



**National
Association of
Neonatal
Nurses**

Marijuana, Breastfeeding, and the Use of Human Milk Position Statement #3071

NANN Board of Directors
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Breastfeeding is the optimal feeding method and human milk the optimal source of nutrition for neonates and infants. Research addressing the impact of marijuana use during breastfeeding is limited. As the professional voice of neonatal nurses, the National Association of Neonatal Nurses (NANN) recommends women abstain from marijuana consumption while breastfeeding or providing human milk for consumption.

Association Position

Human milk and breastfeeding provide the optimal nutrition for infant growth and development (NANN, 2015). The legalization of marijuana in several US states and Canadian provinces has highlighted confusion regarding the safety of marijuana consumption during pregnancy, including during lactation (Kim & Monte, 2016; Metz & Stickrath, 2015). Intrauterine marijuana exposure is associated with decreased birth weight (Corsi et al., 2019; Crume et al., 2018; El Marroun et al., 2009; Fergusson et al., 2003; Gray et al., 2010; Gunn et al., 2016; Hayatbakhsh et al., 2012; Luke et al., 2019) and preterm birth after adjusting for confounding variables (Corsi et al., 2019; Hayatbakhsh et al., 2012; Leemaqz et al., 2016; Saurel-Cubizolles et al., 2014). In addition, emerging evidence reports neurocognitive and education deficits in children and adolescents exposed to marijuana during fetal development (Metz & Stickrath, 2015).

Marijuana crosses into breast milk after maternal consumption (Baker et al., 2018; Hale et al., 2019; Perez-Reyes & Wall, 1982). Available data on associated risks to infants are insufficient to address the safety of marijuana consumption by women who are breastfeeding or providing human milk for consumption. Because of the lack of safety data regarding maternal marijuana consumption, transmission to the breast milk, and potential impact on infants, women who are providing human milk for consumption should be advised to avoid marijuana consumption.

Introduction

Using the search terms and their synonyms and/or subject headings for *marijuana*, *infant*, and *breastfeeding*, Pubmed, CINAHL, Academic Search Premier, Cochrane, and TRIP databases were searched for relevant literature. As this is an emerging area of study, results were limited; therefore, organizational websites were also screened related to the topic to broaden the search. Because NANN's members predominantly work and live in the United States and Canada, the literature search focused on the evidence from these countries.

Background and Significance

Incidence of Use

Marijuana is the most common illicit drug used during pregnancy and lactation in the United States, with use ranging from 3.4%–16.0% (Crume et al., 2018; Ko et al., 2015; National Institute on Drug Abuse, 2019; Substance Abuse and Mental Health Services Administration [SAMHSA], 2020). With more states legalizing medical and recreational marijuana, it is projected that use during pregnancy will continue to rise. In Canada, the overall incidence of marijuana use during pregnancy in 2016 was 3.5% (Perinatal Services BC, 2020). The perceived safety of marijuana by consumers likely contributes to continued use throughout pregnancy (Chang et al., 2019). Current evidence on use is mainly based on self-reporting mechanisms and, thus, may underestimate the actual incidence. There is a higher incidence of use during a woman's first trimester of pregnancy, most likely due to her initially being unaware of her pregnancy (Crume et al., 2018; Metz & Stickrath, 2015; National Institute on Drug Abuse, 2019; SAMHSA, 2017). Studies identified a higher prevalence of marijuana use during pregnancy in younger

women, women with fewer than 12 years of education, women who had used marijuana prior to pregnancy, and those who initiated prenatal care late (Crume et al., 2018; Ko et al., 2015).

Evidence indicates that women who were more likely to use marijuana during the perinatal period also were more likely to use marijuana in the postpartum period. The Pregnancy Risk Assessment Monitoring System (PRAMS) from two states (Vermont and Alaska), where medical marijuana has been legalized, found the incidence of postpartum marijuana use during 2009–2011 was 6.8% (Ko et al., 2018). Colorado PRAMS data during 2014–2015 show an incidence of marijuana use of 10.2% in women who breastfed for fewer than 8 weeks, 5% in women who ever breastfed, and 4.1% in women who breastfed for more than 9 weeks (Crume et al., 2018). There was a lower rate of initiation of breastfeeding in women who used marijuana during pregnancy (88.6%) compared with those who were nonusers (93.8%) (Crume et al., 2018). In Canada, estimates of incidence of postnatal marijuana use is inferred to be similar to perinatal incidence of use (Perinatal Services BC, 2020).

