Michael Frowen Memorial Essay Prize Competition 2011

“Is Drinking Alcohol During Pregnancy a Form of Child Abuse?”
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1. Introduction

As a direct consequence of a pregnant woman drinking a certain quantity of alcohol, the developing child will acquire birth defects in utero. This may be viewed as child abuse: damage to a child caused by a mother’s neglect. Alcohol is a common drug abused by women of childbearing age. Infants born to alcoholic mothers may demonstrate prenatal and postnatal growth deficiency, congenital abnormalities, mental retardation and behavioural disorders, all known as Fetal Alcohol Syndrome (FAS). This is one of the leading known preventable causes of mental retardation and birth defects.

This essay will explore the mechanism by which alcohol impacts child development and whether this can be truly quantified. Once the theories purported by scientific research have been discussed, the ethical core of the question will be considered. Much of the debate on this issue lies in the argument about at which point during pregnancy the fetus can be considered a ‘child’ susceptible to abuse. There is also the question of whether protection of this ‘child’ can be carried out while respecting a woman’s autonomy. Finally, this essay will consider ways in which prevention of alcohol-induced defects can be achieved.

2. Effects of Alcohol on Embryonic and Fetal Development

Alcohol is a teratogen capable of interfering with fetal development and causing birth defects. To diagnose a child with FAS, the child must have all three findings: characteristic facial abnormalities, growth deficits and central nervous system abnormalities. The hallmark of FAS is the array of craniofacial abnormalities; including a long flat philtrum, low nasal bridge, short palpebral fissures, thin upper lip, ear malformations, flattened maxilla, short upturned nose, and epicanthal folds. The clinical presentation of FAS related nervous system abnormalities include developmental delay, microcephaly, seizures, hyperactivity, cognitive deficits, learning and memory impairments, poor psychosocial functioning and motor coordination deficits. A broad range of these symptoms are observed at varying degrees of severity and in various combinations. Alcohol entering the mother’s bloodstream does not bind to any tissue or plasma proteins. Hence, it is able to freely cross the placenta, enter the growing fetus through the umbilical cord and cross the blood brain barrier. At various points during development once a specific threshold of alcohol consumption has been crossed, damaging long term effects are inevitable.

2.1 Mechanism of Alcohol Effect

Alcohol is able to induce craniofacial abnormalities by interfering with neural crest maintenance and migration. The exact mechanisms by which this occurs are unknown, but ethanol has been shown to induce cell damage by increasing reactive oxygen intermediates. Other evidence, using both in vitro and in vivo rodent models highlights the significant, yet variable, effects of alcohol on neurogenesis. A reduction in stem cell number, increase in neuronal proliferation, delayed neuronal differentiation and decreased genomic stability have been observed. These changes were demonstrated to be in part due to the effect of ethanol on cytokine release, which propel angiogenesis and neural growth. Key signalling
pathways are altered by exposure to alcohol, including the Wnt-catenin signalling pathway\textsuperscript{16}, which is an important regulator of stem cell self-renewal in the developing brain\textsuperscript{17}. Neurotransmitter pathways are also affected, such as the serotonergic 5-hydroxytryptamine (HT) pathway. This is significant as serotonin is a trophic factor for brain development, the levels of which are greatly reduced in an ethanol-exposed fetus\textsuperscript{18-19} possibly contributing to the abnormal development of the central nervous system in FAS\textsuperscript{20}.

2.2 Impact of Alcohol on Early Pregnancy

It is during embryonic development in the first trimester of pregnancy that the developing child is most at risk of damage by teratogens, as organogenesis is taking place. The embryo is most susceptible to teratogenic agents during periods of rapid differentiation, which varies with each organ (Fig.1). For instance, the critical period for brain growth and development is from three to 16 weeks. The brain is unusual in that its differentiation continues to extend into infancy with increasing vascularisation\textsuperscript{21}. Therefore, throughout gestation the brain may receive increasing quantities of alcohol, which compromises the developing central nervous system – making it more susceptible to the teratogenic effects of alcohol\textsuperscript{22}. Teratogens can produce mental retardation during both embryonic and fetal periods. Alcohol exposure will have the greatest impact during the embryonic stage in the first few months of pregnancy, a point at which many women may not be aware they are pregnant. Hence such women may continue drinking heavily, thereby putting their developing child at risk of FAS and other congenital malformations.

\begin{figure}
\centering
\includegraphics[width=\textwidth]{time_line.png}
\caption{Time-line of in utero development indicating periods where specific organs and systems are particularly susceptible to teratogenic damage.}
\end{figure}
2.3 How Much Alcohol is Too Much?

