



# FETAL ALCOHOL SYNDROME

A LITERATURE REVIEW FOR THE 'HEALTHY PREGNANCIES,  
HEALTHY BABIES FOR KOORI COMMUNITIES' PROJECT

# **Fetal Alcohol Syndrome: A Literature review for the ‘Healthy pregnancies, healthy babies for Koori communities’ project**

Prepared by  
Priscilla Pyettfor  
the Victorian Aboriginal Community Controlled Health Organisation (VACCHO)  
with  
VACCHO Research team: Kellie Loughron, Peter Waples-Crowe  
and Renee Williams



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## Acronyms

ARBD	Alcohol related birth disorder
ARND	Alcohol related neurodevelopmental disorder
FAE	Fetal alcohol effects
FAS	Fetal alcohol syndrome
FASARD	Fetal alcohol syndrome and related disorders
FASD	Fetal alcohol spectrum disorder(s)
PFAS	Partial Fetal alcohol syndrome

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# 1. Scope and purpose

The purpose of this literature review is to provide background information for the Victorian Aboriginal Community Controlled Health Organisation (VACCHO) project entitled ‘Healthy pregnancies, healthy babies for Koori communities.’ This is a research and awareness project that has been conducted to identify levels of awareness of Fetal Alcohol Syndrome (FAS) in the Victorian Koori community and to develop culturally appropriate information and training materials.

FAS has been identified as a significant issue in some Indigenous communities in Australia. Projects to raise awareness of FAS have been carried out among Aboriginal communities in Western Australia (WA) and Cape York (ANCD, 2002). However, there are significant differences in the historical, social and cultural circumstances of Aboriginal communities in Cape York and WA compared to Aboriginal communities in Victoria. Differences include population size and living conditions, patterns of alcohol use and access to services. It was therefore important for Aboriginal communities in Victoria to investigate the levels of knowledge and concern in their communities about alcohol use and its effects on the developing foetus, and about children who may have FAS.

The literature reviewed describes the epidemiology and clinical aspects of FAS and other effects of alcohol consumption during pregnancy, which are variously referred to as ‘fetal alcohol effects’ (FAE), ‘alcohol related neurodevelopmental disorder’ (ARND) and sometimes as ‘fetal alcohol syndrome and related disorders’ (FASARD). Other terms include ‘alcohol related birth defect’ (ARBD), ‘partial fetal alcohol syndrome’ (PFAS) and ‘fetal alcohol spectrum disorders’ (FASD) (O’Leary, 2002:8).

We have focused on those aspects of the literature that are of particular relevance to our purpose: understanding the relationship between alcohol consumption and pregnancy; understanding the epidemiological data on FAS/FAE in different populations; determining the relationship between FAS/FAE and Indigenous population groups; and identifying culturally relevant awareness programs and intervention strategies. More detailed information on all aspects of FAS/FAE and ARND can be obtained from the comprehensive literature reviews (O’Leary, 2002; Telethon Institute for Child Health Research, n.d.) that have been used as a basis for this review and from the many scholarly articles identified within those reviews that are listed in the reference list at the end of this document.

## **2. Sources**

This project draws on recent Australian literature reviews, including a recent review conducted by Colleen O’Leary in WA (O’Leary, 2002). This review was based on an extensive and comprehensive research strategy undertaken for the National Expert Advisory Committee on Alcohol (NEACA). Additional literature focusing on Indigenous populations by the Telethon Institute for Child Health Research and the Kulunga Research Network (Telethon Institute for Child Health Research, n.d.) was reviewed as were articles identified in each of the sources, and further articles identified in various reference lists.

### **3. Introduction – what is FAS?**

FAS is recognised as one of the foremost, non-genetic cause of intellectual impairment (Abel and Sokol, 1986), one which is potentially preventable (O’Leary, 2002). FAS was first described in the *Lancet* in the 1970s by Jones et al. (1973) and was linked to low socio-economic status.

FAS is the term used to describe the more severe symptoms of alcohol consumption on the embryo and foetus while FAE, ARND and ARBD are used to describe the less severe forms. The broad spectrum of fetal alcohol effects (FAE) are ambiguous and poorly defined (O’Leary, 2002) but generally describe the same pattern of behavioural abnormalities as in the severe cases and FAS (Steinhausen et al., 2003).

