

# PREGNANCY AND SUBSTANCE ABUSE

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October 21, 2012

**Introduction**

Substance abuse during pregnancy can affect the developing fetus both directly, through passage of drugs through the placenta, and indirectly, through poor maternal health habits and environmental conditions (Minnes, Lang, & Singer, 2011). Alcohol and illicit drugs are toxic to the placenta and developing fetus, and can lead to congenital birth defects as well as post-partum drug withdrawal symptoms. Teratogens are agents that are capable of interfering with fetal development producing birth defects, most likely to occur when exposure occurs between the 2<sup>nd</sup> and 8<sup>th</sup> week of gestation, during the time when organs are forming (Porter & Kaplan, 2011). Common teratogens include alcohol, tobacco, stimulants, opioids, and marijuana.

Substance abuse during breastfeeding can adversely impact the health of the baby, and in most cases, breastfeeding is contraindicated if the mother is using drugs (Baker, 2010). Alcohol and drug use in women has been correlated with a shortened duration of breastfeeding leading many women to abstain from breastfeeding entirely (Lauwers & Swisher, 2011). The overall adverse effects of substance abuse upon pregnancy are multifactorial, complex, and not completely understood.

Tobacco use is the most common addiction among pregnant women and alcohol is the most commonly used teratogen (Porter & Kaplan, 2011). Neonates whose mothers smoke are also at increased risk of birth defects and deficiencies in physical growth and intelligence, as well as behavioral abnormalities. Alcohol consumption during pregnancy increases the risk of spontaneous abortion in direct proportion to the amount consumed and no amount has been determined to be without risk. Regular drinking often decreases birth weight and binge drinking can cause fetal alcohol syndrome (FAS), neonatal death,

and failure to thrive (Porter & Kaplan, 2011). Binge drinking in women is defined as four or more drinks per occasion.

The relationship between alcohol consumption and malnutrition has been well described and includes gastritis, mal-absorption, micronutrient deficiencies, and liver disease (Lieber, 2000). Drug addiction may lead to nutritional deficiencies as well as fluid and electrolyte imbalances (Islam, Hossain, & Ahsan, 2001). Researchers have documented impaired serum mineral values in drug addicts, and have observed a relationship between malnutrition and immunodeficiency (Hossain, Kamal, Ahsan, & Islam, 2007).

### **Research Issues and Limitations**

Because many pregnant women who use illicit substances also use tobacco and alcohol, it is often difficult to determine which adverse health conditions are caused by a specific substance. Determining specific harm from poly-drug use is an exceptionally difficult task and obtaining reliable information about illicit substance abuse is challenging because its use may deter honest self-reporting. It is also difficult to determine if observable health complications are caused directly by the substance or by lifestyle factors such as nutritional status, secondary to substance abuse. Concurrently, it can be difficult to differentiate between primary malnutrition (reduced or disordered dietary intake) and secondary malnutrition, which can result from gastrointestinal problems, reduced nutrient absorption, metabolic changes, and increased utilization and excretion of nutrients (Academy of Nutrition and Dietetics [A.N.D.], 2012). Malnutrition in drug addiction can be broadly attributed to a decreased focus on food, diversion of funds, excessive stress on the immune system, decreased appetite, craving of nutrient-

deficient foods, metabolic anomalies, and the co-prevalence of eating disorders (A.N.D., 2012).

Substance-abusing women often have other lifestyle habits that can lead to fetal damage, including high stress, lack of prenatal care, sexually transmitted diseases, and high-risk behaviors such as drug-trade activities that expose them to violence (Minnes et al., 2011). Dixon, Kurtz, & Chin (2008) examined behavioral outcomes associated with continued parental drug use throughout childhood. Their review highlights the importance of controlling psychosocial risk factors in the evaluation of behavioral outcomes related to prenatal substance exposure. While alcoholic and addicted mothers may expose their children in both prenatal and postnatal settings, it is also likely that some mothers will expose their baby in one setting but not the other. For example, the addicted mother who finds out she is pregnant and quits entirely, or the pregnant mother who returns to, or starts abusing substances shortly after giving birth.

