



## Factors influencing alcohol consumption during pregnancy and after giving birth

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### Abstract

**Aims** This study explored the demographic profile of women consuming alcohol during pregnancy and after giving birth, as part of a larger cohort study of smoking during pregnancy.

**Methods** This was a prospective study of a cohort of 665 women registered with a maternity care provider organisation for antenatal care in Wellington. Data were collected from postal questionnaires sent at intervals during gestation and the postnatal period. The questionnaires elicited information about smoking, alcohol consumption and demographic data.

**Results** At 24 weeks gestation, 74% of women reported not consuming any alcohol in the preceding seven days. Women who were pregnant for the first time, women who experienced nausea, women who were socio-economically deprived and women who smoked were less likely to report having consumed alcohol. At six weeks after giving birth the number of women reporting not consuming any alcohol in the preceding seven days decreased to 46%. Socio-economic deprivation was associated with abstinence and tertiary education with alcohol consumption.

**Conclusions** Approximately a quarter of women continue to drink alcohol during pregnancy. Health education aiming to reduce alcohol consumption in pregnancy needs to take into account the profile of women who drink during pregnancy.

In first world countries such as New Zealand, there has been increasing concern about alcohol consumption during pregnancy because of its damaging and long-term effects on the foetus. A substantial body of evidence points to the dangers of heavy drinking and there is increasing evidence that even light consumption may give rise to long-term problems.<sup>1-3</sup>

Two recent New Zealand studies show that approximately a quarter of all pregnant women continue to drink after pregnancy recognition with a significant number drinking at intoxicating and damaging levels.<sup>4,5</sup> The general directions for limiting the harm caused by alcohol have been set by the National Alcohol Strategy 2000-2001,<sup>6</sup> and a number of initiatives directed specifically towards reducing the consumption of alcohol by pregnant women are currently underway.<sup>7</sup>

The effectiveness of policies and initiatives aimed at reducing alcohol consumption during pregnancy will be enhanced if the social characteristics and health beliefs of those who drink at this time are well understood. Data on alcohol consumption collected prospectively from a cohort of Wellington women as part of a study of smoking behaviour are reported in this paper.

## Methods

**Study population.** The study population consisted of all pregnant women who registered with the maternity care provider, 'Matpro' for their antenatal care by the time they were 24 weeks pregnant. 'Matpro' is an organisation of midwives, general practitioners and specialists contracted to provide primary maternity care. In New Zealand primary maternity care is usual care and Matpro providers deliver 95% of all primary maternity care in the Wellington City, Porirua and Kapiti area of New Zealand, the locality in which the study took place.

**Data collection.** All 1047 women registering with 'Matpro' for their antenatal care by the time they were 24 weeks pregnant with last menstrual period (LMP) dates over a six month period were eligible for inclusion. 75 women became ineligible for inclusion as a result of miscarriage, termination of pregnancy or moving from the locality. All eligible women were sent a questionnaire when they were 20-24 weeks pregnant. 665 (68.4%) consented to take part in a longitudinal study. Further questionnaires were sent at 36 weeks gestation and at 6-10 weeks postpartum. Dates for mailing follow-up questionnaires were based on the expected delivery date. Questionnaires were mailed in monthly batches. A reply paid and addressed envelope was included for replies. Non-responders were sent one reminder letter and a further copy of the questionnaire. Data on alcohol consumption were collected at 20-24 weeks gestation, 36-40 weeks and at 6-10 weeks postpartum. Alcohol consumption data were collected by asking women "on how many days in the last seven days would you say you drank any type of alcohol?" The following pre-coded responses were available: every day, 5-6 days, 3-4 days, 1-2 days, no days, don't know.

Ethics approval for the study was granted by the Wellington Ethics Committee, accredited by the Health Research Council of New Zealand.