The quantity and pattern of alcohol consumption during pregnancy has a role to play in the incidence of FAS. Damage to the development of the child in utero is more likely to occur following continuous heavy intake of alcohol during pregnancy\textsuperscript{23-25}. A recent study explored a range of pregnancies, based on a large sample from the millennium cohort study\textsuperscript{26}. It was shown that children whose mothers had been ‘binge or heavy drinkers’ (seven or more units a week or six at one sitting) were more likely to be hyperactive and have behavioural and emotional problems than those whose mothers abstained during pregnancy. However, there was no evidence to suggest that the children of ‘light drinkers’ (one to two units per week) had been in any way harmed\textsuperscript{26}. This study clearly demonstrates that alcohol during pregnancy does not definitively lead to birth defects and thus cannot necessarily be deemed child abuse. The findings support a woman’s right to choose ‘light’ alcohol consumption during pregnancy.

The risk of alcohol-related birth defects increases as a direct consequence of various factors (fig. 2); including increased maternal age, parity, history of alcohol abuse, poverty, smoking, drug use, nutritional deficiencies and poor prenatal care\textsuperscript{27}. Genetic influences have also been shown to alter the susceptibility to alcohol teratogenesis. For example, women with a more efficient alcohol dehydrogenase enzyme and cytochrome P450 2E1 have a decreased risk for giving birth to a child with FAS\textsuperscript{28-29}. Therefore, the limit at which alcohol cause fetal malformations is difficult to set due to the individual nature of one’s susceptibility to alcohol-induced birth defects.

![Figure 2. Summary of the interactions of maternal risk factors and mechanisms related to FAS and alcohol-related birth defects.](image)

- **Circles = Sociobehavioral factors**: alcohol intake pattern, low socioeconomic status, culture and smoking.
- **Squares = Biological factors**: blood alcohol levels, tobacco components, undernutrition, free radicals, hypoxia and cell damage.
- **Solid lines**: biological relationships and physiological pathways.
- **Dotted lines**: interactions among environmental and behavioural factors.

GI = Gastrointestinal [Abel and Hannigan,1995].
3. Potential Benefits of Alcohol Consumption during Pregnancy

It may be argued that a small quantity of alcohol consumed by the mother may in fact be beneficial to the developing baby. If alcohol has the potential to reduce stress in mothers, it may protect the baby from the harmful risk factors associated with stressed mothers. The physical symptoms associated with stress include an increased heart rate, blood pressure and muscle tension. During pregnancy stress may increase the risk of preterm labours, low birth-weights and complications such as preeclampsia\textsuperscript{30-31}. The results of research investigating the effect of stress during pregnancy do not appear to be conclusive. The timing of prenatal maternal exposure to stressful life events has a role to play in the severity of adverse pregnancy outcomes\textsuperscript{32}. Stress is a highly subjective experience; there are differences in what an individual would consider stressful and the physiological response is variable.

The question then arises over the effectiveness of alcohol in relieving a pregnant woman’s stress, both psychologically and, somewhat more importantly to the baby’s development, physiologically. Research findings have been contradictory; perhaps the most common conclusion is that alcohol’s effects on stress are complex\textsuperscript{33}. It is clear that there are individual differences in the effects of alcohol on stress responses. Characteristics influencing this include a family history of alcoholism, personality traits, level of cognitive functioning, and gender. Some argue that the adverse associations between stress and health are actually a consequence of external reactions to stress rather than a direct result of stress itself. For instance, common reactions to stress include smoking, drinking (alcohol and coffee), skipping meals or eating junk food, not taking enough physical exercise or getting enough sleep. In many of the studies, these lifestyle responses to stress are not appropriately controlled for. Therefore, the debate lies in whether the adverse risks of stress, which can be dampened by alcohol, outweigh the unquantified variable risk of ‘moderate’ alcohol to the developing child. It is clear that there are no definitive answers to this, and the nature of the questions asked involve so many variables it has thus far proven difficult to address adequately.

