



Fact Sheet

Fetal Alcohol Spectrum Disorder: The effect of alcohol on early development

"It's like my brain's not in the same order as everybody else's. It's like I'm wired differently."

Young man with Fetal Alcohol Syndrome (Streissguth, 1997).

Key points

- Alcohol during pregnancy can cause birth defects and brain damage in unborn babies. This has been known since ancient times, however, observations were not verified scientifically until the mid 20th Century.
- Mounting evidence confirms that there is a continuum of effects, with no safe amount and no safe time for exposure to alcohol during pregnancy. Not all babies who are exposed to alcohol will be affected to the same degree.
- While heavy exposure early in pregnancy can result in visible birth defects, most disorders are neurological, and therefore more difficult to diagnose.
- 1 in 100 live births are thought to be affected by prenatal alcohol exposure.

Fetal Alcohol Syndrome

In 1973 science confirmed that alcohol was a teratogen, a toxic agent that during pregnancy can cause developmental disorders (Jones and Smith, 1973). Fetal Alcohol Syndrome is a medical diagnosis most often associated with heavy alcohol abuse and binge drinking, particularly early in pregnancy.

- FAS consists of measurable deficits in three categories:
 - characteristic facial malformations
 - brain and central nervous system disorders
 - growth retardation

Other conditions associated with FAS may include:

- heart & kidney defects
 - hearing and eyesight impairment
 - skeletal defects
 - immune deficiencies (Stratton et.al, 1996; NIAAA 1997)
- The facial characteristics unique to alcohol teratogenesis occur around the third week of development and include a flat elongated philtrum, a thin upper lip, small wide apart eyes and small head circumference (Clarren S, 2000). The

recognisable face of FAS becomes less distinctive over time and since FAS is not routinely screened many children with FAS remain undiagnosed.

- The incidence of FAS in the developed world is estimated to be 0.05 to 3.0 per 1000 live births (NIAAA, 1997). This is considered an under estimation, however, FAS is considered to be a leading preventable cause of birth defects in the developed world.

A spectrum of effects

- Fetal Alcohol Syndrome as described above is part of a spectrum of effects referred to collectively as **Fetal Alcohol Spectrum Disorder (FASD)** (Chudley et al, 2005). FASD is the umbrella term used to describe a range of adverse effects including FAS, Partial FAS (PFAS), Alcohol-Related Neurodevelopmental Disorders (ARND) or Alcohol Related Birth Defects (ARBD).
- Overseas studies estimate that Fetal Alcohol Spectrum Disorder, which includes FAS, collectively affects 1 in 100 live births (May and Gossage, 2001).
- There are many unpredictable factors that determine the outcome including: the amount of alcohol in the bloodstream, the timing of exposure during gestation, the mother's state of health, as well as genetic factors (Larkby and Day, 1997).
- Twin studies reveal genetic variation in susceptibility despite having equal exposure to alcohol (Streissguth and Dehaene, 1993; Christoffel and Salafsky, 1975).

"For example, there is a family I know with 4 children born to an alcoholic mother who eventually died from her alcoholism: Child #1 had some problems in school, but is functioning well independently. Child #2 has ARND and a borderline IQ, looks normal but has lots of problems controlling impulses and has poor judgment. Child #3 has full FAS and a normal IQ, looks affected, has problems with impulse control and poor judgment, but because of the obvious look of FAS the system takes that child's disabilities more seriously. Child #4 was exposed but is not affected at all - bright, no behaviour or learning problems, good judgment, mature, responsible. So we cannot always assume that if a child is exposed that the child will be affected the same way."

(Kellerman, 2005)

- Associated neurobehavioural disorders become more obvious and significant later in a child's development (Streissguth, 1997; Stratton et al., 1996).
- Neurological damage from prenatal exposure does not necessarily result in mental retardation but can include sensory problems, impulsivity, poor problem solving ability, impaired judgement and critical thought, inability to predict outcome or learn from experience, difficulty with memory and information retrieval and ability to follow instructions or recognise social cues (Streissguth, 1997).
- Information processing speed is slower in children prenatally exposed to alcohol (Burden et al, 2005). After controlling for prenatal drug exposure, postnatal environmental factors and child verbal IQ, one study showed that children in the alcohol-exposed group had decreased executive functioning at levels of exposure less than one drink a day (Noland et al, 2003).

"The real-world implications of this are that children exposed prenatally to alcohol may be able to perform simple tasks, but may struggle with tasks that are more challenging and require complex cognition and the use of working memory."

(Croxford, 2005).

How much alcohol is safe during pregnancy?

