



Alcohol, substance use and pregnancy

Health behaviours joint strategic needs assessment literature review

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September 2014

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Contents

Introduction.....	2
Alcohol and pregnancy	2
Alcohol consumption and lactation	3
Substance use during pregnancy	4
Substance use and breastfeeding	8
Conclusion.....	10
References	11

Introduction

This short report on alcohol, substance use and pregnancy completes a suite of literature review documents around the seven health behaviours incorporated in the joint strategic needs assessment (JSNA).

It complements the secondary data analysis report which can be found on the [JSNA publications](#) page with final health behaviours report.

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Alcohol and pregnancy

Alcohol is associated with pleasure, unwinding and being sociable. However, whilst alcohol is considered an acceptable part of British culture, excessive drinking and binge drinking can be problematic and negate the effects of other positive health behaviours. Over-consumption of alcohol can lead to irreversible liver damage including cirrhosis and alcoholic hepatitis. It can also substantially increase the risk of mouth and throat cancers, as well as high blood pressure and heart problems. Alcohol misuse increases the risk of poor health and places a huge burden on the National Health Service.

There are differing levels of drinking and people can be categorised into abstainers, lower risk (sensible), increasing risk (hazardous) and higher risk (harmful) drinkers. The current health guidelines state the recommended amount of alcohol for females is 2-3 units (equivalent to a pint of beer) a day. However, there has been a significant increase in the number of women (of childbearing age) who consume alcohol heavily and regularly.¹

The Health Survey for England (2012) records that 80% of women stated they had drunk alcohol in the previous 12 months and drinking above the recommended levels was highest among women aged between 16 and 34 years. The highest average consumption on one day of drinking was 7.1 units for women aged between 16 and 24 years. The percentage of women drinking on five or more days was highest in the older age groups (45+ years) and lowest amongst women aged between 16 and 44 years. Approximately 18% of females aged over 16 drank more than 14 units a week (increased risk) whilst 4% drank more than 35 units (high risk). For those aged 25–34 years, 16% drank more than 14 units compared to 19% of those aged 35–44 years. Alcohol consumption by the index of multiple deprivation shows approximately 21% of women (over 16 years) from the least deprived quintile drank more than 14 units of alcohol per week. The highest rate was found in the second least deprived quintile (22% drinking 14+ units) whilst only 13% of women from the most deprived quintile drank more than 14 units.²

The guidance is clear: drinking alcohol is considered to be risky during any time of pregnancy, with the risks increasing the more the woman drinks (including higher-frequency and higher-quantity drinking). There is evidence to show that 63% of pregnant women drink at some point during their pregnancy, with 17% reporting binge-drinking behaviours. There is a strong social gradient, with older mothers and those of a higher socioeconomic group having a greater tendency to drink during pregnancy, particularly wine, whilst drinking beer is associated with smoking and a lower educational attainment of the mother.³

With regards to pregnancy there tends to be an underestimation of alcohol consumption, due to the limitations of self-reporting, poor estimation, poor recollection and stigma around drinking in pregnancy. Unplanned pregnancies are associated with regular consumption of alcohol and binge drinking and many women may be unaware of their pregnancy and continue drinking. Whilst the foetus is at most risk of damage during the first trimester, alcohol consumption throughout pregnancy continues to be dangerous.⁴

A main risk of alcohol consumption during pregnancy is foetal alcohol syndrome (FAS), which is part of a continuum of birth defects (foetal alcohol spectrum disorder) related to alcohol use during pregnancy. Foetal alcohol spectrum disorder encompasses a wide range of conditions, and can include growth and developmental problems, hyperactivity/attention deficit, poor social understanding and inappropriate social behaviour, language problems, kidney and heart defects, and weak muscle tone. Whilst the condition cannot be cured, it can be managed, and the impact reduced. The incidence of children born with FASD in the UK is not known, however American studies estimate that FAS occurs in 0.5-2 live births per 1,000.⁵ Other alcohol-related pregnancy issues include low birth weight, miscarriage, stillbirth, premature birth and other intellectual disabilities.⁶ There is also evidence to suggest excess prenatal alcohol can impact on a child's academic attainment.

