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

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Abstract

Objective: To describe the prevalence and distribution of alcohol consumption during pregnancy in an Australian population over a 5-year period.

Design, setting and participants: Cross-sectional repeated sample, trend analysis of aggregated and stratified alcohol consumption patterns during pregnancy. Pregnant women were enrolled from 2007 to 2011 in the Griffith Study of Population Health: Environments for Healthy Living, a birth cohort study being conducted in south-east Queensland and north-east New South Wales.

Main outcome measures: Sociodemographic and alcohol consumption data were self-reported at enrolment. Alcohol measures included alcohol consumption (any level) and high-risk alcohol consumption, both during pregnancy (at any stage) and after the first trimester of pregnancy.

Results: Of 2731 pregnant women for whom alcohol consumption data were available, a decrease in alcohol consumption was observed over the study period; 52.8% reported alcohol use in 2007 compared with 34.8% in 2011 ($P < 0.001$). The proportion of women who drank alcohol after the first trimester of pregnancy declined from 42.2% in 2007 to 25.8% in 2011. However, high-risk drinking patterns — at all or after the first trimester — did not change over the 5 years ($P = 0.12$). Low-level alcohol consumption was associated with older women ($P < 0.001$), more highly educated women ($P = 0.01$), and women from higher-income households ($P < 0.001$). In contrast, high-risk consumption after the first trimester was associated with lower levels of education ($P = 0.011$) and single-parent status ($P = 0.001$).

Conclusions: This study showed a steady and statistically significant decline in the proportion of women who reported drinking alcohol during pregnancy from 2007 to 2011. To further reduce these levels, we need broad public health messages for the general population and localised strategies for high-risk subpopulations.

Trial registration: Australian New Zealand Clinical Trials Registry ACTRN12610000931077.

Alcohol consumption during pregnancy may contribute to birth defects, growth and developmental abnormalities, and fetal mortality.[1-3] 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.[2]

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.[4] 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 south-east Queensland and north-east New South Wales.[5]

Participants completed a baseline, self-administered questionnaire, which included items from the 2004 National Drug Strategy Household Survey[6] relating to alcohol consumption, modified for pregnancy. Images and information about different alcohol types and what constitutes a standard drink were provided.[6] Participants were asked about alcohol consumption (any level) and high-risk alcohol consumption (five or more standard drinks on any one 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.[5]

Data management and analysis

Data cleaning and descriptive analyses were undertaken using SAS 9.2 software (SAS Institute Inc). Pearson χ^2 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

1 Alcohol consumption during pregnancy, by maternal and household sociodemographic variables, level of consumption and stage of pregnancy, 2007–2011