**Analysis.** Data were entered into a Microsoft Access database. Ten percent of data entered were manually checked against questionnaires. Data were transferred to SAS and odds ratios and 95% confidence intervals (CI) calculated. Selection of variables to find the model that best predicted the outcome of interest was performed using stepwise regression. Variables included in the model were ethnicity, tertiary education (defined as any post secondary school diploma, degree or other qualification), Community Service Card (CSC) status (a subsidy available for health care for low income earners), whether the pregnancy was planned, whether nausea had been experienced during the pregnancy and smoking status. Ethnicity data were collected using the ethnicity question from the 1996 New Zealand Census which asked people to tick as many boxes as necessary to show which ethnic group(s) they belonged to. In the analysis Maori were defined as women identifying either as sole Maori or Maori plus another ethnic group.

For a sample of 600 with  $\alpha_2=0.05$  and power of 80%, a difference of 10-13% could be detected between the two groups defined by a particular predictor variable, with the difference depending on whether the sample was split 50/50 or 70/30 on that variable, and if one of the groups had 30% of women reporting drinking.

## Results

**Response rate.** The first questionnaire at 20-24 weeks gestation was sent to 1117 women: 665 (68.4%) responded. The second questionnaire was sent to 639 women and responses were received from 559 (87.5%). The third was sent to 634 women and responses received from 548 (86.4%).

**Was the cohort representative?** Grouped demographic data from a subset of women who did not respond to the 20-24 week questionnaire were available from the Wellington Hospital Perinatal Information Monitoring System (PIMS). When compared to responders, non-responders included a higher proportion of women who were not married or in a defacto relationship (11% vs 24%;  $\chi^2=17.8$ ,  $p=0.001$ ), women who smoked (14% vs 26%;  $\chi^2=18.9$ ,  $p=0.001$ ), had no tertiary education (35% vs 49%;  $\chi^2=10.8$ ,  $p=0.001$ ) or were receiving a benefit (8% vs 19%;  $\chi^2=14.9$ ,  $p=0.001$ ). The mean age of non-responding women (29.9 years) was slightly lower than responding women (31.9 years) ( $\chi^2=18.6$ ;  $p=0.001$ ). It is possible that some of these differences reflect the characteristics of the subgroup of women

delivering at Wellington Hospital for whom PIMS data were available. Data were not available for women delivering at other hospitals in the region and these hospitals, although smaller, served localities with a higher proportion of socio-economically deprived women. There was no difference between responders and non-responders in alcohol consumption data recorded on PIMS, weeks gestation, parity, gravida, baby's birthweight or Apgar score.

**Antenatal alcohol consumption.** At 20-24 weeks 487 women (73.8%) responding to the question had not consumed any alcohol in the preceding seven days and 26 women (3.9%) had consumed alcohol on three or more days. At 36-40 weeks rates of alcohol consumption were similar. At 20-24 weeks abstinence was associated with socio-economic deprivation as measured by CSC status (OR 0.34) and by receipt of income support (OR 0.48), current smoking (OR 0.55), first pregnancy (0.58) and experiencing nausea or vomiting (OR 0.66) (Table 1).

**Table 1. Women who had consumed any alcohol during the last seven days, at 20-24 weeks gestation.**

		Number in cohort	Women who consumed alcohol		Univariate analysis (OR)	95% CI
		N	n	%		
Employed	Yes	401	111	27.7	1.30	0.89-1.89
	No	233	53	22.8		
CSC holder*	Yes	122	15	12.3	<b>0.34</b>	<b>0.19-0.61</b>
	No	520	151	29.0		
Receives income support	Yes	114	18	15.8	<b>0.48</b>	<b>0.28-0.82</b>
	No	516	145	28.1		
Maori	Yes	66	13	19.7	0.69	0.37-1.30
	No	588	154	26.2		
Has tertiary education	Yes	363	95	26.2	1.05	0.73-1.52
	No	258	65	25.2		
First pregnancy	Yes	256	50	19.5	<b>0.58</b>	<b>0.40-0.85</b>
	No	398	117	29.4		
Planned pregnancy	Yes	471	123	26.1	1.22	0.81-1.83
	No	178	40	22.5		
Smoker at 20-24 weeks	Yes	100	17	17.0	<b>0.55</b>	<b>0.32-0.96</b>
	No	552	150	27.2		
Experienced nausea	Yes	489	115	23.5	<b>0.66</b>	<b>0.45-0.98</b>
	No	161	51	31.7		

