Alcohol consumption and the outcomes of pregnancy

The consumption of alcohol offers no benefits in relation to the outcomes of pregnancy and alcohol is both teratogenic and feto-toxic in the human.

Under reporting of alcohol consumption is thought to be widespread and the effects of alcohol consumption in the offspring may not always be recognized. It is important for GPs, obstetricians and midwives to devise ways of identifying women who may suffer from problem drinking during their pregnancy at a time when potentially beneficial interventions can be offered. On the other hand there is still controversy as to whether infrequent and low levels of alcohol consumption during pregnancy convey any long-term harm – in other words is there a safe upper limit for alcohol consumption in pregnancy?

Since 1981 the US Surgeon General's Office has given consistent advice that in the US women who are pregnant (or considering a pregnancy) are advised not to drink alcoholic beverages. UK agencies have not felt happy to endorse this advice and the latest guidelines on antenatal care from the National Institute for Clinical Excellence (NICE) stated:

> **'Alcohol has an adverse effect on the fetus. Therefore it is suggested that women limit alcohol consumption to no more than one standard unit per day' (NICE and National Collaborating Centre on Women's Health, 2003).**

The continuing controversy associated with the possible harmful effects of low levels of alcohol consumption, is highlighted by a recent editorial in the *British Medical Journal (*Mukherjee et al, 2005). The literature review of this editorial suggests that there is no safe upper limit for alcohol consumption, and that the longstanding advice to women in the US should be offered to women in the UK as well. The problem is, as most observers will admit, that the quality of evidence available does not permit an unequivocal recommendation to be made.

ALCOHOL CONSUMPTION IN PREGNANCY - EPIDEMIOLOGICAL STUDIES

Despite the advice of the Surgeon General, regular surveys in the US suggest that between 9 and 15% of women drink alcohol at least once a month during their pregnancy. European studies have suggested that consumption rates are probably lower than this, although obviously the caveat about self-reporting remains.

Unpublished studies from the Section of Reproductive and Developmental Medicine in Sheffield enquired about alcohol consumption as part of a food frequency questionnaire to unselected pregnant women. Forty five percent did not consume alcohol at all during their pregnancy, a further 44% reported consuming < 1 unit (8 g of alcohol) per week. Ten per cent of women consumed < 1 unit a day and only 2 of 233 women admitted to consuming more than 1 unit per day during their pregnancy.

It is important to bear in mind that women who have problem drinking, frequently have other behaviours which may independently or synergistically contribute to an adverse outcome of pregnancy, e.g. smoking, drug abuse, poor nutrition and defaulting from antenatal care.

ADVERSE OUTCOMES OF ALCOHOL CONSUMPTION ON THE REPRODUCTIVE PROCESS

Alcohol consumption is associated in a dose response relationship with anovulatory infertility. Infertility, in association with endometriosis, appears to be more common in those who drink than those who do not but there is no dose response effect. There is no excess of tubal disease or 'unexplained' infertility in women who drink compared to those who do not.

Among fertile women, despite the evidence above about ovulation, there is no delay to conception and in fact there is a significantly shorter waiting time to conception in women who drink modest amounts of alcohol compared to those who do not drink any alcohol (Juhl et al, 2002). Male fertility is unimpaired with consumption up to 40 g of alcohol per day but thereafter there is a dose response reduction in spermatogenesis, with significant numbers of aspermic men among the heavy alcohol consuming group taking > 80 g per day.

A major concern about alcohol and the reproductive process is the increasing resort to binge drinking, particularly among young women. Studies suggest that this type of behaviour is associated with a significantly increased risk of unprotected intercourse with associated problems of unplanned pregnancy and sexually transmitted disease.

Alcohol consumption is associated with no increase in first trimester miscarriage but a dose-related response to the rarer second trimester miscarriage was reported 20 years ago (Harlap and Shiono, 1980). No recent studies in this matter have appeared in the literature.