Benefits of Breastfeeding and Human Milk

There are a myriad of benefits to the mother, infant, and society associated with breastfeeding and the use of human milk. Short-term benefits to the infant include decreased risk of infections (severe respiratory infections, necrotizing enterocolitis, gastroenteritis, otitis media, and urinary tract infections), reduced hospital readmissions, decreased pain following minor procedures, and reduced risk for Sudden Infant Death Syndrome (SIDS) (American Academy of Pediatrics [AAP], 2012; Association of Women's Health, Obstetrics and Neonatal Nurses [AWHONN], 2015). Furthermore, breastfeeding is associated with improved maternal-infant bonding. Long-term benefits to the infant include reduced incidence of allergic diseases (clinical asthma, atopic dermatitis, and eczema), celiac disease and childhood inflammatory bowel disease, childhood leukemia and lymphoma, obesity, cardiovascular disease, and diabetes mellitus. Breastfeeding also is associated with improved cognition and neurodevelopment (AAP, 2012; Association of Women's Health, Obstetrics and Neonatal Nurses [AWHONN], 2015).

At times, a mother's own milk supply may be insufficient. A mother may be unable to provide breast milk for medical reasons, or she may decide to not provide breast milk for a variety of reasons. The use of donor human milk continues to offer many beneficial effects similar to mother's own milk and should be recommended over the use of infant formula in these circumstances (AAP 2017; Edwards & Spatz, 2012; NANN, 2015). When using human milk other than the mother's own personal milk, the milk should be obtained from a reputable milk bank that maintains strict quality control procedures to ensure the safety of milk, including screening for illicit substance use (AAP, 2017; Haiden & Ziegler, 2016). Milk sharing (obtaining breast milk from a friend, family member, or off the Internet) should be strongly discouraged because the rigorous safety processes, including screening for marijuana and other illicit drugs, is variable and may not be provided (AAP, 2017; Paynter & Hayward, 2018).

Positions of Professional Organizations

There are many variables to consider when weighing the risks of initiating and continuing breastfeeding while using marijuana. Some of these variables include but are not limited to the increased potency of current products, the frequency and duration of a woman's use, and the route of consumption (smoking, vaping, ingesting, or topical application) versus known benefits associated with breastfeeding (Reece-Stremtan & Marinelli, 2015). Various professional medical and nursing organizations recommend that, due to insufficient and limited data, marijuana use should be strongly discouraged by breastfeeding mothers (American College of Obstetricians and Gynecologists [ACOG], 2017; AWHONN, 2018; March of Dimes, 2017; National Center for Chronic Disease Prevention and Health Promotion, 2017; Reece-Stremtan & Marinelli, 2015; Ryan et al., 2018). Breastfeeding mothers who choose to continue to use marijuana should be advised to significantly reduce their intake and be informed of possible adverse effects on infant development from exposure to cannabis compounds in breast milk (Centers for Disease Control and Prevention [CDC], 2020; ACOG, 2017; Reece-Stremtan & Marinelli, 2015; Ryan et al., 2018). Furthermore, the CDC warns of the potential dangers of second- and third-hand smoke exposure, as well as concerns about parents' impaired judgement while providing care to their infant (CDC, 2020). Canadian professional medical and nursing organizations echo similar recommendations regarding marijuana use during pregnancy and lactation (Canadian Association of Midwives, 2018; Canadian Pediatric Society, 2020; Cantin et al., 2019; Perinatal Services BC, 2020; Ratchford, 2018; Society of Obstetricians and Gynaecologists of Canada, n.d.)

Public health messages and dispensary regulations from various states are inconsistent regarding safety of marijuana use during pregnancy and lactation. Barry and Glantz (2018) evaluated the practices of the first four states that legalized recreational marijuana—Alaska, Colorado, Oregon, and Washington. They found that state campaign education messages from Colorado and Oregon stated that there is no safe level of marijuana use during pregnancy and included information regarding pregnant women and negative effects on fetal or infant health; messages from Washington and Alaska did not include this information.

Pharmacology of Marijuana and Lactation

Marijuana is an extract of the leafy *Cannabis sativa* plant and consists of over 400 different chemical components and 60 pharmacologically active cannabinoids. These active cannabinoids include Delta-9-tetrahydrocannabinol (Delta-9-THC) and cannabidiol (CBD). The psychoactive component of marijuana is Delta-9-THC, while CBD does not produce any psychoactive effects. The amount of Delta-9-THC in marijuana has significantly increased in the past decades (Oberbarnscheidt & Miller, 2017).

Marijuana is highly lipophilic. It is stored primarily in adipose tissue, liver, muscle, and spleen and is then distributed into the blood stream (Oberbarnscheidt & Miller, 2017). Delta-9-THC acts upon type 1 (CB1) and type 2 (CB2) cannabinoid receptors. These receptors are found throughout the central nervous system and peripheral tissues. The

CB1 receptor plays a major role in fetal brain development (Metz & Borgelt, 2018). Marijuana consumption can result in significant mental, physical, and toxic effects, and the effects are inconsistent between users. In addition, marijuana use can cause dependence, tolerance, and addiction. Attempts to discontinue use may result in withdrawal symptoms (Oberbarnscheidt & Miller, 2017). Approximately 10% of adult users become addicted to marijuana, and the rate of addiction is greater among teen users (Lopez-Quintero et al., 2011).

