questions answered.

*Attitudes towards using contraception* were measured by 2 items on a 7-point scale from 1 (strongly disagree) to 7 (strongly agree). An overall attitude score was created by averaging the answers from the 2 questions (an average score  $\leq 3$  was considered as a negative attitude, an average score  $> 3$  was considered as a positive attitude towards using contraception).

### *Data Analysis*

Descriptive statistics were reported as medians and inter-quartile ranges (*IQR*) for non-normally distributed variables. Normality was tested using the Shapiro-Wilk test. Categorical data were presented as frequencies and percentages. Comparisons of continuous variables were assessed using a Mann-Whitney U test whereas the association between categorical variables was performed using a Fisher's exact test. All analyses were performed using the R statistical software<sup>13</sup> and p-values were two-tailed with  $p \leq 0.05$  considered statistically significant.

## RESULTS

Table 1 displays the participants' contraceptive and alcohol use behaviour. The majority of participants reported using contraception when having sex in the past month. The most common form of contraceptive used was male condoms (~60%), followed by the oral contraceptive pill (~46%). There was wide variability reported from participants regarding the number of times they had sex in the past month and their alcohol use behaviour.

**TABLE 1** Contraceptive and Alcohol Use Behaviour, Knowledge, and Attitude Towards Contraception

| Measure  | <i>n</i>   |
|--|------------|
| <b>Number of times used contraception in the past month:</b> |            |
| Never  | 9 (8.5%)   |
| Sometimes  | 4 (3.8%)   |
| About half the time  | 6 (5.7%)   |
| Most of the time   | 11 (10.5%) |
| Always   | 76 (71.7%) |
| <b>Forms of contraception used:</b>                          |            |
| Male condoms   | 63 (59.4%) |
| Oral contraceptive pill                                      | 49 (46.2%) |
| Female condom or diaphragm                                   | 2 (1.9%)   |
| Implant/rod; injection                                       | 16 (15.1%) |
| Hormonal IUD   | 8 (7.5%)   |
| Non-hormonal IUD   | 1 (0.94%)  |
| Vaginal ring   | 0 (0%)     |
| Contraceptive patch  | 0 (0%)     |
| Other  | 2 (1.9%)   |

IUD = intrauterine device.

The reported level of contraception use was categorized into 2 main contraceptive groups (never or sometimes vs half, often or always) for analysis. Table 2 provides a comparison of the key demographic variables between these 2 groups. Participants who reported Never/Sometimes using contraception were significantly older (difference in medians of 4 years,  $p < .001$ ) and reported having significantly less sex in the past month, compared to participants who used contraception more frequently (median of 1 vs. 6, respectively,  $p < .001$ ). There was no significant relationship observed between contraceptive behaviour and gender, relationship status, alcohol consumption or type of contraceptive.

There was a significant difference in one of the knowledge scales between the 2 contraceptive groups: participants who reported Never/Sometimes using

contraception had a higher knowledge of reproduction compared to those who reported using contraception more often (Table 3). Lastly, the proportion of participants who used contraception more frequently reported having more positive attitudes towards contraception compared to those who reported Never or Sometimes using contraception ( $p = 0.01$ , Table 4). Although positive attitudes towards contraception were much more common than negative attitudes in the overall sample, this effect was more evident among those who reported using contraception more frequently.

## DISCUSSION

The current study assessed contraceptive use behaviour, attitudes, knowledge of contraception, reproduction and potential risks associated with consuming alcohol while pregnant, including FASD, in a sample of university students of reproductive age. Overall, it was found that the majority of participants reported using contraceptives in the past month. However, the main forms of contraceptives used were short-acting reversible contraceptives (SARCs). Nevertheless, we found higher rates of long-acting reversible contraceptives (LARCs) compared to previous Australian studies, with 23.5% of participants in the current study reporting they were using a LARC method. This is in comparison to a previous survey of women aged 16–59 years, which found <3% of participants were using LARCs.<sup>4</sup> Similarly, data from the household, income and labour dynamics in Australia survey reported that <5% of women were using LARCs.<sup>14</sup> These differences may be due to the differences in the sample types, in that the previous studies were conducted in the general population, whereas the current study was conducted using a university-based sample. Although the higher level of LARC use is positive, this still needs to be the target of future interventions and research as increased LARC use is a simple and effective way of reducing unintended pregnancies. However, it is important that programs designed to promote LARC methods are women-centred, putting the priorities, needs, and preferences of individual women first. Importantly, it has been previously highlighted how prioritizing method effectiveness above all else may deny some women reproductive control.<sup>15</sup>