- Specialists studying the effect of alcohol on brain development have not found a level of exposure that can be considered safe. There are cell populations in the brain that are more sensitive to alcohol and these can be affected during different periods of development (NIAAA, 1997; NIAAA, 2001). Adverse effects have been observed at average levels of exposure as low as one drink a week (Sood et al, 2001; Day and Richardson, 2004).

"In sum, alcohol effects on the developing human brain appear to be a continuum without threshold when dose and behavioural effects are quantified appropriately." (Sampson et al, 2000).

- A study from Great Britain suggests that as little as between 1-4 units of alcohol a week can impair the developing central nervous system of a fetus throughout pregnancy (1 unit is equivalent to a small glass of wine) (Hepper, 1999).
- Five drinks a week has been shown to inhibit female fertility (Kold Jensen et al, 1997).

Can anything else cause FASD symptoms?

"Of all the substances of abuse, including heroine, cocaine and marijuana, alcohol produces by far the most serious neurobehavioural effects in the fetus."
(Stratton et al, 1996)

- Many teratogens can cause birth defects and neurodevelopmental disorders but alcohol is singularly the most common and significant contributor. There is an increased likelihood of problems for the child when alcohol is combined with other teratogenic agents such as tobacco (Sampson et al, 2000).
- Some animal research suggests that drinking by the genetic father prior to conception may increase the risk of learning impairment and hyperactivity in children (Cicero, 1994).

What is the best advice?

"We do not know what, if any, amount of alcohol is safe. But we do know that the risk of a baby being born with any of the fetal alcohol spectrum disorders increases with the amount of alcohol a pregnant woman drinks, as does the likely severity of the condition. And when a pregnant woman drinks alcohol, so does her baby. Therefore, it's in the child's best interest for a pregnant woman to simply not drink alcohol."
(U.S. Surgeon General 2005)

- The New Zealand Ministry of Health advises women who are pregnant, planning pregnancy or breastfeeding to avoid any alcohol (Ministry of Health, 2005).
- However, such advice is not universally accepted or applied. A survey of New Zealand doctors showed that, while all believed there should be a limit on alcohol consumption in pregnancy, only 46% recommended abstinence and around half the obstetricians and general practitioners routinely advise women about alcohol at the first antenatal contact (Leversha and Marks, 1996).
- The Royal Australia New Zealand College of Obstetricians and Gynaecologists (RANZCOG) does not support advising women to abstain from drinking alcohol during pregnancy (RANZCOG, 2005). This position, based on the UK Royal College of Obstetricians and Gynaecologists guidelines has come under scientific challenge by scientists internationally (Guerra et al, 1999).

- An international review of 81 leading obstetric textbooks shows inconsistent recommendations, some choosing not to address the subject at all. Of the publications since 1991 only 25% recommended a zero alcohol intake during pregnancy (Sarkar, 2003).

How big is the problem likely to be in New Zealand?

The number of individuals affected by FASD in New Zealand is unknown. However figures indicating the number of New Zealand women drinking during pregnancy suggest that children at risk of FASD could number in their thousands.

- A 1994 national study in New Zealand showed 41.6% of pregnant women consumed alcohol during pregnancy. Hazardous drinking was not confined to any one socioeconomic group (Counsell, et al, 1994).
- A 1999 nutrition report on 500 pregnant women in New Zealand showed that 29% continued to drink alcohol after their pregnancy was confirmed. Of the 24% of women who regularly drank to intoxication before pregnancy recognition, 11% continued to do so throughout pregnancy (Watson and McDonald, 1999).
- A survey of midwives reported that 36% of pregnant adult clients and 82% of pregnant teenage clients drank during their pregnancy (Mathew et al, 2000).
- In a 2002 study, a quarter of pregnant New Zealand women at 24 weeks report consuming alcohol in the previous 7 days (McLeod et al, 2002). The study found that women who were older, had previous pregnancies, had a tertiary education and higher income levels, were more likely to drink.
- A 2005 national survey in Australia revealed that 33% of mothers aged 25-34 years report continuing to drink in pregnancy and a similar number believed it is unnecessary to abstain (Salvation Army, 2005).
- In the USA, where avoiding alcohol has been the official recommendation since 1989, drinking during pregnancy has declined from 21% to around 12% (Center for Disease Control, 2004).
- The lifetime cost for the care of one individual with Fetal Alcohol Syndrome has been estimated to be between \$US850,000 and \$US3,000,000 (NOFAS-UK, 2004; US Senate, 2005).
- Canada estimates that caring for affected individuals up to 21 years of age, costs that country around \$344 million every year (Slade et al, 2006).

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