### **Alcohol**

Prenatal exposure to alcohol has been extensively studied. Roughly one in eight US women drink during their pregnancy (Bakhireva & Savage, 2011). Fetal alcohol spectrum disorders (FASD) include FAS, partial FAS, alcohol-related birth defects (ARBD), and alcohol-related neurodevelopmental disorder (ARND) (US Department of Health and Human Services [DHHS], 2012). FAS involves a specific pattern of malformations characterized by distinctive facial features, growth deficiencies, and organ malformation (Dixon et al., 2008). Inattention, impulsivity, slower processing speed, memory deficits, lower IQ scores, and childhood-onset depression have been reported. People with FAS usually have smaller-than-average brains, coordination problems,

abnormal formation of bones and some organs, and reduced immunity (US DHHS, 2012), all factors that can compromise feeding capacity and nutritional status.

Deficiencies in several vitamins and minerals have been implicated as risk factors for FASD. May and Gossage (2011) suggested that injury-induced alterations in the metabolism of B vitamins, calcium, omega-3 fatty acids, zinc, and copper may play a role in the development of FASD. Nutritional supplements have been recommended, and specific nutrients such as choline have been under investigation as a treatment for reducing damage caused by prenatal alcohol exposure. Undernourishment is also associated with antioxidant deficiency, permitting the accumulation of free radicals, which make expression of FASD traits more likely to occur (May & Gossage, 2011). There is no cure or treatment for defects associated with FAS, making early intervention crucial, as fetal alcohol spectrum disorders are fully preventable. Postnatal behavioral interventions including training in social skills and personal safety have been shown to be beneficial (Dixon et al., 2008).

Mothers who drink more than two drinks per day are nearly twice as likely to stop breastfeeding compared to mothers who drink less (Mohrbacher, 2010). Data regarding the use of alcohol during breastfeeding is limited, as no institutional review board (IRB) would approve of a prospective controlled study using clinically relevant amounts of alcohol. Women who drink during breastfeeding unequivocally pass alcohol to the baby. Animal studies have demonstrated a variety of adverse outcomes such as altered sleep patterns, and research has shown that human maternal alcohol consumption does not promote lactation, contrary to folklore (US DHHS, Substance Abuse and Mental Health Services Administration, 2009). Social drinking (1-2 drinks, 1-2 times per week) is not an

absolute contraindication to breastfeeding. Limited research suggests delaying breastfeeding for two hours per drink, and in some cases to “pump and dump” the first batch after drinking (Baker, 2010). Recommendations for binge drinking mothers are to pump and store breast milk prior to their drinking bout. Problem drinkers consuming a moderate amount of alcohol daily should not breastfeed their baby (Baker, 2010).

### **Tobacco**

Tobacco use during pregnancy has been linked to low birth weight, and some research suggests it may have greater impact than illicit drug use (Bailey, McCook, Hodge, & McGrady, 2012). Low birth weight suggests that the fetus has not obtained important nutrients and oxygen needed for optimal brain growth and neuronal development (Minnes et al., 2011). According to Minnes et al. (2011), prenatal tobacco exposure has consistently been linked to lower IQ and attention problems, as well as depression and anxiety. Furthermore, tobacco suppresses appetite and can compromise the senses of taste and smell, affecting food intake and therefore all areas of nutrition (Hatcher, 2008), leading to negative fetal consequences. Tobacco cessation is of paramount importance in pregnant mothers, and should be stressed to all women of childbearing age.

It is possible that breastfeeding mothers who smoke cigarettes may cause more harm to their child via their breast milk compared to the effects of secondhand smoke (Lauwers & Swisher, 2011). Maternal cigarette smoking in early pregnancy is associated with higher plasma lipid levels and lower milk total lipid and docosahexaenoic acid (DHA) in the first months of lactation (Agostoni et al., 2003). According to Lauwers and Swishers (2011), nicotine in breast milk can cause fussiness, diarrhea, shock, vomiting,

rapid heartbeat, restlessness, altered sleep patterns, all which can contribute to slow infant weight gain. Mothers of slow weight-gaining babies should be asked if they smoke if they have not already volunteered this information. Smoking has been documented as one of the reasons why many women choose formula over breastfeeding, often related to anxiety about exposing the baby, and because nicotine can limit milk production and secretion. Furthermore, infants who receive formula are exposed to the toxic chemicals of the smoke and are without the protective benefits of their mother's milk (Lauwers & Swishers, 2011).

If smoking cessation is not achieved, nicotine exposure can be minimized through smoking after breastfeeding rather than immediately before, and should occur outside or in a separate room to minimize exposure to the toxins of secondhand smoke. Smoking cessation programs involving a patch or chewing gum are also recommended to reduce exposure to secondhand smoke. Studies have found a link between smoking and increased incidence of colic in the baby (Mohrbacher, 2010). Some researchers recommend a multidisciplinary approach for pregnant women with nicotine dependence, demonstrating that small efforts to educate mothers can have large payoffs in terms of outcomes for mothers and babies (Lundquist, Seward, Byatt, Tonelli, & Kolodziej, 2012).