Alcohol consumption has been shown to impair fetal growth, again in a dose response relationship (Mills et al, 1984), but discontinuing heavy alcohol consumption at any stage in pregnancy is associated with recovery in the fetal growth pattern. It is worth bearing in mind that this advice may not have any benefits in terms of neurodevelopment of a child who has been exposed to

heavy alcohol consumption, but it will certainly benefit the child in terms of growth and stature.

Regular heavy alcohol consumption in pregnancy is associated with the fetal alcohol syndrome (FAS) which has four diagnostic criteria:

1. Confirmed maternal alcohol exposure
2. Evidence of a characteristic pattern of facial anomalies.
3. Evidence of growth retardation
4. Evidence of central nervous system neurodevelopmental abnormalities

The US Institute of Medicine has suggested that lesser degrees of this syndrome could be incorporated into a diagnostic classification. The fetal alcohol spectrum disorders (FASD) includes alcohol-related birth defects (ARBD), where typical structural defects are seen without the pattern of neurodevelopmental disorder, and the opposite situation of alcohol related neurodevelopmental disorder (ARND) where there is neurodevelopmental impairment with no obvious structural defects.

FAS occurs in 0.6 per thousand live births and FASD is seen in an additional 9 per thousand live births. These figures come from North America and it has been suggested that North American prevalence rates may be up to 20 times higher than those seen in Europe and that in the US and Canada, African-American and Native American background and low socio-economic status in themselves predict a 10 fold increase in FAS (Abel, 1995).

It is also the case that many genetic and malformation syndromes have some of the clinical characteristics of FAS. Children with other genetic and dysmorphic syndromes are born as frequently to women who abuse alcohol as they are to women in the general population. A diagnosis of FASD should not automatically be assigned to a child with disabilities just because his or her mother drank alcohol during their pregnancy.

DO LOW LEVELS OF ALCOHOL CONSUMPTION HARM THE FETUS?

Evidence-based guidelines, including the NICE guideline, suggest that there is no evidence of harm to the fetus from alcohol consumption at levels of < 1 unit per day. There is a suggestion, however, that some individual maternal fetal pairs may be at increased risk for genetic reasons. In addition, the presence of alcohol-related neurodevelopmental defects may be related to the timing of exposure, with concern particularly about binge drinking in the first trimester, individual susceptibility, and interaction with other harmful behaviours. However, it is not clear whether any harmful effect of low levels of alcohol consumption operate through a threshold or a dose response model.

There are some publications based on follow-ups of children whose mothers drank, compared to those of mothers who did not. The articles suggest that even low levels of alcohol consumption may be associated with aggressive behaviour patterns in the offspring (Sood et al, 2001). Reductions in body weight were also reported in children measured at 14 years of age (Day et al, 2002).

In the latter studies, height and head circumference were both negatively associated with first trimester but not second and third trimester maternal alcohol exposure. Child development studies performed at 18 months and 42 months in Denmark, in contrast, concluded that a maternal alcohol intake of up to one drink (12 g of alcohol) per day was unlikely to have an impact on child development (Olsen, 1994). HM

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KEY POINTS

- There is no evidence of benefit to the fetus from alcohol consumption during pregnancy and an increasing body of evidence suggesting harm.
- Binge drinking in early pregnancy or before pregnancy may be particularly harmful, and specific advice to young women (and men) should make this clear.
- There is no evidence of harm from low levels of alcohol consumption (less than 1 unit per day), but pending further scientific evidence of quality, the optimal advice is to avoid alcohol altogether while planning for a pregnancy and during the pregnancy.
- In the antenatal clinic efforts should be made to improve objective history taking about alcohol and other substance abuse to attempt to identify the high risk group of women with problem drinking and/or associated behaviours, e.g. drug use.
- Counselling and detoxification programmes should be made easily available to such women as well as existing quit smoking services.
- It is quite likely that many cases of fetal alcohol spectrum disorder (FASD) are being missed and training in the recognition of this spectrum and the availability of tertiary referral for confirmation of the diagnosis should be made more widespread in the UK through community and hospital based paediatric clinics.