**TABLE 2** Comparison of Demographic, Alcohol, and Contraceptive Variables

|  | <b>Total<br/>(n = 106)</b> | <b>Never/<br/>Sometimes<br/>(n = 13)</b> | <b>Half/Often/<br/>Always<br/>(n = 93)</b> | <b>P-value*</b> |
|--|----------------------------|--|--|-----------------|
| Age (Median, IQR)  | 19 (18–21)                 | 23 (20–27)                               | 19 (18–21)                                 | <.001           |
| Gender   |                            |  |  | 1               |
| Male   | 26 (24.5%)                 | 2 (12.5%)                                | 23 (87.5%)                                 |                 |
| Female   | 80 (75.5%)                 | 10 (11.5%)                               | 70 (88.5%)                                 |                 |
| Relationship status  |                            |  |  | 0.1             |
| Married  | 10 (9.4%)                  | 3 (30%)                                  | 7 (70%)                                    |                 |
| Not Married  | 96 (90.6%)                 | 10 (10.4%)                               | 86 (89.6%)                                 |                 |
| Number of times had sex in the past month (Median, IQR)      | 5 (1–10)                   | 1 (0–3)                                  | 6 (2–12)                                   | <.001           |
| Number of drinking occasions in the past month (Median, IQR) | 4 (2–7)                    | 3 (3–5)                                  | 4 (2–7)                                    | 0.97            |
| Typical number of drinks per occasion (Median, IQR)          | 4 (2–6)                    | 4 (2–6)                                  | 4 (2–6)                                    | 0.53            |
| Highest number of drinks per occasion (Median, IQR)          | 6 (4–10)                   | 8 (6–10)                                 | 6 (4–9)                                    | 0.29            |
| Type of contraceptive  |                            |  |  | 0.57            |
| SARC   | 70 (73.7%)                 | 0 (0%)                                   | 25 (100%)                                  |                 |
| LARC   | 25 (26.3%)                 | 4 (5.7%)                                 | 66 (94.3%)                                 |                 |

\*P-value for comparison between contraceptive groups.

IQR = inter-quartile range; LARC = long-acting reversible contraceptive; SARC = short-acting reversible contraceptive.

The current study did not find that participants with increased levels of knowledge were more likely to use contraception. Three of the 4 knowledge questions failed to discriminate between the 2 groups, and further, participants who reported less frequent contraception use had higher knowledge of reproduction than those who reported more frequent contraception use. This is consistent with some previous studies that also have not found a relationship between knowledge and behaviour.<sup>9</sup> The results from the current study did find that participants with more positive attitudes towards contraception reported using contraception more frequently. This was consistent with previous research related to alcohol use, where it was found that attitudes towards alcohol use during pregnancy were more impactful on drinking behaviour or intentions than knowledge about FASD.<sup>10,11</sup> While the

current study and other studies have found support for the influence of attitudes on behaviour, there is limited intervention research that has focused on changing people’s attitudes. For instance, a systematic review on contraceptive educational interventions reported that out of 17 studies, only 3 measured attitudes toward contraception as an outcome of the intervention. Notably, studies that have included a focus on attitudes have reported that even brief interventions can lead to increased positive attitudes towards LARCs.<sup>16,17</sup> Consequently, this is an area to be considered for future intervention research and practice.<sup>18</sup>

The current study is preliminary in nature and has a number of limitations. In particular, although the high level of reported contraception use in this sample is encouraging, it resulted in only a small number of participants in the group of ‘less frequent’ users

**TABLE 3** Knowledge of the 2 Contraceptive Groups

|  | Never/<br>Sometimes<br>(n = 13)<br>Median<br>(IQR) | Half/Often/<br>Always<br>(n = 93)<br>Median<br>(IQR) | P-value |
|--|--|--|---------|
| Knowledge of reproduction                          | 2 (1–2)  | 1 (0–1)  | 0.01    |
| Knowledge of contraception                         | 4 (3–5)  | 3 (0–5)  | 0.22    |
| Knowledge of risks of alcohol use during pregnancy | 5 (4–5)  | 4 (0–5)  | 0.13    |
| Knowledge of FASD                                  | 2 (1–4)  | 1 (0–3)  | 0.24    |

FASD = fetal alcohol spectrum disorder; IQR = inter-quartile range.

(i.e., those who reported “never” or “sometimes” using contraception). Future research with larger samples is needed to further understand the role of knowledge and attitudes in predicting contraceptive use. In addition, the scales assessing knowledge of reproduction and attitudes towards contraceptive use were each based on only 2 items. Expanding these item sets for future studies would be likely to provide a more reliable and sensitive measurement of these constructs. As with many studies in this area, the current study relied on self-reports of sexual and drinking behaviour, obtained via an online survey. Although this could be regarded as a limitation, studies suggest that research findings derived from online surveys are not compromised by such factors as participant anonymity or lack of motivation and that they are generally consistent with those obtained from other research methods.<sup>19</sup>

The high rates of alcohol use, particularly binge drinking, reported by some university students in the current study, combined with the use of less effective forms of contraception, further highlights that this is a group at potential risk of experiencing an unintended AEP. Future research is needed to

**TABLE 4** Attitudes Towards Contraception

|                   | Never/<br>Sometimes<br>(n = 13) | Half/Often/<br>Always<br>(n = 93) |
|-------------------|---------------------------------|-----------------------------------|
| Positive attitude | 9 (9.2%)                        | 89 (90.8%)                        |
| Negative attitude | 4 (50%)                         | 4 (50%)                           |

investigate what influences the contraceptive choices of university students, particularly those who are binge drinking at high levels and the implementation of interventions that could help reduce the risk of unintended alcohol-exposed pregnancies, through focusing on contraceptive and risky alcohol use behaviours.