### **Cocaine**

Prenatal cocaine exposure is associated with reductions in weight, head circumference and/or length, at birth (Minnes et al., 2011). Reduced head size can negatively impact mental development. Attention problems, rule breaking, aggression, and other externalizing behaviors have been documented, reported to be due to a lack of self-regulation. Callaghan (2006) discusses the significance of health-promoting self-care

behavior states within the context of adolescents. Disregard for safety and high-risk traits can have serious nutritional implications, and behavioral problems resulting from cocaine abuse during pregnancy may perpetuate the cycle of malnutrition. In addition, cocaine is known to decrease appetite, which will compromise nutritional status of the mother and subsequently the fetus.

Cocaine is easily absorbed and significant passage into breast milk is inevitable. Cocaine binds easily to albumin, and drug concentrations are likely to be higher in the mother's milk compared to her blood. Cocaine has been found in mother's milk for as long as 36 hours after use (Mohrbacher, 2010). Additionally, it has been found that cocaine-using mothers are less flexible and engaged during feeding interactions (Eiden, Schuetze, & Coles, 2010). According to the American Academy of Pediatrics (AAP), cocaine use is an absolute contraindication to breastfeeding. Education and awareness efforts may be the most effective prevention strategy, and interventions including intensive residential treatment with integrated programs for nursing mothers may be indicated in some cases.

### **Methamphetamine**

Prenatal methamphetamine exposure is associated with low birth weights (Minnes et al., 2011). Other findings include a lower arousal from sleep, lack of energy, and physiological symptoms indicating withdrawal; and there are reports of cleft palates and gastrointestinal distress, among others (McGuinness & Pollack, 2008).

Methamphetamine use during breastfeeding has been associated with extreme agitations, seizures, and even death of the infant (Lauwers & Swisher, 2011). Shah et al. (2012) found methamphetamine use during pregnancy to be associated with less likelihood of



breastfeeding, the newborn being more likely to have poor sucking reflexes, more likely to require neonatal intensive care unit (NICU) admission, as well as intervention by child welfare authorities (McGuinness & Pollack, 2008). The drug “ecstasy” has grown in popularity in recent years, and prenatal exposure is likely to create some of the same risks faced by exposure to other forms of amphetamine. Like all other substances of abuse, a nonjudgmental public health-centered approach toward treatment and follow-up is vital to improving both infant and maternal outcomes.

### **Opiates**

Findings related to heroin abuse include increased risk of premature delivery, low birth weight, length and head circumference, stillbirth, and sudden infant death syndrome (SIDS) (Minnes et al., 2011). Central nervous system abnormalities and developmental delay have been found, as have behavioral problems such as hyperactivity and ADHD in childhood (Dixon et al., 2008). Heroin-addicted mothers who have received methadone maintenance therapy have infants with higher birth weights and lower rates of growth retardation compared to those not receiving methadone (Minnes et al., 2011). Heroin passed to the infant through the mother’s milk can cause increased sleepiness and poor appetite in the baby, as well as an uncoordinated sucking reflex, all of which can contribute to an undernourished baby (Lauwers & Swisher, 2011). Other findings include restlessness, tremors, and vomiting. AAP categorizes heroin as another contraindication to breastfeeding mothers, while methadone has been placed in the approved category.

### **Marijuana**

Marijuana is the most frequently used illicit drug among women of childbearing age in the United States (US DHHS, Substance Abuse and Mental Health Administration,

2007). Marijuana is not associated with fetal growth defects or specific abnormal physical characteristics; however it has been correlated with developmental problems throughout childhood (Minnes et al., 2011). Literature reviews reveal long-term emotional and behavioral consequences in children exposed to marijuana, accompanied by an increased risk of adolescent substance abuse. Kuczkowski (2004) reported sleep disturbances, hyperactivity, impassivity, and inattention. Other studies have documented decreased motor development in the child at one year (Mohrbacher, 2010). Marijuana can compromise the mother's ability to produce sufficient amounts of milk (Lauwers & Swisher, 2011). Infants exposed to marijuana through milk can test positive for up to three weeks.