\*Community Services Card (CSC) held or applied for (Income level for a couple with 1 child <\$32000 pa).

A forward stepwise regression model yielded three significant predictors of lower alcohol consumption: CSC status (OR 0.31; 95% CI 0.17-0.58), first pregnancy (OR 0.47, 95% CI 0.31-0.71) and nausea (OR 0.60, 95%CI 0.39-0.91) (each odds ratio is controlled for the other variables in the model).

**Alcohol consumption after giving birth.** At 6-10 weeks postpartum, 247 women (45.7%) responding to the question had not consumed any alcohol in the preceding seven days and 89 women (16.4%) had consumed alcohol on three or more days. Alcohol consumption was associated with tertiary education (OR 1.46) (Table 2). Abstinence was associated with socio-economic deprivation as measured by CSC status (OR 0.44). A forward stepwise regression model yielded one predictor of lower

alcohol consumption: CSC status (OR 0.40, 95% CI 0.23-0.69). Current smokers were more likely to have consumed alcohol (OR 2.00 95% CI 1.09-3.58).

**Table 2. Women who had consumed any alcohol during the last seven days, at 6-10 weeks postpartum.**

		Number in cohort	Women who consumed alcohol		Univariate analysis (OR)	95% CI
		N	n	%		
Employed	Yes	343	197	57.4	1.32	0.92-1.90
	No	178	90	50.6		
CSC holder*	Yes	77	29	37.7	<b>0.44</b>	<b>0.27-0.73</b>
	No	259	259	57.7		
Receives income support	Yes	79	39	49.4	0.77	0.48-1.24
	No	440	246	55.9		
Maori	Yes	47	22	46.8	0.73	0.40-1.33
	No	490	268	54.7		
Has tertiary education	Yes	307	177	57.7	<b>1.46</b>	<b>1.02-2.08</b>
	No	203	98	48.3		
First pregnancy	Yes	210	118	56.2	1.16	0.82-1.64
	No	325	171	52.6		
Planned pregnancy	Yes	400	225	56.3	1.48	0.99-2.19
	No	131	61	46.6		
Smoker at 20-24 weeks	Yes	67	40	59.7	1.30	0.78-2.19
	No	470	250	53.2		
Experienced nausea	Yes	403	213	52.9	0.86	0.58-1.28
	No	129	73	56.6		

\*Community Services Card (CSC) held or applied for (Income level for a couple with 1 child <\$32000 pa).

An increase in the number of days in the last seven on which alcohol was consumed between 20-24 weeks gestation and six weeks after giving birth was associated with tertiary education (OR 1.52). No increase was associated with socio-economic deprivation as measured by CSC status (OR 0.58) (Table 3). A forward stepwise regression model yielded only one predictor for increased alcohol consumption: tertiary education (OR 1.52, 95% CI 1.05-2.20).

## Discussion

This prospective cohort study provides some information about the profile of New Zealand women consuming alcohol during pregnancy and after giving birth. The cohort studied was broadly representative of urban New Zealand as a whole. However, socio-economically deprived women were likely to be under represented in the responding group, probably due to the choice of postal questionnaire as the method of data collection.