#### **How alcohol affects the unborn baby**

Alcohol affects fetal and cell growth through malnutrition and by influencing maternal diet (O’Leary, 2002). The maternal-fetal endocrine balance may also be disrupted (O’Leary, 2002) and alcohol can cause ‘permanent, or at least persistent, damage to developing nerves, not temporary damage as it does to developed [adult] nerves’ (Avaria et al, 2004:343).

The effects of alcohol on the foetus depend on a number of factors including: timing of exposure, embryonic development and the influence of other substances such as smoking.

The toxic effects of alcohol can:

- impact on conception-affecting the quality of the egg and sperm prior to conception;
- cause spontaneous abortion (miscarriage);
- result in craniofacial abnormalities, organ malformations, microcephaly or a normal-sized brain with decreased cells;
- affect pre- and post-natal growth; and/or
- contribute to behavioural and cognitive disorders (O’Leary, 2002).

The effects of alcohol on the developing embryo are poorly understood, but some evidence exists from animal studies for an early effect (in the first month of pregnancy) that leads to craniofacial abnormalities (Astley et al., 1999) and a later effect (in the sixth month of pregnancy) that leads to the neurodegeneration (Ikonomidou et al., 2000).

It is also believed that smoking may increase the adverse effects of alcohol (O’Leary, 2004).

## How is FAS diagnosed?

Diagnosis is based on identifying that the infant has specific facial characteristics as well as neurological, developmental, behavioural or cognitive disorders, and growth deficiency, together with reports of the mother's use of alcohol during pregnancy and around the time of conception. A new 4-Digit Diagnostic Code has been developed and tested over 3 years and is reported to have more precision (O'Leary, 2002).

There are a number of problems with current methods of diagnosing FAS and related disorders. The lack of any objective, quantitative diagnostic tool or laboratory test for diagnosing FAS has increased the risk of diagnostic misclassification (O'Leary, 2002). Subjective assessment of facial features and growth retardation are particularly problematic in relation to different ethnic and Indigenous populations. The absence of race-standardised norms increases the likelihood of misclassification (Abel, 1995; O'Leary, 2002; 2004). 'Facial features associated with FAS are not always easy to assess, particularly in the newborn period. There is also concern that certain facial features of FAS are more common in specific racial groups. Standardised measures have been developed in the US but these measures have not yet been tested or standardised in Australia' (Harris and Bucens, 2003:531).

There are also problems with determining levels of alcohol use during pregnancy, including uncertainty about the reliability of self-reports, and the reluctance of doctors to take an alcohol history as a routine part of antenatal care due to pressures of time, discomfort or concerns about the implications and repercussions of such questions (Harris and Bucens, 2003). Since the implications of a diagnosis of FAS can be profound, and may have repercussions not only for the child, but also for the mother, the family and the community, the clinician may be reluctant to make a diagnosis of FAS, with its associated stigma (Harris and Bucens, 2003).

The relationship between alcohol consumption during pregnancy and birth outcomes is far from clear (Henderson, 2007). Some children exposed to alcohol in utero have none of the features of FAS. Others have some but not all. The broad spectrum of abnormalities related to alcohol consumption during pregnancy occur with variable severity. Features similar to those of FAS may also occur in infants as a result of other disorders and may also occur as a result of a range of viral infections contracted during pregnancy (O'Leary, 2004). Indeed, all the characteristics of FAS can have other causes (Autti-Ramo, 2002). Furthermore, diagnosis is not always possible in the newborn period because neurological and cognitive impairment may not be evident until later in childhood, and the facial features characteristic of FAS may be subtle (Telethon Institute for Child Health Research, n.d.).

## **4. What are the babies like? What are the effects of FAS/FAE?**

Babies and young children with FAS are usually recognised by specific facial features that are described in the medical literature as: small eye openings, flat upper lip, an elongated or missing groove between the upper lip and nose, and a flat midface. They are also characterised by growth deficiency such as being of low birthweight, failing to thrive, and growing in a disproportionate ratio of weight to height. They also have at least one of the following abnormalities of the central nervous system: small head size, small brain, neurological impairment (such as impaired fine motor skills), hearing loss, or lack of co-ordination (O’Leary, 2002).