Current government recommendations suggest pregnant women and those wanting to become pregnant avoid alcohol completely, therefore eliminating the risk of a foetus being affected by alcohol and the negative impacts of any alcohol-related conditions.

Alcohol consumption and lactation

Whilst many women abstain from drinking alcohol whilst pregnant, the issues surrounding breastfeeding and alcohol use are less straightforward. An increasing body of literature is showing that some common positive beliefs around breastfeeding and alcohol are not supported by evidence. For example, it was suggested that alcohol induced lactation in breastfeeding mothers. However, evidence now suggests that alcohol inhibits prolactin and oxytocin (which encourage milk production and the 'let down' of milk into the breast). This reduces milk yield,

making it harder for the baby to get milk. This in turn leads to the infant suckling harder and feeding more often in the 8-12 hours after alcohol ingestion by the mother, reinforcing the perception that the baby is feeding better and getting more milk. Alcohol can also have a detrimental effect on infant's sleep, evidence has shown whilst babies may drop off sooner, the amount of active (REM) sleeps are reduced, while other studies have shown the sleeps were 25% shorter.⁷

The role of alcohol on an infant's psychomotor development is less clear. Although there are reported differences between those children whose mothers continue to drink alcohol whilst breastfeeding, this difference could be attributed to other variables such as the age of the mother, smoking behaviour or the crude measure of psychomotor development used.⁸ Excessive drinking by a breastfeeding mother may result in slow weight gain or failure to thrive for the infant, however this could be linked to other issues surrounding alcohol consumption such as neglect, or reduced care and stimulation of the infant and cannot exclusively be attributed to alcohol ingested by the infant while breastfeeding.⁹

The World Health Organization's (WHO) position is continuing to breastfeed outweighs the occasional drink of alcohol but it advises that lactating women should restrict or abstain from drinking alcohol.¹⁰ In both respects it is essential to provide clear, accurate and consistent information to pregnant and breastfeeding women about the risks of alcohol to allow women to make informed decisions.

Substance use during pregnancy

The use of tobacco, illicit and legal substances during pregnancy can increase the risks of health and social problems for both the mother and the infant. For example, newborns of substance-using mothers are highly likely to have neonatal abstinence syndrome (NAS) and require support for withdrawal.^{11,12} The table below shows the complications of various substances on pregnancy.

Table 1: Substance and complications in pregnancy

Substance	Complications in pregnancy
Amphetamines	Association with low birth weight, prematurity and increased foetal morbidity. Effects confounded by the impact of other situational, health and lifestyle factors, and poly-substance use.
Anabolic agents (including steroids)	May disrupt menstruation or result in amenorrhea (cessation of menstruation). Use can cause malformation of the foetus (teratogenesis).
Cannabis/marijuana	Can inhibit reproductive functions by disrupting ovulation. May be harmful to foetal development and result in lower birth weight. Mixed evidence around mild developmental problems in children; this could be confounded by the other situational, health and lifestyle factors and poly-substance use in this population.

Substance	Complications in pregnancy
Cocaine	Premature rupture of the membranes and placental abruption associated with use during pregnancy. Evidence that children may have issues with behaviour, attention, language and cognition; this could be confounded by situational, health and lifestyle factors and poly-substance use in this population.
Opioids - including illicit (heroin) and prescription (methadone, tramadol)	Intrauterine growth of the foetus may be inhibited and new borns may have low birth weight, be premature and experience respiratory depression and withdrawal symptoms. Increased risk of perinatal mortality. Evidence is confounded by other situational, health and lifestyle factors, such as use of other drugs, mother's nutritional status, lifestyle, infections and exposure to trauma. Neurological developmental issues may be due to a deprived social environment.
Khat (plant-based stimulant)	Limited evidence that khat chewing may have an impact on foetal growth and development and low birth weight. There is no published evidence that it causes teratogenic effects.
Prescription drugs	Limited evidence that benzodiazepine (minor tranquillizer) in early pregnancy is associated with an increased risk of malformation and oral cleft.
Tobacco	Decreased fertility. Increased risk of miscarriage, perinatal mortality and low birth weight.