4. Child Abuse

Child abuse is any form of physical, emotional or sexual mistreatment or neglect that leads to injury or harm. Drinking alcohol to the point of hindering development during pregnancy would fit into the category of neglect. Neglect is the persistent failure to meet a child’s basic physical and/or psychological needs, likely to result in the serious impairment of the child’s health or development. Birth defects caused by alcohol-exposure may also be considered physical abuse due to poisoning causing disfigurement and disability. However, this does not translate to all instances of alcohol consumption during pregnancy, as discussed earlier birth defects arise dependent on quantity of alcohol, timing and the individual physiology and genetics of the mother.
4.1 Philosophical Views on the Nature and Status of the Embryo

As discussed, much of the damage done by alcohol is when it acts as a teratogen during embryogenesis. Therefore, the controversial status of the embryo and whether it is to be considered a child susceptible to abuse and in need of protection must be considered when answering this question. There are a range of moral positions on the status of the embryo defined. The two most opposite positions are clear, simple and unambiguous. In the first case, a fertilised egg is regarded as a human being. Consequently, in principle an embryo has an inviolable value and a right to life. This position would consider that in principle termination of pregnancy would be unacceptable. Therefore, from this viewpoint it is clear that drinking during pregnancy at any point is a form of child abuse and thus any sexually active woman of child bearing age, potentially pregnant, must not drink due to the risk of embryo neglect.

The polar opposite moral standpoint is that the embryo is considered to have very little or no intrinsic moral value. Hence, it is not considered to need any particular protection, nor is it regarded as having a right to life. Many people hold a gradualist position somewhere between the described polar views of embryo status. With regard to the right to life or right to develop, a range of opinions may be held. These different positions are supported by various arguments based on, amongst other things, biology, potential, and personhood. Dependent on one’s opinion on the status of an embryo, the view of alcohol consumption during pregnancy will vary, as will the conviction of the need to protect the embryo from the risks of alcohol, thus removing a woman’s right to drink alcohol in certain circumstances.

4.2 Legal Rights of an Unborn Child versus a Mother’s Right to Choose

A principle laid down in the United Nations 1959 Declaration of the Rights of the Child that the child "needs special safeguards and care, including appropriate legal protection, before as well as after birth." In accordance with this the Unborn Victims of Violence Act of 2004 is a United States law which recognizes a "child in utero" as a legal victim. The law defines "child in utero" as "a member of the species Homo sapiens, at any stage of development, who is carried in the womb". If the embryo/fetus were to be considered a 'child' then excess alcohol exposure would most certainly be considered a form of child abuse as reflected in the laws surrounding alcohol consumption by children. The legal age for purchasing alcohol being 18 in Great Britain, the same age one is no longer even considered a child legally. The Unborn Victims of Violence Act was strongly opposed by most pro-choice organizations, on grounds that the U.S. Supreme Court's Roe v. Wade decision said that the human fetus is not a "person" under the Fourteenth Amendment to the Constitution, and does not have a constitutional right to life. Thus the moral dilemma concerning embryo and fetal status has been played out in the court of law. A law to protect the developing child from alcohol during pregnancy would cause a similar conflict.
In Great Britain, the Abortion Act of 1967 made abortions legal up to 28 weeks. Therefore, if it is possible to abort a pregnancy up until a certain point based purely on a woman’s right to choose, then up until this point it is difficult to consider in the eyes of the Law that drinking alcohol is a form of child abuse. Undoubtedly after this set point the birth defects resulting from alcohol is abuse. Yet by this time in the vast majority of FAS cases the damage will have been done. In order to protect a child from FAS, action has to be taken from the offset, yet this would be very difficult to justify legally enforcing, considering for much of pregnancy a woman very much holds the rights to treat her own body as she wishes. All women of reproductive age who are sexually active, not using effective birth control, and who consume alcohol are at risk of having a child with FAS. If taken to the extreme, all women of child bearing-age would be scrutinised for drinking alcohol.