The science of the transfer of drugs, including marijuana, into human milk is in the early stages. Only 30% of medications currently marketed have been studied in relation to breastfeeding. The ability to predict drug levels in human milk is limited (Hale & Rowe, 2017). The high fat concentration in breast milk makes it an ideal environment for penetration due to the lipophilic properties of marijuana. Studies published between 1982 and 2018 document the transmission of Delta-9-THC from maternal consumption into breast milk (Baker et al., 2018; Hale & Rowe, 2017; Perez-Reyes & Wall, 1982).

A pilot study included eight exclusively breastfeeding women smoking a specific strain of marijuana purchased from a specific dispensary. This study reported the presence of Delta-9-THC in breast milk at approximately 2.5% of the maternal dose. The study detected a peak concentration one hour after inhaled consumption, with slow recession over the subsequent four hours (Baker et al., 2018).

Another study analyzed the breast milk of 54 women reported to be using marijuana and noted that Delta-9-THC was detectable in 65% of provided samples up to six days after the last reported use (Bertrand et al., 2018). The half-life of Delta-9-THC in the breast milk was calculated to be approximately 27 hours. The number of times a mother consumed marijuana in a day was a positive predictor of the concentration of Delta-9-THC in her breast milk (Bertrand et al., 2018). This is consistent with an older study that reported that a mother consuming marijuana multiple times per day had significantly higher concentrations in her breast milk than the mother consuming marijuana once per day (Perez-Reyes & Wall, 1982). Concentration of marijuana in breast milk is impacted by multiple factors including dose, frequency of use, diffusion, maternal metabolism, and the lipophilic properties of Delta-9-THC trapping it within the breast milk (Metz & Borgelt, 2018).

Neonatal Impact of Marijuana Use During Pregnancy

Despite significant literature exploring associations between intrauterine marijuana exposure and neonatal outcomes, inconsistencies persist as research in this area has been limited by polysubstance use and confounding variables (Fergusson et al., 2003; Gunn et al., 2016; Hayatbakhsh et al., 2012; Leemaqz et al., 2016; Thompson et al., 2019). Nevertheless, sufficient evidence in the literature suggests intrauterine marijuana exposure has negative impacts in the neonatal period.

Intrauterine marijuana exposure is associated with decreased birth weight (Corsi et al., 2019; Crume et al., 2018; El Marroun et al., 2009; Fergusson et al., 2003; Gray et al., 2010; Gunn et al., 2016; Hayatbakhsh et al., 2012; Luke et al., 2019). Two longitudinal

studies found significant and independent impacts of marijuana use on infant birth weight after accounting for confounding variables (Fergusson et al., 2003; Hayatbakhsh et al., 2012). One of these studies found infants exposed to marijuana in utero were, on average, 300 g lighter than their nonexposed counterparts (Hayatbakhsh et al., 2012). Another cross-sectional study of women in Colorado found marijuana use during pregnancy resulted in a 50% increased likelihood of infants being born with low birth weights. This outcome was observed after adjusting for confounding variables including tobacco use, race, and socioeconomic status (Crume et al., 2018). There is conflicting information on the impact of maternal marijuana use on infant length and head circumference (Coleman-Cowger et al., 2018; El Marroun et al., 2009; Gray et al., 2010; Gunn et al., 2016).

Marijuana exposure also has been associated with preterm birth after adjusting for confounding variables (Corsi et al., 2019; Hayatbakhsh et al., 2012; Leemaqz et al., 2016; Saurel-Cubizolles et al., 2014). A large retrospective cohort study reported a 12% increased rate of preterm birth for women using marijuana compared with half that rate for women who abstained (Corsi et al., 2019). Another longitudinal study out of British Columbia found intrauterine marijuana exposure resulted in a 27% increased rate of preterm birth (Luke et al., 2019).

In addition, three studies published between 1987 and 2014 found that infants exposed to marijuana in utero may present with neurologic symptoms including hyperactive startle reflexes and tremors (Fried & Makin, 1987; Fried et al., 1987; Ordean & Chisamore, 2014). These infants also may have interrupted sleep states and harsh cries (Lester & Dreher, 1989; Ordean & Chisamore, 2014; Scher et al., 1988).