Source: A summary of the health harms of drugs¹³

The effect levels of various substances in the short and long term (based on current knowledge and evidence) have been summarised in the tables below. These summary statements are generalisations due to the methodological differences between studies and limited data.

Table 2: Short-term effects and birth outcomes of various substances

Short-term effects/ birth outcome	Nicotine	Alcohol	Marijuana	Opiates	Cocaine	Methamphetamine
Foetal growth restriction	Effect	Strong effect	Effect	Effect	Effect	Effect
Birth anomalies (teratogenesis)	No consensus on effect	Strong effect	No effect	No effect	No effect	No effect
Withdrawal	No effect	No effect	No effect	Strong effect	No effect	*
Neuro-behaviour	Effect	Effect	Effect	Effect	Effect	Effect

Table 3: Long-term effects and birth outcomes of various substances

Long-term effects	Nicotine	Alcohol	Marijuana	Opiates	Cocaine	Methamphetamine
Growth restriction	No consensus on effect	Strong effect	No effect	No effect	No consensus on effect	*
Behaviour	Effect	Strong effect	Effect	Effect	Effect	*
Cognition	Effect	Strong effect	Effect	No consensus on effect	Effect	*
Language	Effect	Effect	No effect	*	Effect	*
Academic achievement	Effect	Strong effect	Effect	*	No consensus on effect	*

* Limited or no data available.

Source: Pre-natal substance abuse: short- and long-term effects on the exposed fetus¹⁴

Smoking and other substance use can make it harder for a woman to get pregnant, and smoking during pregnancy can cause major health problems for the baby. It is shown that smoking can negatively affect the placenta (the baby's source of food and oxygen), leading to an increased risk of bleeding, miscarriage or stillbirth. Smoking can also increase the chance of having a premature or low birth weight baby, a higher risk of certain birth defects such as a cleft palate or lip, and an increased risk of sudden infant death syndrome.¹⁵ Despite the known risks of smoking and tobacco use 19 women (out of 100 maternities) were smoking at the time of delivery in Lancashire (2012/13), significantly higher than the rate for England (13).¹⁶

There is evidence that smoking cessation will have a bigger impact on the birth weight and gestational age (at delivery) of an infant than eliminating illicit drug use. There is a perception that illicit drugs will cause greater foetal damage than smoking, and smoking is considered less serious than other drug use. However, the health, social and economic costs related to tobacco use are higher than those for illicit drug use and eliminating smoking would significantly reduce poor birth outcomes. Many pregnant women who successfully stop using illicit drugs will often continue to smoke so any benefits from the cessation of drugs may be negated.¹⁷

Between 2012 and 2013, 4.1% of women reported using cannabis/marijuana in England and Wales.¹⁸ It is the most commonly used illicit drug during pregnancy and its effects are further confounded by the use of tobacco (if smoked). It can easily pass into the foetal bloodstream and can restrict the flow of oxygen. Whilst there is mixed evidence of the effects on the foetus, it can lead to a shorter gestation and lower birth weight. The relationship between marijuana exposure and development in childhood shows some deficits in learning. Other negative effects for adolescents

show problem solving difficulties, impulsivity and attention deficit, however there does not appear to be a reduction in IQ levels. Prenatal exposure to marijuana has been noted as doubling the risk of both tobacco and marijuana use in 16 to 21 year olds, and increasing the risk of other substance abuse.¹⁹