### CONCLUSIONS

Given the lifelong and extensive adverse impacts that can be experienced for individuals with FASD, prevention of unintended alcohol-exposed pregnancies is an area that requires urgent attention. If the high prevalence rates of FASD are to be reduced, prevention needs to take place for people of reproductive age, particularly in Australia where we have high rates of unplanned pregnancies and a binge drinking culture.

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| <b>Alcohol and Contraceptive Use Behaviour Questions</b>                             |   |
|--|---|
| Looking back at your calendar how many days in the past month did you drink alcohol? |   |
| On the days you drank alcohol what was the highest number of drinks you had?         |   |
| On the days that you drank alcohol what was the typical number of drinks you had?    |   |
| Looking back at your calendar how many times did you have sex in the past month?     |   |
| When you did have sex did you use contraception?                                     | Never; Sometimes; About half the time; Most of the time; Always |
| What forms of contraception did you or your partner use (tick all those that apply)  | Contraceptive types listed                                      |

*Continued*

| <b>Knowledge Questions</b>   |  |
|--|--|
| When during a woman's cycle is she most likely to become pregnant?   | During her period (start of cycle); 3 days after her period ends; Two weeks before her next period starts; 3 days before she gets her period; I don't know (end of cycle)  |
| Which of the following choices is TRUE about pregnancy?  | You cannot become pregnant the first time you have sex; You cannot become pregnant if you have sex standing up; You cannot become pregnant if you do not have an orgasm; None of the above is true; I don't know   |
| Which birth control method guarantees you will not become pregnant?  | Using a condom every time you have sex; Douching, showering, or bathing immediately after sex; "pulling out" before ejaculation; None; I don't know  |
| Hormonal birth control comes in which of the following forms?  | Pills taken by mouth; patch worn on the skin; ring placed in the vagina; all of the above; I don't know  |
| You should NOT use the birth control pill if you have any of the following:  | Fibroids, drink alcohol, currently taking antibiotics, none it is safe to use birth control in all of these situations, I don't know   |
| How long after a woman stops using birth control can she become pregnant?  | Immediately, 1 month, 3 months, 6 months, I don't know   |
| If you forget to take one birth control pill and remember the next day, what should you do?  | Throw the missed pill away and then continue the following day from where you left off; Take the rest of the week's pills at once and then start the placebo ("reminder") week; Take 2 pills then continue; throw the missed pill away and wait 1 month to start a new pack; I don't know. |
| Which method of birth control is the best at preventing pregnancy?   | The IUD; Depo-Provera, male condom, withdrawal "pull out" method, I don't know   |
| A doctor places the birth control implant (Nexplanon) in what part of the body?  | Thigh, vagina, arm, buttock, I don't know  |
| Do you believe that a woman who is pregnant should pay attention to her alcohol intake?  | Yes or No  |
| How many standard alcohol drinks per day is it safe for a pregnant women to have for her developing baby?  | None, 1, 2-3, 5-5, More than 5   |
| How often is it safe for a pregnant woman to drink that amount of alcohol?   | Never, once per week, twice to three times per week, everyday, I don't know  |
| Do you believe that it might be harmful for the fetus if the mother drinks more than 5 drinks on a single occasion?  | Yes or No  |
| Do you think it makes a difference whether you drink beer, wine, or spirits, when you are pregnant? That is, is one type of alcohol more harmful than another? | Yes or No  |

*Continued*



|   |  |
|---|--|
| When is it best for a pregnant woman to stop drinking alcohol in her pregnancy?                           | When she wants to get pregnant; when she realises she is pregnant; at 3 months, at 5 months, it doesn't matter |
| Have you heard of fetal alcohol spectrum disorder (FASD) before?  | Yes or No  |
| In FASD a baby is born:   | Drunk; with a birth defect, addicted to alcohol, with seizures, I don't know                                   |
| With FASD   | Gets better as kids get older, stays the same throughout life, can be fixed by medication, I don't know        |
| How long does FASD last?  | Days, weeks, months, years, a life time  |
| <b>Attitude Questions</b>   |  |
| Using contraception when having sex with someone of the opposite sex during the next month would be . . . | Extremely bad, somewhat bad, neither bad nor good, somewhat good, extremely good                               |
| Using contraception when having sex with someone of the opposite sex during the next month would be . . . | Extremely foolish, somewhat foolish, neither foolish or wise, somewhat wise, extremely wise                    |