Drinking alcohol during pregnancy may damage semen quality in sons

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Mothers who drink alcohol while they are pregnant may be damaging the fertility of their future sons, according to new research to be presented at the 26th annual meeting of the European Society of Human Reproduction and Embryology in Rome today.

Doctors in Denmark found that if mothers had drunk 4.5 or more drinks a week while pregnant, then the sperm concentration of their sons, measured about 20 years later, was a third lower in comparison to men who were not exposed to alcohol while in the womb. A drink was measured as 12 grams of alcohol, which is the equivalent to one 330 ml beer, one small (120 ml) glass of wine or one glass of spirits (40 ml).

Dr Cecilia Ramlau-Hansen, senior researcher at the Department of Occupational Medicine, Aarhus University Hospital (Denmark) and clinical associate professor at the Department of Epidemiology, Institute of Public Health, University of Aarhus, told a news briefing: "Our study shows that there is an association between drinking a moderate amount of alcohol (about four to five drinks a week) during pregnancy and lower sperm concentrations in sons. However, because this is an observational study we cannot say for certain that the alcohol causes the lower sperm concentrations. It is possible that drinking alcohol during pregnancy has a harmful effect on the foetal semen-producing tissue in the testes - and thereby on semen quality in later life - but our study is the first of its kind, and more research within this area is needed before any causal link can be established or safe drinking limits proposed."

Dr Ramlau-Hansen and her colleagues studied 347 sons of 11,980 women with singleton pregnancies who were recruited to the Danish "Healthy habits for two" study between 1984-1987. Around the 36th week of pregnancy the mothers answered a questionnaire on lifestyles and health. The sons were followed up between 2005-2006, when they were aged between 18-21, and semen and blood samples were collected and analysed.

The researchers divided the sons into four groups, ranging from those who were least exposed to alcohol (their mothers had drunk less than one drink a week) - and this was the reference group against which the other groups were measured - to those whose mothers drank 1-1.5 drinks a week, 2-4 drinks a week, or 4.5 or more drinks per week.

They found that sons of mothers drinking 4.5 or more alcoholic drinks a week had average sperm concentrations of 25 million per millilitre, while the sons who were least exposed to alcohol had sperm concentrations of 40 million/ml. After adjusting for various confounding factors, they found the sons in the group most exposed to alcohol had an average sperm concentration that was approximately 32% lower than that in the least exposed group.

The World Health Organization defines a "normal" level of sperm concentration as being approximately 20 million/ml or more. Dr Ramlau-Hansen said: "The reduced sperm concentrations in the most exposed men are rather close to the lower end of the WHO's normal range for fertility. The probability of conception increases with increased sperm concentration up to 40 million/ml and so it is possible that the most exposed men could be less fertile than the least exposed."

She found that semen volume and total sperm count (which also affect a man's fertility) were associated with prenatal alcohol exposure; these were highest in sons whose mothers drank 1-1.5 drinks a week. The

researchers could find no association between alcohol exposure and the movement and shape of the sperm or with any reproductive hormones such as testosterone.

Dr Ramlau-Hansen said: "Our finding that sons prenatally exposed to 1-1.5 drinks per week had higher semen volume and total sperm count compared to the least exposed group is not surprising and is quite a common finding when studying alcohol. It could indicate that small amounts of alcohol have a beneficial effect (for example, on the semen-producing tissue in the foetal testes), but, in fact, we believe this result may be biased by the characteristics of the women drinking small amounts of alcohol during pregnancy or by inaccurate reporting of alcohol consumption. Therefore, it is not possible to draw a firm conclusion from this result."

The researchers also investigated whether fathers' alcohol consumption had any effect. "We investigated the association between fathers' total alcohol intake and semen quality in the sons and found that paternal alcohol was not associated with semen volume or sperm concentration. This finding suggests that the observed associations between maternal alcohol consumption and sons' semen quality are not confounded by lifestyle factors that are shared by a couple, such as smoking," said Dr Ramlau-Hansen.

She concluded: "If further research shows that maternal alcohol consumption is a cause of reduced semen concentration in male offspring, then we are a bit closer to an explanation of why semen quality may have decreased during the last decades and why it differs between populations. If exposure to alcohol in foetal life causes poor semen quality in adult life, we would expect that populations with many pregnant women drinking, possibly heavily, in pregnancy would have lower fertility in comparison with populations of where pregnant women do not drink."

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