		Any stage of pregnancy				After first trimester			
		Alcohol consumption		High-risk alcohol consumption*		Alcohol consumption		High-risk alcohol consumption*	
	No.	No. (%)†	P‡	No. (%)†	P‡	No. (%)†	P‡	No. (%)†	P‡
Total	2731	1206 (44.2%)	< 0.001	240 (8.9%)	< 0.001	917 (33.7%)	< 0.001	68 (2.5%)	< 0.001
Maternal age									
< 25 years	651	237 (36.4%)	< 0.001	64 (9.9%)	0.550	150 (23.2%)	< 0.001	20 (3.1%)	0.365
25–29 years	798	318 (39.8%)		62 (7.9%)		240 (30.2%)		22 (2.8%)	
30–34 years	703	363 (51.6%)		65 (9.3%)		289 (41.2%)		16 (2.3%)	
35+ years	566	283 (50.0%)		48 (8.6%)		234 (41.5%)		9 (1.6%)	
Missing	13	5		1		4		1	
Maternal education									
Did not complete school	560	237 (42.3%)	0.073	62 (11.2%)	0.034	165 (29.6%)	0.010	22 (4.0%)	0.011
Completed high school	839	349 (41.6%)		71 (8.6%)		267 (32.0%)		18 (2.2%)	
Trade or apprenticeship	786	374 (47.6%)		74 (9.5%)		276 (35.2%)		23 (3.0%)	
University degree	533	241 (45.2%)		33 (6.2%)		204 (38.4%)		5 (0.9%)	
Missing	13	5		0		5		0	
Country of birth									
Australia	1906	876 (46.0%)	0.005	167 (8.8%)	0.940	665 (35.0%)	0.032	47 (2.5%)	0.902
Other	823	330 (40.1%)		73 (8.9%)		252 (30.8%)		21 (2.6%)	
Missing	2	0		0		0		0	
Marital status									
Single-parent family	364	168 (46.2%)	0.429	51 (14.3%)	< 0.001	113 (31.3%)	0.290	18 (5.0%)	0.001
Two-parent family	2351	1033 (43.9%)		186 (8.0%)		800 (34.1%)		50 (2.1%)	
Missing	16	5		3		4		0	
Annual household income									
Lowest quintile	448	176 (39.3%)	< 0.001	51 (11.4%)	0.054	119 (26.6%)	< 0.001	18 (4.0%)	0.072
Second quintile	451	176 (39.0%)		31 (6.9%)		134 (30.0%)		6 (1.4%)	
Third quintile	448	193 (43.1%)		31 (7.0%)		154 (34.5%)		11 (2.5%)	
Fourth quintile	451	207 (45.9%)		39 (8.7%)		158 (35.1%)		7 (1.6%)	
Highest quintile	449	260 (57.9%)		48 (10.7%)		215 (47.9%)		11 (2.5%)	
Missing	484	194		40		137		15	
Cigarette smoking									
Smoked	681	358 (52.6%)	< 0.001	126 (18.6%)	< 0.001	264 (38.9%)	0.001	44 (6.5%)	< 0.001
Did not smoke	2044	844 (41.3%)		114 (5.6%)		651 (32.0%)		24 (1.2%)	
Missing	6	4		0		2		0	
Recreational drug use									
Used drugs	149	102 (68.5%)	< 0.001	44 (29.7%)	< 0.001	85 (57.1%)	< 0.001	20 (13.5%)	< 0.001
Did not use drugs	2538	1084 (42.7%)		191 (7.6%)		815 (32.2%)		45 (1.8%)	
Missing	44	20		5		17		3	

* Five standard drinks or more on any one occasion. † Percentages were calculated excluding missing data. ‡ Pearson χ^2 and Fisher exact tests were used for aggregated and stratified data. ◆

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 almost 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[7,8] 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 related to the small sample size, but it is also possible that public health programs and national policies are not reaching women who are most at risk of having babies with alcohol-related birth defects.

Consistent with some other risk behaviour,[10-12] there was a socioeconomic differential in drinking patterns during pregnancy: low-level alcohol consumption after the first trimester increased with increasing age, education and income, and high-risk consumption after the first trimester was more common in single women and women who did not complete school. It is particularly concerning that women who continued high-risk drinking after the first trimester were also much more likely to smoke cigarettes or use recreational drugs, which are also associated with adverse pregnancy outcomes.[13,14]

Given that the sociodemographic composition of the cohorts did not change across the 5 years of recruitment,[15] the findings are not likely to be a result of random variation in participant sampling or demographic shifts in the study region. Nevertheless, it is possible that the study was biased slightly towards women with lower 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.

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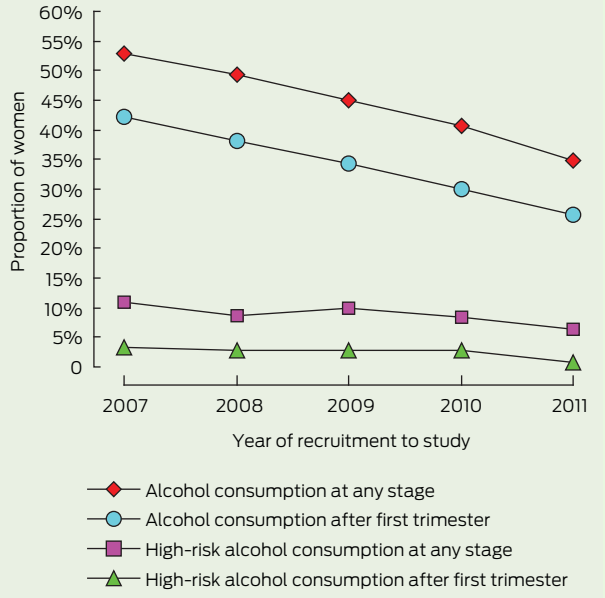
2 Proportion of women who consumed alcohol during pregnancy, by level of consumption and stage of pregnancy, 2007–2011



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