

Alcohol and the child

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Alcohol can harm children in a variety of ways. In this necessarily superficial review, I shall examine the effects of alcohol drunk by mothers on pre- and postnatal infant growth and development, the short- and long-term sequelae of experimental alcohol ingestion by children, the consequences of alcohol drunk by parents on the well-being of their dependent child, and the effects of alcohol ingestion on the health of young teenagers.

Alcohol, pregnancy and the fetus

Modern scientific interest in the potential adverse effects of maternal alcohol abuse on the fetus followed reports in the early 1970s (for review, see Beattie, 1988) that heavy drinking by some pregnant women results in specific physical and neurodevelopmental problems in their infants, termed the fetal alcohol syndrome (FAS) (Ulleland *et al.* 1970; Jones *et al.* 1974). A deluge of clinical and research papers on the subject followed (Abel, 1985) and it has become apparent that alcohol has the potential to produce a wide variety of adverse effects on pregnancy outcome (Table 1). FAS children have been described in all races and from the newborn period to young adulthood.

Growth retardation. Growth retardation is fundamental to FAS. Length and head size are affected as well as weight, suggesting detrimental intra-uterine effects early in pregnancy. Average term birth weight is only 2179 g (4 lb 13 oz) (population mean 3180 g (7 lb 1 oz)) (Abel, 1983) and although subsequent growth velocity may be normal, 'catch-up' growth is unusual (Beattie *et al.* 1983).

Craniofacial features. Plate 1 shows the face of a child with FAS. The eyes are small with short palpebral fissures and prominent epicanthic folds. Ptosis and squints may be evident. The mid-face is poorly formed with maxillary flattening and a short retroussé nose. Palatal clefts occur in some affected children. The philtrum is poorly formed, and the upper lip thinned.

Neurodevelopmental problems. Mental handicap is the most important effect of alcohol exposure on the fetus, and virtually all FAS children show some degree of intellectual impairment. The mean IQ of reported cases is in the region of 70 (mild mental handicap range). However, a spectrum of developmental outcome is seen and

Table 1. *Spectrum of alcohol-related birth defects*

Stage of reproduction	Alcohol-induced effect
Before conception	Lowered fertility
During pregnancy	Spontaneous abortion Prematurity
At birth	Stillbirth Fetal alcohol syndrome Fetal alcohol effects
Post partum	Feeding and sleeping difficulties Hyperactivity Learning disabilities

some children have a low normal IQ. In general, those children with the most-extreme dysmorphic features and growth retardation show the most-severe degrees of cognitive impairment (Streissguth *et al.* 1978). A variety of neurological problems are found in these children, including epilepsy, ataxia, spasticity or hypotonia. Some children show severe behaviour and learning difficulties.

Congenital abnormalities. A wide variety of associated physical malformations have been reported in FAS children (Abel, 1984). Congenital heart disease is relatively common. Among forty cases of FAS children in Scotland, ten had clinically significant heart disease, three infants dying from complex lesions (Beattie *et al.* 1983).

While it is clear that some pregnant women drinking at an alcoholic level (more than 10 units, 80 g absolute alcohol, daily) produce children with full FAS, other infants from such pregnancies may exhibit only partial FAS features, and are considered to have fetal alcohol effects (FAE) (Ouellette *et al.* 1977; Olegard *et al.* 1979). Some may simply have short stature and poor school performance with behaviour difficulties (Shaywitz *et al.* 1980). A review of the clinical features observed in 245 cases served as the basis of minimal diagnostic criteria for FAS recommended by the Fetal Alcohol Study group of the Research Society on Alcoholism (Rosett, 1980).

Incidence of FAS and FAE

An assessment of the overall incidence of the syndrome is difficult. Much depends on the background characteristics of the population under study, and there is a clear danger in extrapolating relatively high incidence figures from small atypical communities. Overall, studies suggest an incidence of one FAS case per thousand live births, with three to four cases of FAE per thousand live births among the general population (Abel, 1984). In some regions very few cases are recognized. In Britain, cases have mainly been seen in the West of Scotland, Liverpool and Belfast (Halliday *et al.* 1982; Poskitt, 1982; Beattie *et al.* 1983). It cannot be coincidental that in these areas traditionally high levels of alcohol abuse are combined with more severe socio-economic deprivation.

Reports suggest that 2–14% of women drink heavily during pregnancy, depending on the criteria used (Abel, 1984). Recognition of the problem is difficult, requiring a high index of suspicion and a sympathetic non-judgemental approach. Unfortunately, current biochemical screening tests of alcohol abuse, difficult enough to interpret in the non-pregnant population, are especially unreliable when applied to pregnant women (Barrison *et al.* 1982). Reduction in heavy alcohol intake seems to be associated with an improved fetal outcome irrespective of the stage of pregnancy (Rosett *et al.* 1978; Seidenberg & Majewski, 1978; Rosett, 1980). In some areas, large multi-faceted intervention programmes have been tried (Little *et al.* 1984) but even simple counselling may be effective (Larsson, 1983).