The number of women in the cohort who reported consuming alcohol increased after giving birth compared to that reported during pregnancy. This postpartum increase implies that a reduction in consumption occurred related to the pregnancy, suggesting many New Zealand women are aware of at least some of the risks of alcohol consumption during pregnancy. A reduction in the quantity of alcohol consumed and the frequency of consumption after recognition of pregnancy has also been identified in other New Zealand studies.<sup>4,8</sup>

**Table 3. Women who had increased their alcohol consumption by 6-10 weeks post partum.**

		Number in cohort	Women who increased alcohol <sup>†</sup>		Univariate analysis (OR)	95% CI
		N	n	%		
Employed	Yes	346	145	41.9	1.16	0.80-1.68
	No	180	69	38.3		
CSC holder*	Yes	77	23	29.9	<b>0.58</b>	<b>0.34-0.98</b>
	No	453	192	42.4		
Receives income support	Yes	79	31	39.2	0.93	0.57-1.52
	No	444	182	41.0		
Maori	Yes	48	15	31.3	0.66	0.35-1.24
	No	492	201	40.9		
Has tertiary education	Yes	311	136	43.7	<b>1.52</b>	<b>1.05-2.19</b>
	No	204	69	33.8		
First pregnancy	Yes	213	93	43.7	1.29	0.91-1.83
	No	327	123	37.6		
Planned pregnancy	Yes	402	168	41.8	1.33	0.89-2.00
	No	134	47	35.1		
Smoker at 20-24 weeks	Yes	67	31	46.3	1.33	0.80-2.23
	No	471	185	39.3		
Experienced nausea	Yes	406	163	40.2	1.05	0.70-1.58
	No	131	51	38.9		

\*Community Services Card (CSC) held or applied for (Income level for a couple with 1 child <\$32000 pa). †Includes women who continued to drink every day.

Approximately a quarter of women in the cohort studied continued to drink to some extent during their pregnancy. Rates of 19% at full-term were reported in a study of women attending a Dunedin hospital in 1989.<sup>9</sup> In a more recent study of nutrition during pregnancy in a sample of North Island women, 29% of those surveyed continued to drink to at least some extent during pregnancy.<sup>4</sup> In the current study women who continued to drink were more likely to be European, to have planned their pregnancy and to be in the middle and higher socio-economic groups.

The current study did not provide information about the amount of alcohol consumed by women continuing to drink. However, Watson and McDonald found women who binged and drank heavily during pregnancy were disproportionately Maori or Pacific women, women under 25 years and those in a lower socio-economic group.<sup>4</sup>

In discussing alcohol consumption with pregnant women, health professionals need to be aware that while women from higher socio-economic groups are more likely to continue to drink during pregnancy, heavy or binge drinking is more likely to be undertaken by younger women, socio-economically deprived women and Maori women.

The health professional's role in providing advice about alcohol consumption during pregnancy is complicated by the fact that it is not clear whether the effect of alcohol consumption is linear, implying that there is no safe level of alcohol consumption during pregnancy or whether there is a threshold, implying a safe level of drinking.<sup>2</sup> Research on animals suggests that the relationship between alcohol consumption and central nervous system development may have a threshold but the relationship with physical growth may be linear.<sup>2</sup> However, there is strong evidence that heavy drinking<sup>1</sup> and binge drinking<sup>2,10,11</sup> adversely affect foetal outcomes. Current advice to health providers is conflicting. Curtis<sup>12</sup> in her advice to New Zealand health

professionals promotes total abstinence during pregnancy as do more recent New Zealand publications and resources directed at health professionals.<sup>13</sup> In contrast the Royal College of Obstetricians and Gynaecologists (UK) recommends limiting alcohol consumption to no more than one standard drink per day.<sup>14</sup> A 1999 survey of midwives, in reporting that the majority indicated a need for further training to facilitate communicating information about alcohol to their clients,<sup>5</sup> highlighted the problems facing health professionals in deciding which advice to follow when advising patients. More information is needed to enable the development of clear, evidence-based recommendations for health professionals regarding the advice they can give to pregnant women about safe levels of alcohol consumption.

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