Children affected by alcohol in utero may develop mild to severe behaviour problems, including disruptive, aggressive, hyperactive and even ADHD behaviour (attention deficit hyperactive disorder). They also exhibit signs of anxiety and emotional problems. Behaviour that is classified as ‘self-absorbed’, ‘communication disturbed’, and ‘antisocial’ is seen in moderate to severe FAS and mild FAS/FAE (Steinhausen et al., 2003:181).

In recent years the term ‘fetal alcohol spectrum disorder’ (FASD) has been widely adopted in North America, and is increasingly used on Australian websites, policy documents, conferences and in pamphlets for pregnant women. FASD is an umbrella term covering a wide range of physical, intellectual and behavioural problems, and in North America children or adults may be assessed as having FASD if they have any one of these and if their mothers are known or assumed to have consumed alcohol while pregnant – that is, with ‘known or probable significant prenatal alcohol exposure’ (Loock et al., 2005:630). Although a recent issue of the Journal of the Canadian Medical Association states ‘The term FASD is not intended for use as a clinical diagnosis’ (Loock et al., 2005:628), guidelines for diagnosing FASD are presented in the same issue of the journal (Chudley et al., 2007).

However, diagnosis of FAS/FAE or FASD is made even more difficult because behavioural problems, such as increased aggression, school difficulties, and poor social competence are somewhat subjectively assessed and because behavioural problems may be compounded by the child’s home life, including the effects of ongoing alcohol use in the family.

## 5. Epidemiology – What do we know about the prevalence of FAS?

The prevalence of FAS is hard to measure. We have already discussed the difficulties associated with diagnosis, particularly the subjective nature of assessment and the fact that early diagnosis is difficult. Data collection systems on FAS are also inconsistent, which makes comparisons difficult or impossible. For example, the WA Birth Defects Registry recorded greatly increased rates of FAS after the Rural Pediatric Database was added (O’Leary, 2002).

Internationally, the most widely used summary prevalence estimate of FAS is 1 to 1.5 cases per 1000 live births, with great variation due to ascertainment strategies (Abel, 1995; Burd et al., 2003).

The variability of rates in these studies reflects different sampling strategies and different patterns of alcohol abuse in different sites (Williams et al., 1999). A number of authors suggest that prevalence rates of FAS are likely to be underestimated due to methodological problems in study design and difficulties with detection and diagnosis (Elliott and Bower, 2004; Harris and Bucens, 2003; Williams et al., 1999). There are also studies where the prevalence of FAS may be overestimated because the researchers have chosen sites where FAS is expected to occur more often (Williams et al., 1999), and in communities where drinking rates are known to be particularly high. Recent studies show that even amongst women who are deemed ‘alcoholic’ and who drink heavily throughout their pregnancy, it is believed that less than 5% will have children with complete FAS (Abel, 1995; Burd et al., 2003).

### Australian data

There have been very few published Australian studies of FAS prevalence (Harris and Bucens, 2003) and there is as yet no national data on FAS in Australia (Telethon Institute for Child Health Research, n.d.). Four Australian population surveys conducted between 1976-1985 found no cases of FAS, although there were between 0.4 and 13.0% of heavy drinkers in these studies (Abel, 1995).

The Australian Paediatric Surveillance Unit commenced active surveillance of FAS in January 2001, with monthly reporting by over a thousand paediatricians in Australia. This is the first prospective national study of FAS in Australia; it continued for three years and aims to document prevalence of FAS (pc Bower in O’Leary, 2002:22).

It is claimed that some State birth defects registries suggest high rates amongst Indigenous infants (Telethon Institute for Child Health Research, n.d.). Recently the WA Birth Defects Registry reported 0.02/1000 for non-Aboriginal children, with 2.76/1000 Aboriginal children (O’Leary, 2002). By contrast, only 3 cases of FAS were reported to the Victorian Birth Defects Register in over one million births between 1983 and 1998 and none of these was Indigenous (Riley and Halliday, 2000). A further study of all live

birth records in Victoria between 1995 and 2002 found no increased incidence of FAS among Indigenous than non-Indigenous births (Allen et al., 2007).

