Changes in alcohol consumption in pregnant Australian women between 2007 and 2011

Alcohol consumption during pregnancy may contribute to birth defects, growth and developmental abnormalities, and fetal mortality. In 2009, the National Health and Medical Research Council (NHMRC) revised its guidelines, recommending that the safest option for pregnant women, and women planning a pregnancy, was to not consume alcohol at all. Although Australia conducts routine National Drug Strategy Household Surveys, changes made in 2010 to the survey questions about alcohol use during pregnancy — to incorporate drinking before and after knowledge of pregnancy — preclude direct comparisons over time. Thus, we aimed to describe the prevalence and distribution of alcohol use during pregnancy in an Australian population over the 5-year period 2007 to 2011.

Methods

Study design and data sources
We undertook a cross-sectional repeated sample, trend analysis of alcohol consumption patterns during pregnancy. Data were obtained from baseline surveys of pregnant women participating in the Griffith Study of Population Health: Environments for Healthy Living (EFHL study) from 2007 to 2011. This longitudinal birth cohort study annually recruits participants from public maternity hospitals in the Logan–Beaudesert, Gold Coast and Tweed health districts in southeast Queensland and north-east New South Wales. Participants completed a baseline, self-administered questionnaire, which included items from the 2004 National Drug Strategy Household Survey relating to alcohol consumption, modified for pregnancy. Images and information about different alcohol types and what constitutes a standard drink were provided. Participants were asked about alcohol consumption (any level) and high-risk alcohol consumption (five or more standard drinks on any occasion) at early, mid and late pregnancy (0–13, 14–26 and 27–42 weeks, respectively). They were also asked about low-level alcohol use, which was defined as consuming between half a standard drink and two standard drinks on any occasion. Data on maternal age, education, marital status, income, smoking and recreational drug use were also collected.

Data management and analysis
Data cleaning and descriptive analyses were undertaken using SAS 9.2 software (SAS Institute Inc). Pearson χ² and Fisher exact tests were performed to describe aggregated and stratified alcohol consumption patterns over the study period. Significance was set at a level of 5%. Small cell sizes prevented regression analyses.

Ethics approval
The EFHL study was approved by the human research ethics committees of Griffith University, Metro South Health Service District, Gold Coast Health Service District and North Coast Area Health Service.

Results
From 2007 to 2011, 2743 pregnant women were enrolled in the EFHL study (age range, 16–52 years). Alcohol consumption data were available for 2731 of them, and 1206 (44.2%) reported drinking alcohol at some time during pregnancy. In total, 917 women (33.7%) reported consuming alcohol after the first trimester of pregnancy, when they would have been aware of their pregnancy, and 68 women (2.5%) reported drinking at high-risk levels after the first trimester (Box 1).

Sociodemographic patterns of alcohol use
The mean age of women who reported drinking alcohol after the first trimester of pregnancy was 30.5 years, which was significantly older than the women who reported no alcohol consumption or consumption only in the first trimester (28.6 years) (P < 0.001). In contrast, the mean age of women drinking at high-risk levels was younger than that of women who...
did not report high-risk consumption or drank only in the first trimester (27.7 years v 29.3 years) \( (P = 0.03) \).

The proportion of women consuming low levels of alcohol after the first trimester significantly increased with increasing age \( (P < 0.001) \), increasing levels of education \( (P = 0.01) \) and increasing household income \( (P < 0.001) \). Women who smoked cigarettes and used recreational drugs during pregnancy were more likely to consume alcohol \( (P < 0.001) \) for both (Box 1).

High-risk drinking after the first trimester was reported by 3.1% of women younger than 25 years and 4.0% of those in the lowest household income quintile (Box 1). Also, high-risk drinking after the first trimester was associated with lower levels of education \( (P = 0.011) \) and single-parent status \( (P = 0.001) \), was 5.4 times more likely among women who smoked than among non-smokers, and was 7.5 times more likely among women who used recreational drugs than among non-drug users (Box 1).

**Temporal patterns of alcohol use**

From 2007 to 2011, the proportion of women who reported drinking alcohol during pregnancy significantly decreased; 251 of 475 women (52.8%) reported alcohol use in 2007, compared with 168 of 483 (34.8%) in 2011 \( (P < 0.001) \) (Box 2). The proportion of women who drank alcohol after the first trimester of pregnancy declined from 200 of 474 women (42.2%) in 2007 to 124 of 481 (25.8%) in 2011 (Box 2). The proportion of women who consumed alcohol during every trimester of pregnancy halved from 2007 (99/474; 20.9%) to 2011 (53/481; 11.0%). However, for those who reported high-risk consumption — at all or after the first trimester —
there was no statistically significant change over the 5 years (P = 0.12).

Despite the overall decrease in alcohol consumption after the first trimester of pregnancy from 2007 to 2011, no significant decrease was found for women older than 35 years (P = 0.11), single parents (P = 0.07), those in the lowest household income quintile (P = 0.54), those with a trade or apprenticeship education (P = 0.28) or those who used recreational drugs (P = 0.13). Also, there was no significant change in high-risk drinking patterns after the first trimester for any sociodemographic group over the 5 years.

Discussion

This study shows a steady and statistically significant decline in the proportion of women who reported drinking alcohol during pregnancy from 2007 to 2011. The proportion of women who continued to drink alcohol after their first trimester of pregnancy also declined. It is possible that increased media emphasis on the negative effects of alcohol during pregnancy\(^1\)\(^2\)\(^{,8}\) may have increased underreporting of alcohol consumption during the study period, thus resulting in this overall decline. Although alcohol consumption in the general population also declined during the study period,\(^9\) this study showed no change in alcohol consumption after the first trimester for older women, single parents, low-income women, women with a trade or apprenticeship education, or women who used recreational drugs. Further, the proportion of women who reported high-risk drinking (five standard drinks or more on any one occasion) did not change over the 5-year period. This finding may have been associated with low levels of alcohol consumption, because inclusion in the study was dependent on reaching the third trimester of pregnancy.\(^2\) Women who had experienced early fetal loss, which may have been associated with high levels of alcohol consumption, were not included.

The most recent Australian guidelines advocate abstinence from alcohol during pregnancy. Although our results suggest that national alcohol and pregnancy policies and public health programs may have had some effect in reducing population-level alcohol use by pregnant women, these may not affect the behaviour of specific at-risk groups. Thus, it is necessary to provide broad public health messages for the general population and more localised strategies for high-risk subpopulations.

Acknowledgements: This research is part of the EFHL study, which receives core funding from Griffith University and is also funded by an Australian Research Council Discovery Project grant (DP101005423). The EFHL study was conceived by Roderrick McClure, Cate Cameron, Judy Searle and Ronan Lyons. We gratefully acknowledge the chief investigators, project, administrative and research staff, and hospital antenatal and birth suite midwives of the participating hospitals for helping to conduct the study. Cate Cameron was supported by a Public Health Fellowship (ID 428254) from the NHMRC.

Competing interests: No relevant disclosures.

Received 25 Nov 2012, accepted 30 May 2013.