Long-Term Impact of Marijuana Use During Pregnancy and Lactation

There is evidence of long-term harm from prenatal marijuana exposure. Three longitudinal prospective cohort studies have provided insight into long-term effects of in utero exposure to marijuana. The Ottawa Prenatal Prospective Study (OPPS), the Maternal Health Practices and Child Development (MHPCD) Study, and the Generation R (GenR) Study recruited women who were pregnant and followed their children into early childhood (GenR), adolescence (MHCPD), and early adulthood (OPPS). In summary, findings include neurobehavioral deficits in infants to 3 year olds and lower verbal and memory reasoning scores during preschool years (3–5 years). In school-aged children (6–9 years), findings included poorer sustained attention; increased impulsivity and hyperactivity; impaired visual perception, visual memory, and language comprehension; impaired executive functioning; depressive and anxious symptoms; and altered brain morphology in the frontal cortex. Deficits in executive functioning, visual-spatial working memory, academic achievement, and increased rates of smoking and early substance use were noted in 14–22 year olds (Badowski & Smith, 2020).

Smith and colleagues (2016) studied a cohort of young adults (18–22 years) from the longitudinal OPPS using functional MRI imaging and found prenatal marijuana exposure affected neurophysiological processes in several neural networks that underlie

executive functioning. These results demonstrate that prenatal marijuana exposure does have long-term effects on brain activity. Of note, the existing cohort studies were conducted when available marijuana had a much lower potency than what is available today.

Typically, mothers do not initiate marijuana use when breastfeeding but rather as a continuation of use during pregnancy (Crume et al., 2018). The long-term effects of marijuana exposure through breast milk on children have not recently been studied, and effects are difficult to isolate. Tennes et al. (1985) found that infants exposed to marijuana while breastfeeding were slightly shorter than their counterparts. Astley & Little (1990) found that infants exposed to marijuana in breast milk had decreased motor development compared with their peers at 1 year of age. These results were confounded by maternal marijuana use in the first trimester, and it was unclear which exposure was responsible for the effect seen. However, animal studies suggest that exposure to marijuana while breastfeeding has implications on neurodevelopment similar to in utero exposure (Badowski & Smith, 2020).

Additional long-term considerations include the risks of second-hand marijuana exposure and impaired caregivers (Davis et al., 2020). Second-hand marijuana exposure is an independent risk factor for SIDS (Badowski & Smith, 2020). Given that there are ongoing concerns about the effect of marijuana use in adolescents and young adults, whose brains are still maturing, it is not unreasonable to be concerned about marijuana exposure in infants whose brains are undergoing rapid and significant development (Davis et al., 2020).

Recommendations

1. Human milk is the preferred diet for neonates and infants due to numerous short- and long-term benefits.
2. When mother's own milk is not available, the use of donor human milk should be considered. When donor human milk is utilized, it should be obtained from a reputable human milk bank program that screens for marijuana and other illicit drugs.
3. There are insufficient data to evaluate the effects of maternal marijuana use during breastfeeding or lactation on neonatal and long-term outcomes.
4. There is no known safe level of marijuana consumption when providing breast milk.
5. Educating mothers who are lactating regarding the potential risks of marijuana use during lactation is a key role of the nurse.
6. Nurses should play an active role in counseling women to abstain from marijuana consumption during lactation and be advised of potential long-term neurocognitive effects on the infant from continued use.
7. For mothers who choose to continue using marijuana while lactating, the nurse should advise them to minimize their consumption.
8. When approaching lactating mothers who use marijuana, the nurse should be supportive and provide education in a nonjudgmental manner.

9. Nurses should continue to provide lactation support to all women lactating.
10. Nurses should be developing evidence-based, nonjudgmental, and nonpunitive hospital, state, and national guidelines addressing marijuana use during lactation.
11. Knowledge of local and state requirements regarding involvement of departments of human services when a neonate is impacted by maternal marijuana use is essential for the nurse.
12. A key role for the nurse is advocating for evidence-based marketing of marijuana products and raising awareness of the negative impacts of marijuana on the fetus when used during pregnancy and its transfer into breast milk.
13. Nurses need to be involved in legislative and public health initiatives that raise awareness of the transfer of marijuana from maternal use into breast milk and the lack of information regarding its safety.
14. Further research addressing maternal use of marijuana during lactation needs to be done with nurse participation and leadership.

Conclusions

Human milk is the optimal nutrition for all neonates and infants. A portion of marijuana from maternal ingestion transfers into breast milk and has a long half-life. Maternal marijuana use during pregnancy increases the risk of low birth weight, prematurity, and negative long-term neurobehavioral effects on offspring. There is insufficient research that addresses the impact of maternal marijuana consumption on feeding human milk to neonates and infants. The National Association of Neonatal Nurses joins several professional organizations in recommending that lactating mothers abstain from marijuana use. Furthermore, those that choose to continue to use marijuana should be advised to significantly reduce their intake and be informed of possible adverse effects on neonate and infant development from exposure to marijuana in breast milk.

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