Reports from The Australian Paediatric Surveillance Unit show that the Indigenous population is over-represented in cases reported so far (pc Bower in O’Leary, 2002:22).

## **Women’s drinking patterns**

The Australian Institute of Health and Welfare (AIHW) report that 38% of Australian women consume 3 or more drinks per day, and 15.5% consume 5 or more per occasion (AIHW 1999 in O’Leary, 2002:26).

The Women’s Health Australia longitudinal study in 1996 found 24.2% of women were non-drinkers in pregnancy, 68.2% were ‘low risk’ drinkers, 3.6% were low intake drinkers but had a binge weekly, and 3% were classified as consuming alcohol at hazardous or harmful levels (Telethon Institute for Child Health Research, n.d.).

The AIHW survey reported that Aboriginal women are less likely than non-Aboriginal women to drink alcohol, but those who do are likely to drink at hazardous or harmful levels. However, there are no population-based data relating alcohol intake and pregnancy amongst Aboriginal women (Telethon Institute for Child Health Research, n.d.).

## 6. Why is the reported prevalence of FAS higher in Indigenous communities?

In some parts of Australia and overseas, particularly Canada and the United States, prevalence estimates of FAS in Indigenous communities are higher than that reported for the wider community. However, most researchers agree that the difference reflects socio-cultural variables such as socio-economic status, drinking patterns, and differences in diet rather than racial characteristics (O'Leary, 2004). Furthermore, it is important to note that most studies of FAS in Indigenous populations (particularly in Canada) have been conducted in communities already known to have high levels of drinking (May 1991 in Tait, 2003:100,111). Similarly, one US study that reported adverse effects on parent-reported child behaviour associated with low levels of prenatal alcohol exposure was carried out on what the authors describe as a 'large black, socially disadvantaged sample' (Sood et al., 2001:8). Clearly these findings cannot be generalised to apply to other Indigenous communities or to the Indigenous population as a whole.

Two reviews of international population-based studies of FAS conclude that poverty and socioeconomic status (SES), rather than race and ethnicity, account for differences between groups of different racial origins in the US and in France (Abel 1995; Sampson et al. 1997). Indeed, one of the principal researchers in the area of FAS and FAE has concluded that: 'The major determinant for the occurrence of FAS is poverty. ... Poverty, not genotype, provides the kind of host environment that exacerbates alcohol's toxic actions' (Abel, 1995:441). Abel goes on to argue that '...population studies comparing racial genotypes for rates of alcohol metabolism or susceptibilities to alcoholism will be less fruitful in preventing FAS than studies which identify the socioeconomic risk factors contributing to FAS' (441).

There are other factors that may lead to higher rates of diagnosis of FAS amongst Indigenous (and other ethnic) populations. Firstly, because diagnosis of FAS is partly based on facial features, some of which are more common and may be normal facial variations amongst different ethnic populations, children of some ethnic groups may be more likely to receive a diagnosis of FAS. Unless 'race-standardised norms' are used, 'claims of low-set ears, short palpebral fissure size, etc., may be artifactual and may thereby contribute to higher incidence rates for a particular ethnic group or a particular study site' (Abel, 1995:439). Secondly, growth norms may differ between different populations, making it difficult to assess infants' growth and physical development. For instance, since there are no growth norms for the native Inuit population in Saskatchewan, Canada, estimation of growth retardation is virtually impossible (Abel, 1995). As a result, according to researchers, an Inuit child with unusual facial features whose mother drank at all during pregnancy could receive 'a very glib diagnosis of FAS by primary care physicians' (Abel, 1995:439). Finally, as Harris and Bucens note, because of the difficulties in ascertaining mothers' drinking behaviour and the stigma attached to both drinking and FAS, there may be a greater reluctance to diagnose FAS in children of non-Indigenous mothers (Harris and Bucens, 2003).

## 7. How much alcohol causes FAS/FAE?

Researchers generally agree that full FAS ‘is seen only in patients whose mothers have a history of **chronic, daily, heavy** alcohol use or **frequent, heavy, intermittent** alcohol use’ (O’Leary, 2004:3 emphasis added ). Heavy alcohol use is defined as six or more drinks per day or at least five to six drinks per occasion, with a monthly intake of at least 45 drinks (Clarren 1978; Rosett 1980 in O’Leary, 2004:3).