Newborn infants, whose mothers have recently been drinking heavily, may exhibit signs of acute alcohol withdrawal (Beattie, 1986). This has been seen in both FAS infants (Pierog *et al.* 1977) and clinically normal infants (Coles *et al.* 1984) following such pregnancies.

Moderate drinking and effects on the fetus

Most controversial in the field of pregnancy-related alcohol research is the concept that FAS represents only one end of a continuum of dose-related adverse effects of alcohol on the fetus. It has been suggested that moderate or even social levels of alcohol ingestion may also have a significant influence on spontaneous abortion rates, birth weight, the incidence of minor congenital abnormalities, and even on neurobehavioural

outcome. At present, the risks are far from clear and more research in this area is required to clarify the situation. Present didactic recommendations for pregnant mothers to totally abstain from alcohol are perhaps somewhat extreme (US Surgeon General, 1981; Anon., 1982a). There does appear to be a small influence on birth weight if more than five drinks weekly are taken (Wright *et al.* 1983) but the biological significance of this is unclear. The occasional drink seems innocuous, but it is important that alcohol intoxication should be avoided.

Pathogenic mechanisms in FAS

The fact that only some mothers drinking heavily in pregnancy induce FAS in their children suggests that a number of factors may influence the outcome of such pregnancies. Ethnic differences in the maternal ability to metabolize alcohol (Aase, 1981) or the variable sensitivity of fetuses to teratogenic agents may play a part. The physico-chemical properties of ethanol give it the potential to disturb the functioning of a large number of different biological systems, but specific mechanisms of pathogenesis of FAS remain unclear (Henderson *et al.* 1981; Colangelo & Jones, 1982; Pratt, 1984). Ethanol and its first metabolite acetaldehyde, are both known to directly influence fetal cell growth (Veghelyi *et al.* 1978; Brown *et al.* 1979) and to be teratogenic (O'Shea & Kaufman, 1979; Abel, 1984). In addition, the secondary nutritional effects of chronic maternal alcoholism (Thomson & Majundar, 1981), disruption of the placental transfer of nutrients to the fetus (Fisher *et al.* 1982), and influences on fundamental aspects of cellular metabolism (Horrobin, 1980) may all have an effect on the eventual outcome of these pregnancies. Binge drinking with high fetal-blood alcohol concentrations achieved may be especially detrimental (Webster *et al.* 1980).

Alcohol intoxication in children

Approximately 1000 children under 15 years of age in England and Wales are admitted to hospital each year because they are intoxicated by alcohol. A recent report has highlighted the problem (Beattie *et al.* 1986). One-third of the incidents involve young toddlers or pre-school children who drink alcohol in the same way that they will ingest any other substance they encounter as they explore their environment. Poor parental surveillance caused by social or domestic problems, and lack of appreciation of the potential toxic effects of alcohol poisoning in these toddlers contribute to the problem.

These young children can be seriously ill, for they drink large quantities of alcohol in relation to their body-weight and rapidly achieve high blood alcohol concentrations. Their ability to metabolize the alcohol is limited (Hollstedt *et al.* 1977) and they rapidly become unconscious. One in five develop potentially brain-damaging alcohol-induced hypoglycaemia, at least partly related to the natural depletion of hepatic glycogen stores by obligate overnight fasting in toddlers, so that this complication is especially likely if they drink alcohol in the early morning (Bradford, 1979).

The remaining incidents involve older children and adolescents who get drunk because of experimentation or bravado, often in the company of friends. The danger here mainly lies in the fact that they often drink away from adult supervision and outdoors, so traumatic or other complications of their intoxication may not be recognized early. It is important to examine the circumstances of each child's alcohol ingestion so that underlying problems can be recognized. Occasionally such incidents reflect general behavioural problems, but at this age very few children are drinking alcohol for effect. Adult involvement may indicate a background of sexual abuse.

Parental drinking and the child

Available evidence suggests, not surprisingly, that children whose parents abuse alcohol have more than their fair share of problems. Most reports in this area have concentrated on families where the father drinks. There is little evidence to support the concept that maternal drinking has more significant detrimental influences on the children than paternal alcohol abuse. In many of these homes, both parents drink heavily.

Apart from experiencing parental drunkenness first-hand, such children are often exposed to the marital disharmony which usually accompanies parental alcoholism (Chafetz *et al.* 1971). This may be of more concern to them than the drunkenness itself (Cork, 1969). It seems inevitable that the disordered relationships within these families must be reflected in the child to some extent. Inconsistent parental behaviour, with periods of over-attentiveness alternating with periods of rejection, the stress of the domestic situation, and the fear of potential or actual parental separation must all disrupt the emotional and social development of such children. Older children may have to accept inappropriate responsibility in such families, and may be too ashamed to seek support from acquaintances or school teachers. Not surprisingly, they often have difficulty in making and maintaining friendships, perhaps in part related to the difficulty in bringing friends into the disturbed home. Some children may find the emotional support they lack in the home in strong peer-group ties, even if this means indulging in delinquent behaviour.

