Introduction

Important foundations for adult health are built during early childhood and the prenatal period (Wilkinson & Marmot 2003, in DEECD 2009). As the Australian Institute of Health and Welfare notes ‘childhood, including the prenatal period, is a time of rapid development during which it is critical to establish good health, positive health behaviours and overall wellbeing’ (AIHW 2009, p.63).

This Bulletin focuses on two prenatal factors that have adverse impacts on child health: alcohol consumption and cigarette smoking in pregnancy.

The Bulletin reports on and discusses findings from the 2009 Victorian Child Health and Wellbeing Survey (VCHWS) regarding the proportion of infants exposed to alcohol and cigarette smoke in utero, and factors associated with this.

The Victorian Child Health and Wellbeing Survey (VCHWS) is a computer assisted telephone interview (CATI) survey of parents or carers of 5000 randomly selected children under 13 years of age. The survey is repeated every three years, with the first survey carried out in 2006. The response rate was high in 2009, with 75 per cent of contacted households completing the survey.

VCHWS forms part of a rolling program of data collections, within the Victorian Child and Adolescent Monitoring System (VCAMS), discussed in Bulletins 1 and 2.

Alcohol consumption and smoking in pregnancy

Effects

It is widely accepted that heavy drinking during pregnancy can be harmful to the development of the foetus. Exposure to alcohol in pregnancy is associated with poorer birth outcomes such as low birth weight, premature births, increased risk of cognitive defects and congenital abnormality (DEECD 2009). Foetal Alcohol Syndrome (FAS) describes a range of alcohol-related abnormalities in the unborn child, with Foetal Alcohol Syndrome (FAS), Alcohol Related Birth Defects (ARBD) and Alcohol Related Neurodevelopmental Disorders (ARND) included at the severe end of the spectrum.

While the risk of birth defects is known to be greatest with high, frequent maternal alcohol intake during the first trimester, maternal alcohol consumption at any stage of pregnancy can affect the development of the foetal brain. The relative risk of consuming alcohol in pregnancy, across a range of consumption levels, is unknown, and there is no established safe lower threshold. On this basis, the most recent National Health and Medical Research Council (NHMRC) Guidelines recommend that ‘for women who are pregnant or planning a pregnancy, not drinking is the safest option’ (NHMRC 2009). This advice is more conservative than earlier advice that women should ‘consider not drinking’ to eliminate alcohol-related risk in pregnancy (NHMRC 2001).

Cigarette smoking in pregnancy can have a range of harmful effects, including increases in rates of perinatal mortality and low birthweight (Laws et al 2006). Smoking is also linked with intrauterine growth restriction, prematurity, birth defects and Sudden Infant Death Syndrome (Chomitz, Cheung et al. 1995; McCormick 1985). Research shows that women who give up smoking during the first twenty weeks of pregnancy give birth to babies of similar weight to those of women who have never smoked (Chan & Sullivan 2008; Hoff et al 2007; in AIHW 2009).
Prevalence data (excluding VCHWS)

Data on alcohol consumption during pregnancy tends not to be routinely collected in Australia, where estimates have typically been based on ‘ad hoc’ studies. In the 2004 National Drug Strategy Household Survey, 47% of women who were pregnant and/or who had breastfed in the last twelve months reported drinking alcohol (AIHW, 2005). In a recent Western Australian study of nearly 5000 mothers three months after delivery, 79.8 % of women reported drinking alcohol in the three months prior to pregnancy and 58.7% drank alcohol in at least one trimester. A minority (4.3%) of mothers reported at least one episode of ‘binge drinking’ (defined in this study as consuming more than 5 standard drinks) in pregnancy (Colvin et al 2007). In Victoria, the last population estimates of alcohol consumption in pregnancy were published twenty years ago. According to hospital records completed by midwives at birth, 64% of women had not regularly drunk alcohol while pregnant, and 3.6% of women reported at least one episode of ‘binge drinking’ (Bell and Lumley 1989).