An early Australian study conducted in 1980, in which seven cases of FAS were identified, described the mothers’ drinking as ‘extremely heavy’: from ‘alcoholic’ to ‘extreme’. One woman was reported as drinking half a bottle of brandy per day, two had ‘probably’ drunk in excess of 300ml vodka per day, and one had reportedly been drinking 3 flagons of Muscat per day on average for the past 3 years and during pregnancy (Walpole and Hockey, 1980:102). ‘The consumption of alcohol equivalent to five or more standard alcoholic drinks...at one time is referred to as “**binge**” drinking and is believed to be more toxic to the foetus than drinking the same amount over several days’ (Telethon Institute for Child Health Research, n.d.:8 emphasis added).

‘Timing as well as quantity of alcohol exposure is important, with exposure in early pregnancy more likely to lead to structural abnormalities of the foetus, and later exposure affecting growth and neurological development’ (Telethon Institute for Child Health Research, n.d.:8; see also Astley et al., 1999; Ikonomidou et al., 2000).

It is much more difficult to establish the quantity and frequency of alcohol consumption that is required to produce partial FAS/FAE and there has been considerable controversy around methodological issues and bias (O’Leary, 2004). Difficulties relate to: accuracy of diagnosis, case ascertainment, women’s recall bias, how to measure alcohol consumption, and averaging daily or weekly intake (which masks the importance of pattern and quantity of alcoholic intake) (O’Leary, 2002).

Reduced IQ, learning difficulties, anti-social behaviour and school problems in adolescents have been reported to be associated with **binge drinking** and heavy drinking in early pregnancy (Autti-Ramo, 2002; Maier and West, 2001), and reduced psychomotor development has been found to be associated with consumption of **three or more drinks** per day during pregnancy (O’Leary, 2002).

‘Overall, there appears to be no sound evidence that **low** levels of alcohol consumption produce FAS and FAE/ARND’ (O’Leary, 2002:1; see also O’Leary 2004; Henderson et al., 2007; Walpole et al., 1990) and a recent meta-analysis found ‘no increase in fetal malformations with **moderate** alcohol consumption (two drinks per week to two drinks per day), during the first 3 months of pregnancy’ (Polygenis et al. 1998 in O’Leary, 2004:3; see also Henderson et al., 2007). However, there is clear evidence that alcohol consumption at **high** levels can contribute to a variety of adverse outcomes in the child (NHMRC, 2001).

Levels above two drinks of alcohol per day in pregnancy also increase the risk of outcomes including spontaneous abortion, low birthweight, and intra-uterine growth restriction (Telethon Institute for Child Health Research, n.d.). One study found that women who drank more than 3 drinks per week significantly increased their risk of first-trimester spontaneous abortion (Windham et al. 1997 in Chang, 2001). However, in Australia the NHMRC advice on drinking during pregnancy has recently changed from total abstinence as the only safe level of drinking during pregnancy. The NHMRC currently cites consistent evidence as indicating that **an average of one standard drink per day** is ‘the level below which no discernible evidence has been found for harm to the unborn child’ (Single et al., 1999 in NHMRC 2001:78).

Although alcohol clearly has the potential to interfere adversely and sometimes disastrously with the development of the foetus, it is important to note that ‘not all children exposed to heavy alcohol consumption during pregnancy are affected to the same degree’(O’Leary, 2004:3). The pattern and quantity of alcohol consumption, particularly the timing related to the stage of development of the foetus, together with other socio-behavioural risk factors appear to increase or decrease the chances of FAS or related FAE occurring (O’Leary, 2004). There is also scientific evidence from animal models that biochemical factors may play a role in determining which foetuses develop FAS (Astley et al., 1999; Ikonomidou et al., 2000). These include antioxidants supposedly conferring a neuroprotective effect (Mitchell et al., 1999), and Vitamin A which may mediate the effect of alcohol somehow (Zachman and Grummer, 1998).

## 8. Other factors/component causes

Researchers have identified a number of factors that **increase** the risk of babies being born with FAS.