5. Current Government Advice to Women

The Department of Health advises “Pregnant women and women trying to conceive should avoid alcohol altogether, never more than 1–2 units once or twice a week.” In March 2008 National Institute for Health and Clinical Excellence (NICE) published guidance advising women not to drink at all during the first three months of pregnancy, adding that a small amount of alcohol one or two days a week after the first trimester was safe. It appears there is almost conflicting advice from the government wanting women to abstain from drinking in order to reduce risks to the developing child as much as possible, yet only having strong evidence that heavy drinking is damaging—they settle for an upper limit of alcohol consumption for the pregnant woman. A 2007 report found that almost one in 10 pregnant women were regularly exceeding the recommended amounts. The government is uncertain about the precise impact of small amounts of alcohol on unborn babies and has concerns for women pushing the boundaries of ‘light’ drinking. Therefore, they are encouraging the undoubtedly safe choice of complete abstinence from alcohol during pregnancy.

6. Protecting Pregnancies from Alcohol Abuse

Prevention is the key way of solving the adverse effects of alcohol in pregnancy. The current government advice discussed above is a type of primary prevention, aiming to avert the health problem across the population before FAS occurs. Methods to improve the public’s knowledge include employing the media, public service announcements, advertising and a warning label on the alcoholic beverage itself. These methods have been shown to increase awareness of the dangers of alcohol consumption during pregnancy to an extent, which may lead to a decrease in FAS incidence. Secondary prevention involves identifying persons at risk, so strategies involve screening and early intervention programs for pregnant women and women of child-bearing age who may be at risk of having a child with FAS. Some screening methods currently in use are CAGE, T-ACE and TWEAK questionnaires designed to identify at-risk drinkers. Tertiary prevention narrows the target group further to those with a recurrence of the condition and attempts to lessen the cognitive, behavioural and social impact of alcohol exposure during child development. Early detection of FAS, although difficult, is necessary since proper care early in a child’s life can reduce the severity of
impairments. Programs need to appropriately diagnose children suffering birth defects as a consequence of alcohol and help these children and their families.

A number of treatment programs targeting at-risk women have shown positive results, one such example is the ‘Seattle Birth to 3 Advocacy Project’38-39. This program was designed for women, who were heavy substance abusers, had no prenatal care and were not connected to service providers during their pregnancy. Specially trained paraprofessionals worked closely with the women, showing them how to set goals, connect with services and acquire new skills. After two years, the majority had remained abstinent from alcohol and importantly were using long-term birth control methods, thereby reducing the risk of alcohol-exposed pregnancies. These results and other similar projects e.g. ‘Trial for Early Alcohol Treatment’ and ‘Protecting the Next Pregnancy’, demonstrate the effectiveness of measures targeting high-risk women for the prevention of FAS. Much responsibility lies with health professionals, including medical practitioners, alcohol teams and probation services, to appropriately inform women at risk, and to initiate referrals and early interventions to protect the potential child from a FAS outcome.

7. Conclusion

In conclusion, it is clear that knowingly drinking excess alcohol during pregnancy causing birth defects is a form of child abuse. The problem lies in defining the safe limits of alcohol for those women who want to continue drinking during pregnancy. It is difficult to determine the advantages of light drinking during pregnancy but ultimately it would be a woman’s right to choose if no direct harm to the child can be demonstrated. A key problem lies in the fact that many women are initially unaware of their pregnancy and thus they continue drinking to a harmful degree unintentionally; unfortunately in some cases by the time the developing child is recognised the damage is done. Defining alcohol during pregnancy as child abuse is dependent on one’s definition of a child. The future challenge is to reduce the incidence of harmful alcohol consumption during pregnancy. By increasing public knowledge of the facts and isolating at-risk cases efficiently, some children may be saved from alcohol-induced birth defects.

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References