### **Discussion and Practical Implications**

Although pregnancy is often considered a time of increased motivation for health promoting actions or treatment, there are reports of surprisingly poor maternal long-term outcomes associated with alcohol or substance abuse, even after specialized care provision during pregnancy (Sarkola, Gissler, Kahila, Autti-Ramo, & Halmesmaki, 2011). Women with substance abuse issues who are pregnant or parenting have additional needs that are unlikely to be met by traditional addiction services or by standard maternal services such as Women, Infant, Children (WIC). In other situations, social services may exist but are under-utilized due to the fear of losing child custody, or to guilt and shame (Niccols et al., 2010).

Gathering information about substance abuse during pregnancy remains a difficult task. Improved methods of obtaining and collecting maternal risk data is needed in order to make progress, as most people are hesitant to share such revealing and potentially

stigmatizing information. While very expensive and impractical in some settings, Bakhireva and Savage (2011) summarized the utility of screening procedures that rely on biomarkers for a more sensitive and specific diagnosis of fetal alcohol exposure. Clinical biomarkers eliminate inconsistencies observable in self-reported data, as earlier prognostic indicators are likely to lead to more successful interventions.

Findings by Dixon et al. (2008) suggest that by manipulating the postnatal environment through parent education or child skills training, challenging behaviors associated with pregnancy and substance abuse can be decreased. Direct interventions should be targeted at both parents and exposed children to reduce the impact of prenatal drug and alcohol exposure. Integrated treatment programs that include on-site pregnancy, parenting, or child-related services may break the intergenerational cycle of addiction. This may lead to improvements in child development, growth, and emotional and behavioral functioning (Niccols et al., 2012). According to Massey et al. (2012), addressing and supporting maternal identity as a provider during pregnancy may be necessary for pregnant substance abusers to achieve and sustain abstinence. Inhibition of parenting skills while under the influence will have a significant impact on the nutritional status and behavioral health of the child and should not be overlooked. Women of childbearing age should be educated whenever possible about the dangers of alcohol and drugs prior to pregnancy, throughout breastfeeding, and during childhood.

### **Relevance to Women, Infant, Children (WIC) and the Northeast Valley Health Corporation (NEVHC)**

Using data from the Behavioral Risk Factor Surveillance System (BRFSS), reports of binge drinking were highest for women who were unmarried (Centers for

Disease Control and Prevention [CDC], 2012). The frequency and intensity of binge drinking episodes decreased with increasing education. Pregnant women with a high school diploma or less reported binge drinking more frequently and in higher amounts compared to those with college degrees (CDC, 2012). Roughly half of all WIC participants nationwide are Hispanic/Latino, with two-thirds having a high school education or less (United States Department of Agriculture [USDA], 2012). According to the BRFSS, reports of binge drinking while pregnant were the second highest for Hispanics, after non-Hispanic White (CDC, 2012). Meanwhile, it is possible that data collected through phone surveys such as the BRFSS may not be representative of the WIC population as a whole. BRFSS data is self-reported and limited only to those who have a landline telephone, eliminating a large population of low-income households such as those in the Northeast Valley. However, the implications for potential substance abuse among WIC participants cannot be ignored and should be addressed. Studies have consistently shown a lower prevalence of drug use based on self-report when compared to prevalence based on biochemical analysis (Hiza, Johnson, & Knight, 2001).

Collecting reliable alcohol and drug data from the WIC population poses challenges, as it is likely that participants will believe their responses could affect eligibility for WIC services. In other words, a mother with a drinking or drug problem is unlikely to volunteer that information. More reliable data on WIC participants with substance abuse issues and their children is essential to ensure appropriate resource allocation (Niccols et al., 2009) and to improve health outcomes. If alcohol or drug abuse is suspected, the participant should be referred to a substance abuse counselor or encouraged to call one of the phone numbers listed in the “Can We Help?” orange

referral pamphlet. The participant should be aware that WIC staff is there to help and is not in a judgmental or punitive role. Project CHOICES intervention was designed to reduce alcohol consumption during pregnancy and use motivational interviewing techniques to highlight the discrepancy between current behaviors and overall goals (Velasquez et al., 2010). Several authors have reported this technique to be successful in promoting behavior change. Motivational interviewing is the preferred strategy for counseling at WIC and should be utilized if a discussion of substance abuse becomes necessary.

Notwithstanding, it is difficult for any health service to provide an optimal service if clients are not willing to cooperate. Compliance during a counseling session may not translate to an attitude change, which is essential for long-term recovery. Meanwhile, witnessing signs of child endangerment, abuse, or neglect require reporting to a government agency. WIC Supervisors are mandated to follow the reporting instructions and fill out the forms in the folder designated for child abuse and elder abuse. WIC staff should always exercise judgment and consult with others when faced with critical incidents.

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