Although family alcoholism has been associated with an increased level of child abuse (Gibbens & Walker, 1956; Smith *et al.* 1974; Mayer & Black, 1977), a direct causal relation between the two problems remains to be proven. In a recent survey by the National Society for the Prevention of Cruelty to Children of trends in child abuse in the UK, misuse of alcohol did not feature as a significant provoking factor (Creighton, 1984).

Parental alcoholism and sexual abuse has also been linked, although again the exact relation is far from clear. Those who sexually abuse children are also likely to exhibit personality disorders, drug abuse and significant psychiatric morbidity (Browning & Boatman, 1977) and it is difficult to separate alcoholism as a direct causal factor in these families. In isolated sexual assault, alcohol intoxication rather than chronic alcohol abuse, may be the provoking factor.

Children raised in alcohol-abusing families show an excess of emotional and behavioural problems (Nylander, 1960; Morrison & Stewart, 1971). Later, juvenile delinquency and alcohol abuse appear more frequent in such children (Rydelius, 1981). They lack good parental models and their own children may also subsequently suffer as a result. In those families in which only one parent is drinking the coping ability of the non-drinking parent or of extended family members may be crucial in modifying the effects on the child (Wilson & Orford, 1978). Those children who lack contact with an adequate parental model within or outside their family, may cope badly with parenthood themselves and problems may affect several family generations.

Knowledge and experience of alcohol in children and adolescents

Alcohol use is an integral part of our society and most children are likely to come into contact with it, directly or indirectly, at a young age. Their early understanding of the effects of alcohol, and their concept of its use, must initially reflect parental attitudes and drinking habits. Later, peer influence and that of society at large becomes increasingly important as young people progress through late childhood and adolescence. Jahoda & Cramond (1972), in the first major alcohol-related study of children in Britain, reported

on the experience and perception of alcohol use in a group of primary school children in Glasgow. They found that by the age of 6 years, two out of five children tested could identify an alcoholic drink by smell and the vast majority of these 6-year-olds could correctly recognize the state of alcohol intoxication, reflecting an early knowledge of alcohol and its effects. Of the 6 to 10-year-olds, 40% in the study had tasted alcohol. In the same year, a linked study of Glasgow teenagers (Davies & Stacey, 1972) showed that by the age of 15 years, 94.6% of the boys and 93.7% of the girls had tasted alcohol. Later studies in London (Hawker, 1978) and Edinburgh (Plant *et al.* 1982) reported similar findings, their results suggesting a rise in reported alcohol experience in teenagers in recent years. Surprisingly, these reports indicate a much higher level of alcohol experience among British teenagers compared with those in the United States, where only 80% of American 16-year-olds had tasted alcohol (Rachel *et al.* 1980). In general, boys have their first taste of alcohol before girls. Most young people are introduced to alcohol within their own homes by their parents. This is an increasing trend and perhaps reflects the general increase in domestic alcohol consumption. However, a small but significant proportion of young people experience their first drink surreptitiously, often in the company of other teenagers and outside the parental home. There is some evidence suggesting that this latter mode of introduction may be associated with a tendency to later heavier drinking in this group (Davies & Stacey, 1972).

Regular use and abuse of alcohol in the adolescent

Both in Britain and the United States, there is mounting evidence that in the last decade teenagers have begun to drink alcohol more frequently, in greater amounts and at a younger age than previously (Plant *et al.* 1982; MacDonald, 1984). In 1984 in England and Wales, 29% of boys and 11% of girls were drinking each week by the age of 13 years (Marsh *et al.* 1986). Surprisingly, Scottish 13-year-olds interviewed in the same study reported drinking less frequently. This earlier use (and abuse) of alcohol has been coupled with an increasing risk of injury or death from alcohol-related accidents or violence especially in the late teens. In 1982 in the USA, over 9000 teenagers died in road-traffic accidents involving alcohol (Anon., 1982*b*). In addition, although alcoholism in children is exceptionally rare, the frequency quickly rises during the mid- and late teens. It is estimated that 3000000 young Americans aged 14–17 years are problem drinkers or alcoholics (Donovan & Jessor, 1976). There is nothing to suggest a lower incidence of these problems among the teenage population in Britain.

These trends in drinking habits have been especially marked among young women. Plant *et al.* (1982) found that female 'regular drinkers' aged 15–16 years had a mean consumption 64.3% higher than that of 17–21-year-old female respondents in Dight's (1976) major study of Scottish drinking habits 10 years earlier. This decreasing sex difference in alcohol consumption is probably related to a number of underlying sociological factors (Shaw, 1980). It is worrying, for although most problem drinking in young males seems to resolve to some extent with time, problem drinking among young women may well become a permanent pattern (Smart *et al.* 1978). Drunkenness and drink-driving convictions, admissions associated with alcoholism to psychiatric hospitals, and contacts with alcohol-counselling agencies have shown a marked increase in the numbers of women involved in recent years, especially in the younger age-group (McNeill, 1983). With these changes in consumption patterns hepatic cirrhosis is likely to develop at a progressively younger age, and especially in young women.

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