1. The consumption of large amounts of alcohol in a short period of time (binge drinking), particularly during the first trimester of pregnancy, clearly increases the risk of FAS (Burd et al., 2003; Telethon Institute for Child Health Research, n.d.).
2. Low socio-economic status (SES) is clearly associated with the patterns of FAS identified in epidemiological studies. Low SES is compounded by many of the other known risk factors including: poor maternal nutrition, high rates of smoking, stress and physical abuse, together with the cumulative effect of intergenerational maternal drinking (Burd et al., 2003; O’Leary, 2002; Telethon Institute for Child Health Research, n.d.).
3. Cultural and racial factors are frequently identified in the literature. FAS varies across populations, and is reported to be highest in African American, Indigenous and coloured/mixed race populations. It is difficult to disentangle cultural and racial factors from socio-economic factors. For example, being Aboriginal (in Australia or Canada), or Black or Hispanic (in the US) is also associated with poor nutrition, genetic and social factors, along with intergenerational maternal drinking, stress, abuse, and smoking (O’Leary, 2002; 2004).
4. Duration of mother’s drinking and the cumulative effect of intergenerational maternal alcoholism affects the baby’s risk of developing FAS (O’Leary, 2004:3). One study describes the characteristics of a typical ‘FAS family’ as both parents drinking, and having been alcoholic for ten or more years (Burd et al., 2003:683).
5. Smoking, in particular, and other drugs such as marijuana and cocaine may exacerbate the effects of alcohol (O’Leary, 2002; 2004).
6. FAS is more likely in babies born to women aged 30 years and older – possibly due to physiological changes or duration of drinking (Burd et al., 2003; O’Leary, 2002; 2004). Furthermore, the risk of having another child with FAS increases with each subsequent pregnancy (Burd et al., 2003).
7. Lastly, the research supports the suggestion that some babies may have a genetic predisposition that increases their chance of developing FAS. Different fetal responses to alcohol have been found in non-identical twins (O’Leary, 2002; 2004). It is important to note that these genetic factors are individual not population-based or racial in origin.

Overlying this are issues specific to Australia's Indigenous population, such as the effects of colonisation, marginalisation, and loss of traditional culture (Elliott and Bower, 2004; O'Leary, 2002; Siggers and Gray, 1998). For Aboriginal people, alcohol misuse is 'symptomatic of the grief, loss and trauma associated with dispossession. This has led to cultural breakdown, family and community dysfunction and intergenerational trauma. It also contributes to the ongoing disadvantage and suffering that confronts Aboriginal people today, thus a dangerous cycle is perpetuating itself. Prevention and treatment services for Aboriginal people must operate within this context' (ATSIC, 2003:21; see also Siggers and Gray, 1998).

## 9. Developing Interventions

### Knowledge of FAS

Australian women's knowledge of the risks associated with alcohol consumption during pregnancy appears to be limited, and rarely obtained from a medical source. (O'Leary, 2002). A South Australian study of Indigenous women found no evidence that available information or advice had been received, internalised or acted upon by the women (Brady 1991 in O'Leary, 2002:26).

The Telethon Institute for Child Health Research were unable to find any published information on the knowledge, beliefs and practices of Australian health professionals with respect to FAS or alcohol counselling in pregnancy (Telethon Institute for Child Health Research, n.d.). However, it appears that few doctors actually screen women for alcohol use during pregnancy (O'Leary, 2002).

### Interventions

Elliott and Bower conclude that 'FAS is the end result of a complex interaction between diverse social, political, environmental, and genetic risks', and that prevention of FAS is therefore 'not a problem for health alone, but for a range of portfolios including housing, justice, education, and community services. For example, a reduced social acceptance of alcohol use might decrease the use of alcohol in women' (Elliott and Bower, 2004:10). Interventions early in the causal chain are likely to be the most effective, but the most difficult to implement, while interventions at later stages will have less effect and provide only 'band-aid' solutions (Elliott and Bower, 2004:10). However, such interventions cannot ignore the broader range of reasons contributing to individual women's alcohol use.

'Interventions should utilise both a woman-centred and a family-centred approach that emphasise the development of a non-judgmental relationship between the health professional and the client' (O'Leary, 2004:5). While even brief interventions have been shown to produce positive results (Handmaker and Wilbourne, 2001), ideally, simultaneous community-based interventions at the three levels of prevention are needed (Burd et al., 2003).