Like cannabis and marijuana, cocaine and crack cocaine use during pregnancy restricts the flow of oxygen to the foetus. It can cause major complications during pregnancy, with premature amniotic sac rupture and separation of the placenta from the uterus prior to delivery a main risk. There are studies which suggest the infant may potentially be born premature, with decreased birth weight/length, whilst a reduced head circumference is likely.²⁰

Other evidence shows that prenatal exposure to cocaine can lead to higher rates of sensory and motor asymmetry and poor muscle tone. General cognitive delay has been identified, but it has not been clearly established whether these negative effects continue into later childhood. However, there is some evidence that prenatally exposed children are lacking in self-regulation and are likely to display more aggressive behaviours and engage in rule breaking, with disruptive behaviours also reported. Increased levels of oppositional defiant disorder, attention deficit hyperactivity disorder (ADHD) and behavioural problems have also been found when compared to non-prenatally exposed children.^{21,22.}

Opioid use (including heroin and methadone) during pregnancy carries serious risks including stillbirth, premature birth, decreased birth weight/length, reduced head circumference, and sudden infant death syndrome. Fluctuations in a pregnant woman's heroin use can also instigate foetal abstinence syndrome which carries a higher risk of the negative outcomes above. Prenatal opiate exposure can lead to issues with the infant's central and autonomic nervous systems. There is some evidence of reduced or delayed cognitive function but other studies have found no significant effects. There does appear to be a link between prenatal opioid exposure and behavioural problems, including ADHD and other disruptive behaviours. Whilst using methadone still carries risks, it is accepted that controlled treatment programmes yield more favourable results than continued heroin use. Supportive services, such as assistance with housing, employment or domestic violence for example, can also play a large role in supporting the opioid-addicted mother.²³

Overall, traditional prenatal care may not be adequately meeting the needs of women who are using one or more substances. Expanding and enhancing treatment services (particularly taking into account the educational background of a pregnant woman) may increase uptake. Barriers to accessing antenatal care services can be reported from both the service provider and the mothers-to-be.

The barriers to accessing services reported by women include:

- attitude of staff;
- lack of continuity of care;
- unreliable information;
- fear of arrest or prosecution;
- guilt about substance use; and
- concerns of child protection/custody.

Barriers reported by the service providers include:

- poor attitude of staff;
- providers being uncomfortable asking about substance misuse;
- lack of resources/facilities;
- lack of knowledge of the services available; and
- reaching the target population with appropriately presented information/knowledge.²⁴

Substance use often co-occurs with other determinants of poor health such as poverty, low income, poor nutrition, chaotic lifestyle, and domestic violence. In the UK the demographic profile of pregnant substance users show they are more likely to come from unstable and vulnerable social backgrounds with high unemployment; they are likely to be single, with lower educational levels and an existing smoking status.²⁵

All these factors can increase the risks in pregnancy and birth for the mother and foetus. A dependence on illicit or other substances may also lead to lower levels of parental functioning, potentially affecting the infant's development alongside the effect of the substance, therefore the situational, health and lifestyle factors in this population should be taken into account during ante and postnatal care.

The alcohol, drugs and tobacco JSNA from Lancashire County Council and partners has a wealth of intelligence and policy recommendations to address the factors surrounding substance use, and the associated economic, health and wellbeing outcomes.²⁶

Substance use and breastfeeding

Breastfeeding carries many benefits for the mother and the baby. These include:

- protecting the baby from infections and disease;
- reducing the risk of breast cancer for the mother;
- stronger thyroid health;
- reducing the risk of hospitalisations due to respiratory tract infection;
- a ready availability with no need for equipment and sterilisation;
- reducing the risk of hospitalisations due to gastrointestinal illness; and
- building a strong physical and emotional bond between mother and baby.²⁷