Victorian data on the prevalence of women reporting smoking in the month prior to delivery is obtained from the Victorian Admitted Episode Database. Victoria has only recently started to routinely monitor women’s smoking throughout pregnancy, as other states have for some time, under the AIHW National Perinatal Data Collection. The AIHW National Perinatal Data Collection data (excluding Victoria) show that in 2006 17% of women who gave birth reported smoking during pregnancy (reported in AIHW 2009). This rate has remained fairly stable since 2001.

The Victorian Child Health and Wellbeing Survey

Methods

VCHWS questions relating to health in pregnancy were directed to respondents who were identified as the biological mother of an infant aged under 2 years. These mothers were asked to recall whether they drank alcohol or smoked cigarettes at three time points during pregnancy:

- when they were first pregnant, but did not know they were pregnant (pre-pregnancy recognition)
- once they knew they were pregnant (post pregnancy recognition, early)
- and towards the end of the pregnancy (post pregnancy recognition, late)

The mothers were also asked to estimate the extent of their drinking and smoking during pregnancy by reporting the number of cigarettes smoked per day or the occasions during pregnancy when they drank more than four alcoholic drinks in one day (binge drinking).

715 biological mothers, aged from 18 to 47 years answered questions about their health during pregnancy. All were able to complete the interview in English. As with almost all studies relating to alcohol consumption during pregnancy, data are dependent on mothers’ self report and recall of drinking during pregnancy. Estimates could be considered to be conservative, given that alcohol consumption and smoking during pregnancy may be seen as socially undesirable and under-reporting may occur.

Exposure to alcohol

The majority of infants (59.8%) (lower confidence interval 55.4% - upper confidence interval 64.2%) had mothers who drank alcohol at some point during pregnancy. Women were most likely to drink pre-pregnancy recognition. A significant proportion (around 26%) continued to drink some alcohol after becoming aware of the pregnancy.

Approximately one in five infants (19.5% (16.1 – 22.9%) had mothers who recalled at least one episode of ‘binge drinking’ (defined here as more than four drinks in one day) during pregnancy. This level of drinking almost always occurred when the mother was still unaware of her pregnancy (18.9% (15.5 – 22.2%) of infants had mothers who reported at least one episode of ‘binge drinking’ pre-recognition of pregnancy, compared with 1.5% (0.6 – 2.4%) post-recognition early in the pregnancy and 1.6% (0.6 – 2.7%) post-recognition later in the pregnancy). A small minority of infants’ mothers (0.7%) (0.0 – 1.4%) ‘binged’ on alcohol at each of the three time points during pregnancy.

Findings are summarised in Figure 1.

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Figure 1: Proportion of Victorian mothers with infants under 2 years who recalled drinking alcohol during pregnancy, by drinking behaviour and stage of pregnancy, 2009

Source: 2009 Victorian Child Health and Wellbeing Survey

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1 A total of 4,875 women took part in telephone interviews.
2 The NHMRC Australian Guidelines to Reduce Health Risks from Drinking Alcohol note that ‘levels of drinking are defined in many different ways and are often difficult to quantify’ (NHMRC, 2009, p.11). The Guidelines avoid the use of terms such as ‘binge-drinking’ ‘heavy drinking’ and ‘problem drinking’ while recognising that such terms are often used in the research literature.
3 Information on age was missing for two mothers.
4 There is a 95 per cent probability that the true value lies between the upper and lower limits of the confidence interval.
Exposure to tobacco

Approximately one in five (18.3%) (15.0 – 21.7%) infants had mothers who smoked cigarettes at some point during pregnancy. Women were most likely to smoke early on in the pregnancy, when still unaware of the pregnancy. 18.2% (14.8–21.5%) of infants had mothers who smoked before realising they were pregnant, whilst 7.0% (4.9-9.1%) of infants had mothers who reported smoking cigarettes late in pregnancy (Table 1).