The effectiveness of advice to abstain completely is not clearly supported by scientific evidence (Telethon Institute for Child Health Research, n.d.; Walpole et al., 1990). Furthermore, where abstinence has been advised, mothers in the heavier drinking groups have been found to continue to drink, while unnecessary guilt and anguish is engendered in women who drink only lightly or occasionally, particularly where there has been a previous poor pregnancy outcome (Walpole et al., 1990). 'It is better to promote the idea that women should avoid binge and heavy drinking if they are planning for pregnancy' (Walpole et al., 1990:300).

The literature highlights the importance of implementing targeted prevention strategies for what is known to be a particularly high-risk group – women who have already had a baby diagnosed with FAS or FAE (O’Leary, 2004; Telethon Institute for Child Health Research, n.d.). However, characterisation of high risk groups carries significant danger of stigmatisation. Furthermore, care must be taken when labelling any pregnant woman as a heavy drinker as this may affect the readiness of a clinician to identify her child as having FAS (Abel, 1995). A possible solution lies in the routine use of screening questionnaires in clinical practices as this may reduce the potential for stigmatisation in asking patients about alcohol use (Chang, 2001). Nevertheless, even such a routine screening process could be experienced as stigmatising for Aboriginal women.

It has been suggested that assessment methods alone, if conducted in a reflective, nonjudgmental interviewing style, may increase awareness and problem recognition which are processes known to promote behaviour change (Handmaker and Wilbourne, 2001). On the other hand, offering premature advice is likely to be ineffective, often creating defensiveness among women who are undecided about benefits versus costs, or uncertain whether they can change (Handmaker and Wilbourne, 2001).

It is widely recognised that heavy drinking is often accompanied by depression, anxiety and other psychological problems, as well as by other drug use and cigarette smoking. Women who drink heavily are frequently found to have high rates of post-traumatic stress disorder and histories of sexual abuse. Women with drinking problems are also likely to have family histories of drinking among female relatives and significant others (Handmaker and Wilbourne, 2001). Interventions to address alcohol and drug use should be embedded within the context of broader efforts toward improving health and well-being. Strategies that include family members are likely to improve outcomes. Ideally, the prenatal care would develop a network with other services for referral (Handmaker and Wilbourne, 2001).

Indeed, intervention requires a broad understanding of the lives of women at highest risk for FAS and ARND (Burd et al., 2003). Interventions need to address other risk factors in the causal chain for FAS. These include ‘enhancing a woman’s diet, reducing physical and emotional abuse, and enhancing a woman’s current living status. Each of these components offers an opportunity to improve the outcome of current and future pregnancies. Developing the capacity for effective prevention and treatment of FAS is a long-term process and for most communities will require considerable capacity building and funding’ (Burd et al., 2003:686).

There are concerns that associating FAS with a minority racial group or socially disadvantaged groups could propagate discrimination. It has been suggested that public attention and effort to address FAS would be greater if the issue were perceived to impact on the general community (O'Leary, 2002). However, the incidence of FAS in the Australian population is relatively rare and promoting the issue broadly may raise alarm and cause unnecessary guilt in women who drink any alcohol during their pregnancy. Even amongst Aboriginal and Torres Strait Islander populations in Australia FAS remains rare. Nevertheless, it is likely that heavy alcohol use and binge drinking during pregnancy may be impacting on birth outcomes for Indigenous babies. Indeed, some Aboriginal communities have identified it as a particular concern for their communities.

Aboriginal health workers and community leaders in Victoria already recognise the need to address heavy alcohol use by pregnant women and young women who may become pregnant. At the same time, it is important that health promotion interventions do not raise unnecessary fears in the Aboriginal community nor increase unnecessary guilt amongst Aboriginal women who have consumed alcohol whilst they were pregnant. Accurate information about alcohol and its effects on the unborn baby, and culturally relevant and sensitive interventions are needed to address concerns about drinking amongst Aboriginal women in Victoria.

Addressing factors such as the effects of colonisation, marginalisation and loss of traditional culture will be an important part of any FAS prevention initiative in Australia's Indigenous populations (Elliott and Bower, 2004; Siggers and Gray, 1998).

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