Breastfeeding has been shown to decrease the negative effects of cigarette smoke on a baby's lungs and offers the health benefits identified above. Breastfeeding can reduce the health disadvantages faced by the infants of mothers from lower socioeconomic groups. Therefore, it is essential to encourage and support the initiation and sustainment of breastfeeding, particularly amongst younger, less well educated and less supported smoking mothers. Many mothers incorrectly believe they should not breastfeed and smoke, resulting them in stopping breastfeeding. Evidence shows that smoking and breastfeeding will always offer more protection than smoking and formula feeding and should be encouraged.²⁸


The evidence on therapeutic drug excretion into human milk is not readily available and most evidence is limited to animal studies, which do not correlate to humans. The main concerns of using drugs/therapeutic interventions are:

- the effects of drugs on milk production;
- the amount of drug excreted into breast milk;
- the extent of oral absorption by the infant;
- potential adverse effects on the breastfeeding infant; and
- the age of the infant.

This also applies to alternative drugs and common herbal products, many of which may be perceived as safe by the breastfeeding mother. The long-term effects of psychotropic medications used for psychiatric treatments (such as anti-depressants, anti-psychotics and mood stabilizers) have not been established. Whilst low concentrations can appear in human milk, it is not clear whether the benefits of breastfeeding outweigh the potential risks.²⁹

Opioid-based treatments (including methadone and some painkillers) are considered safe when breastfeeding if the mother is/remains HIV free, abstains from opioid use (heroin) and is engaged in a monitored treatment programme. The adverse effects of methadone on an infant can include lethargy, respiratory difficulties and poor weight gain. The long-term effects are unknown. Narcotic analgesics (including codeine) can cause apnoea, bradycardia (slowed heart rate), central nervous system depression and respiratory depression. Their use is not considered safe in breastfeeding mothers. They are also addictive and can cause neonatal abstinence syndrome if the mother stops taking them, resulting in painful withdrawal.³⁰ The use of illegal street drugs carries much higher risks to the mother and the foetus/infant compared to therapeutic interventions as the purity or contaminant of the substance is not known. Substance use is not necessarily a contraindication to breastfeeding unless the risks outweigh the benefits (for example women with a positive HIV status).

Non-steroidal anti-inflammatory drugs (NSAID) are considered safe for use, but some can lead to impaired milk production and less effective feeding, and a sedative



effect in the infant. Nicotine replacement therapies are generally considered compatible with breastfeeding, as long as the dose is less than the number of cigarettes typically smoked. Herbal remedies lack data, and evidence surrounding their safety for use whilst breastfeeding is limited. St John's Wort is linked to drowsiness, colic and lethargy in the infant.³¹

Overall, the benefits of breastfeeding are felt to outweigh the risk of exposure to most therapeutic agents via human milk. Recommendations include individual case management with the risk/benefits ratio carefully considered alongside the health of the infant; for example, pre-term babies may be more vulnerable.³²

Caffeine is one of the most commonly used psychoactive substances and is contained in many products including coffee, cola, tea, chocolate, energy supplements and some medications. Whilst caffeine does not have the same associations as illicit substances, it has been suggested consumption of caffeine can have negative effects on pregnancy outcomes, from stillbirth and foetal death to low birth weight and potential heart problems. However, other studies have found no evidence for adverse pregnancy outcomes and some have suggested caffeine can reduce the risk of gestational diabetes.³³

Conclusion

Other postnatal provision, including advice, information and support on breastfeeding and parenting, alongside interventions for substance-exposed infants (including alcohol) can reduce the impact of the substance use on the future cognitive, social and physical development of the child.

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Research evidence was identified and included from general evidence searches, plus specific searches of three bibliographic databases: CINAHL, PsycINFO and MEDLINE. The studies were restricted by language of publication (English only), however, the geography/country was not restricted. The key terms of the health behaviours (stress, drugs, pregnancy, substance use, alcohol, tobacco, sexual behaviour, physical activity and nutrition), their synonyms, and combinations of these terms were used in the search strategies.