6.7% (4.6 – 8.8%) of infants had mothers who reported smoking cigarettes at each of the three time points during pregnancy. There was some evidence that the women who continued to smoke throughout pregnancy attempted to cut back on the number of cigarettes they smoked. The mean number of cigarettes smoked in a day, reduced from 10 cigarettes, pre-pregnancy recognition, to around 8 per day (at early post-pregnancy recognition) and to around 7 per day (at late post-pregnancy recognition). This finding should be interpreted with caution, however, as the confidence interval levels overlap (Table 1).

Exposure to alcohol and tobacco

Approximately one in ten infants (9.7%) (7.3 - 12.2%) had mothers who reported both drinking alcohol and smoking cigarettes pre-pregnancy recognition. A very small proportion (1.9%) (0.6 · 3.1%) of infants had mothers who were both drinking alcohol and smoking cigarettes towards the end of pregnancy. Women who drank alcohol during pregnancy were no more likely to smoke cigarettes in pregnancy than women who abstained from alcohol throughout pregnancy. However it appears that cigarette smoking may be more common among women who reported at least one episode of binge drinking during pregnancy.5

Associated factors

Recent research has found alcohol consumption during pregnancy to be most common among women who are older, better educated and financially well off (Wallace et al 2007; Tough et al 2006). The characteristics of women who are most likely to smoke cigarettes in pregnancy differ markedly from those of women who are most likely to consume alcohol. Rates of smoking in pregnancy are higher among teenage mothers, single mothers, Aboriginal and Torres Strait Islander mothers, and in mothers with lower levels of educational attainment and of low socioeconomic status (Laws et al 2006, in AIHW 2009).

The VCHWS results are inconclusive and should be interpreted with caution, due to the small cell sizes. However, the findings are broadly in keeping with this wider research literature. It appears that infants with mothers who were aged 30 years or more, in couple relationships, and from more affluent households 6 were more likely to have been exposed to alcohol in utero. Infants listed as dependents on health care cards were less likely to have been exposed to alcohol before birth.

Compared to mothers in couple relationships, single mothers were more likely to report smoking cigarettes during pregnancy. Smoking was also more common among mothers aged under 30 years. Mothers who had received tertiary education were less likely to report smoking in pregnancy. Infants were more likely to have mothers who had smoked during pregnancy if they were listed as dependent on a health care card.

Comparison with 2006 VCHWS

The patterns of alcohol consumption and smoking during pregnancy identified in the 2009 VCHWS are broadly similar to those reported in 2006 (Table 2).

Table 1: Proportion of Victorian mothers with infants under 2 years who recalled smoking during pregnancy, by stage of pregnancy, 2009

<table>
<thead>
<tr>
<th></th>
<th>% Ever smoked (95% confidence interval)</th>
<th>Mean number of cigarettes smoked per day</th>
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<tbody>
<tr>
<td>Pre-pregnancy recognition</td>
<td>18.2 (14.8 – 21.5)</td>
<td>10.1 (8.8 – 11.3)</td>
</tr>
<tr>
<td>Post- pregnancy recognition, early</td>
<td>9.0 (6.6-11.4)</td>
<td>7.9 (5.8 - 10.0)</td>
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<tr>
<td>Post-pregnancy recognition, late</td>
<td>7.0 (4.9 - 9.1)</td>
<td>7.1 (5.3 – 9.0)</td>
</tr>
</tbody>
</table>

Source: 2009 Victorian Child Health and Wellbeing Survey

Table 2: Proportion of Victorian mothers with infants under 2 years who recalled drinking alcohol, binge drinking and smoking, 2006 and 2009

