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How much alcohol is safe?

A firestorm once again has erupted at the intersection of science and public health. An article[1] published in the *Journal of Epidemiology and Community Health* last week updates the findings in a longitudinal study of child health in a population that is representative of children born in Great Britain between September 2000 and January 2002. The issue at hand is whether there is a safe amount of alcohol that can be consumed during pregnancy. Although the authors presented their findings in an even-handed manner, the translation of the study findings in the national and international media has been anything but responsible. Headlines in newspapers and newscasts scream the message that light drinking of alcohol during pregnancy is not only perfectly safe, but actually results in higher developmental scores in children at five years of age. Such conclusions are not supported by the research and are reckless and misleading.

In this large study of over 11,000 children, mothers were asked to recall their pattern of alcohol use during pregnancy nine months after having delivered. Based on their reported alcohol consumption, mothers were divided into five groups: teetotalers (women who never drank alcohol); non-drinkers in pregnancy (women who didn't drink during pregnancy but did before and after); light (one to two drinks a week or per occasion); moderate drinkers in pregnancy (three to six drinks a week or three to five drinks per occasion); and binge/heavy drinking in pregnancy (seven or more drinks a week or six drinks on any single occasion). Unfortunately, multiple studies have shown that such recall is fraught with error when it comes to estimating the amount and frequency of alcohol use. In fact, the authors of the study recognized and stated that the study "was prone to recall bias."

The more telling problem, however, is the significant demographic differences between the "light drinking" mothers and the other cohorts. Women who admitted to drinking 1 to 2 drinks per week and were categorized as light drinkers in pregnancy were significantly wealthier, better educated, and more likely to hold a professional or managerial position than any of the other women in the study, including those who did not drink during pregnancy. So although initial results suggested that children of light drinkers had fewer behavioral difficulties and higher cognitive scores, the authors were quick to stress that most of these differences were explained by the socioeconomic advantage of the "light drinking" group of mothers. In addition, women who reported light drinking during pregnancy were less likely than any of the other groups to smoke, suggesting the possibility that lack of prenatal or postnatal exposure to tobacco smoke might be a source for the differences seen between the children.

Another limitation of the study is that the authors examined only the more global aspects of child development: behavioral and emotional functioning and cognitive ability. Extensive research into the impact of alcohol on long-term child development has demonstrated that children prenatally exposed to alcohol may score within the normal range for overall behavioral and cognitive skills, yet still suffer significant disabilities in domains that are key to academic, social, and employment success, such as executive functioning and daily living skills. In addition, as the authors of the article pointed out,

prenatal exposure to alcohol may have "sleeper" effects resulting in the emergence of developmental issues as children enter the school years; because this study only evaluated children until age five, these potential developmental problems could not be captured.

This is of special significance because the instruments the authors used to evaluate the children, the Strengths and Difficulties Questionnaire (SDQ) and the British Ability Scale (BAS) are designed as screening instruments and are not used for full assessment of a child's developmental status. The SDQ is a 25-item parent measure assessing five domains, meaning only five questions are asked per domain—a very brief glimpse into these problem areas. In addition, the questionnaire is normalized, broadly, for children ages 4-16; the 5-year-olds assessed in this study have not yet begun school and therefore have not been developmentally challenged in problem areas that typically begin to develop within a school environment, such as peer problems, hyperactivity, and conduct problems.

As for the BAS, there are 14 total subtests available for 5-year-olds. The authors chose to administer only three subtests but determined these sufficient for assessment of cognitive ability. These specific three subtests together have no validity for assessing overall cognitive functioning. The Naming Vocabulary subtest, for example, assesses "verbal reasoning" and "expressive language" skills, but being able to name a picture item is vastly different from being able to produce sentences of developmentally appropriate length and complexity, or from demonstrating fluid intelligence necessary for true verbal reasoning. In short, this study failed to examine the multitude of abilities that contribute to what is traditionally thought of as intelligence. Moreover, the specific cognitive skills that were assessed in this study are often less affected by prenatal exposure to alcohol than other cognitive skill sets, such as verbal abstract reasoning, working memory, or visual processing speed.

While some reporters in the public media have presented thoughtful evaluations of the implications of the article in question, others have taken the information out of context and presented conclusions that the authors did not intend and that are not supported by the facts. The researchers never claimed that alcohol is beneficial for a growing fetus, yet Emily Sohn, a journalist for *Discovery News*, reported that drinking while pregnant "could actually give your kids a slight developmental advantage." No, that's not what the article says. In fact, the authors place a question mark at the end of their article's title (*Light drinking during pregnancy: still no increased risk for socioemotional difficulties or cognitive deficits at 5 years of age?*), indicating their inability to draw any firm and lasting conclusions about the effects of light drinking during pregnancy; instead, they state that "causal inference based on observational data is limited, and further work to tease out aetiological relationships is needed." It appears that some commentators have foregone the question mark.

Which brings us to the public health response to the question, "How much alcohol can a woman safely drink during pregnancy?" The answer is, "We don't know." Multiple factors play into a child's risk for developmental and behavioral difficulties, including genetics, the family environment in which the child is raised, and the intrauterine

environment in which the fetus develops. Importantly, we must realize that the U.S. population, with a wide range of races and ethnicities, is far more diverse than the all-white population that was included in this study. The pregnant woman's ability to metabolize alcohol varies greatly across race and ethnicity, so applying data developed on an all-white British population to the U.S. population with a broad mix of metabolic capabilities, is hazardous.

Prenatal exposure to alcohol is known to impact the development of the fetal brain, and nothing in the recently published study from Great Britain concludes otherwise. While some reporters have been thoughtful and measured in evaluating the results of the study, others, perhaps in a rush to publicize and grab headlines, have acted irresponsibly, presenting conclusions that are not supported or even suggested in the study. From a public health perspective, we have a responsibility to speak cautiously and make responsible recommendations to safeguard health and well -being. Until we know more, we must advise people, in the best interest of unborn children, that no amount of alcohol is safe to drink during pregnancy.

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[1]Kelly YJ, Sacker A, Gray R, et al. Light drinking during pregnancy: still no increased risk for socioemotional difficulties or cognitive deficits at 5 years of age? *Journal of Epidemiology and Community Health* (2010). doi:10.1136/jech.2009.103002.