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2009</th>
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<tbody>
<tr>
<td></td>
<td>Recalled drinking alcohol % (95% confidence interval)</td>
<td>Recalled binge drinking % (95% confidence interval)</td>
</tr>
<tr>
<td>Pre-pregnancy recognition</td>
<td>60.8 (56.5 - 65.1)</td>
<td>56.0 (51.6 - 60.4)</td>
</tr>
<tr>
<td>Post pregnancy recognition, early</td>
<td>33.7 (29.4 - 38.0)</td>
<td>26.3 (22.4 - 30.2)</td>
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<tr>
<td>Post pregnancy recognition, late</td>
<td>30.7 (26.5 - 35.0)</td>
<td>23.4 (19.5 - 27.3)</td>
</tr>
</tbody>
</table>

Source: Victorian Child Health and Wellbeing Surveys, 2006 and 2009

5 30.1% of women (21.8 – 38.4%) who reported at least one episode of binge drinking had smoked during pregnancy, compared with 15.5% (11.9 – 19.2%) of women who abstained from alcohol.

6 66.8% (61.6-72%) of mothers living in households with a gross income of more than $60,000 reported drinking alcohol during pregnancy, compared with 47.0% (38.5-55.4%) of mothers living in households with a gross income of less than $60,000.
Discussion

The 2009 VCHWS highlights that it is not unusual for Victorian women to drink alcohol during pregnancy, with six in ten women drinking alcohol at some point. Smoking in pregnancy is less common with one in five women reporting this. Women are most likely to drink alcohol and smoke when they are unaware of their pregnancy, and the majority do attempt to cut down on their consumption of alcohol and cigarettes when they know that they are pregnant.

While these VCHWS findings can not be directly compared to data from the other reported studies, they are broadly similar, with regards to prevalence of alcohol consumption and smoking, and the factors that are associated with this.

The VCHWS and national findings suggest that there is a strong argument to promote greater awareness of the harms of alcohol and cigarette smoking among women of child-bearing age. Given that a significant proportion of pregnancies are unplanned (Colvin et al 2007) and that women are most likely to drink alcohol and smoke when unaware they are pregnant, advice should not just be limited to women who are planning pregnancy. Advice needs to be sensitive and relevant to all women of child bearing age - reinforced by health professionals.

While mothers do seem to be highly motivated to adopt healthier lifestyles, following pregnancy recognition, the further reductions in smoking and drinking patterns are fairly modest. This suggests that further support may also be required for women to quit during the later stages of pregnancy. Further research is also needed to determine the characteristics of women who choose to continue drinking and smoking, so that interventions can be appropriately targeted towards key groups.

Specific interventions to address alcohol use and smoking in pregnancy will be most effective if they are planned and developed on the basis of sound evidence about ‘what works’. The Victorian Government has developed a catalogue of evidence-based strategies which provides program planners with a range of early childhood and adolescent intervention strategies that are known to be effective in improving outcomes for children.

This catalogue, which is regularly expanded and updated with new research, can be viewed and searched at: www.education.vic.gov.au/about/directions/children/intervention.htm

Smoking and alcohol in pregnancy: policy directions in Victoria

The Victorian Tobacco Control Strategy 2008-2013 (DHS 2008a) commits to an integrated health promotion program to reduce the number of women smoking in pregnancy and help them quit earlier. The Strategy also includes a target to reduce smoking in pregnant women by 50 per cent by 2013 (from 9.3 per cent to 4.7 per cent).

Restoring the balance – Victoria’s alcohol action plan 2008-2013 encourages safe and responsible alcohol use (DHS 2008b). The strategy aims to:
- reduce drinking and its impact on families and young people
- reduce the consequences of risky drinking on health, productivity and public safety
- reduce the impact of alcohol-fuelled violence and anti-social behaviour on public safety

References


DHS 2008b, Restoring the balance – Victoria’s alcohol action plan 2008-2013, the Victorian Government Department of Human Services, Melbourne.


National Health and Medical Research Council 2009, Australian Guidelines to Reduce Health Risks from Drinking Alcohol, NHMRC.


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