



Prevalence and correlates of a lifetime cannabis use disorder among pregnant former tobacco smokers



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HIGHLIGHTS

- In total, 14% of women met criteria for a lifetime cannabis use disorder (CUD).
- A history of multiple psychiatric disorders and alcohol use disorder predicted CUD.
- Greater quit attempts and lower weight management self-efficacy also predicted CUD.

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ABSTRACT

Background: Following tobacco and alcohol, cannabis is the most commonly used substance during pregnancy. Given the high prevalence of concurrent cannabis and tobacco use as well as the health consequences associated with prenatal substance use, we sought to document the relative contributions of psychosocial and psychiatric factors commonly associated with cannabis use in predicting a lifetime cannabis use disorder (CUD) among women who had quit smoking tobacco as a result of pregnancy.

Methods: Pregnant former tobacco smokers ($n = 273$) enrolled in a larger randomized controlled trial for postpartum tobacco relapse prevention completed semi-structured psychiatric interviews and self-reported demographic, pregnancy, health, psychosocial, and tobacco use factors during their third trimester of pregnancy.

Results: In total, 14% ($n = 38$) of women met criteria for a lifetime CUD. The strongest predictors of a lifetime CUD were a history of having multiple psychiatric disorders ($OR = 36.44$; 95% $CI = 5.03$ – 264.27 ; $p < 0.001$) followed by a lifetime alcohol use disorder ($OR = 3.54$; 95% $CI = 1.27$ – 9.87 ; $p < 0.05$). In addition, more frequent attempts to quit smoking tobacco ($OR = 1.12$; 95% $CI = 1.01$ – 1.25 ; $p < 0.05$) and lower self-efficacy about weight management after quitting smoking tobacco ($OR = 0.78$; 95% $CI = 0.62$ – 0.97 ; $p < 0.05$) also were significantly associated with a lifetime CUD.

Conclusions: Women with a history of both cannabis and tobacco dependence may represent a subset of women who need more specialized treatment during the perinatal period to improve substance use outcomes.

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1. Introduction

Cannabis is the most commonly used illicit substance in the United States and is the only illicit substance for which there have been appreciable increases in the prevalence of use across the past decade (Ansell, Laws, Roche, & Sinha, 2015; Caldeira, O'Grady, Vincent, & Arria, 2012). A 2013 nationwide survey conducted by the Substance Abuse and Mental Health Services Administration, found that the number of Americans 12 years of age and older reporting daily cannabis use has nearly doubled since 2002, with current prevalence rates estimated to be 7.5% (SAMHSA, 2012). Cannabis also has the highest rates of past year dependence of any illicit substance, with 1.6% of users meeting criteria

for a cannabis use disorder (CUD). Several factors, including changes in legal status, perceptions of low risk associated with use, and availability have been linked to the increased rates of cannabis use (Cerda, Wall, Keyes, Galea, & Hasin, 2012; Palamar, Ompad, & Petkova, 2014). Despite the growing societal acceptance of cannabis, the long-term consequences of cannabis use remain a general public health concern, and the high prevalence of cannabis use during pregnancy is of particular interest given the adverse effects on both maternal and fetal health.

Cannabis use is associated with significant health complications (Volkow, Baler, Compton, & Weiss, 2014). The acute effects of cannabis intoxication include euphoria, tachycardia, conjunctival congestion, and anxiety as well as slowed reaction time and impaired memory (Iversen, 2009). Although the acute effects of cannabis typically subside several hours following administration, prolonged cannabis use has been linked to chronic respiratory diseases, cognitive dysfunction, and behavioral

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problems. Smoking cannabis exposes users to carbon monoxide, bronchial irritants, tumor promoters, and carcinogens, which in turn increase risk for respiratory diseases (Ashton, 2001), severe respiratory symptoms (Macleod et al., 2015), and cardiovascular events (Volkow et al., 2014). Cannabis use also has lasting effects on cognition and the regulatory networks of the brain (Filbey, Schacht, Myers, Chavez, & Hutchison, 2009; Gilman et al., 2014), which can lead to memory impairments, deficiencies in attention, slowed reaction time, poor impulse control and increased hostility as well as difficulties with information processing, perceptual coordination, and motor performance (Gunn et al., 2015).

In addition to the general consequences of cannabis use, prenatal cannabis exposure presents specific problems for the developing fetus and has lasting effects on child development. Although prenatal cannabis use has been associated with reduced gestational length and a slowing of fetal growth, studies linking cannabis use during pregnancy to premature birth and low birth weight have been equivocal, with some studies reporting associations between prenatal cannabis use and decreased birth weight (El-Mohandes et al., 2003; Gray et al., 2010) and others reporting no relationship between prenatal cannabis use and low birth weight or premature birth (English, Hulse, Milne, Holman, & Bower, 1997; Fergusson, Horwood, & Northstone, 2002). However, prenatal cannabis exposure consistently has been associated with disrupted sleep patterns (Dahl, Scher, Williamson, Robles, & Day, 1995; Scher, Richardson, Coble, Day, & Stoffer, 1988) and delayed cognitive development in early childhood (Day et al., 1994) as well as with adolescent deficits in cognitive development (Fried & Watkinson, 1990; Richardson, Ryan, Willford, Day, & Goldschmidt, 2002), attention (Fried, Watkinson, James, & Gray, 2002), and executive functioning (Fried, Watkinson, & Gray, 1998; Willford, Richardson, Leech, & Day, 2001). Prenatal cannabis exposure also has been associated with greater delinquent behaviors (Day, Leech, & Goldschmidt, 2011), higher rates of depression (Gray, Day, Leech, & Richardson, 2005) and anxiety (Leech, Larkby, Day, & Day, 2006) and later drug abuse (Day, Goldschmidt, & Thomas, 2006) among adolescents. Thus, cannabis use during the perinatal period has adverse consequences for both maternal and child health.

Despite the consequences of prenatal substance use, prenatal cannabis use is common. Cannabis is the third most commonly used substance during pregnancy following tobacco and alcohol (El Marroun et al., 2008; Gilchrist, Hussey, Gillmore, Lohr, & Morrison, 1996; Havens, Simmons, Shannon, & Hansen, 2009). Although rates of cannabis use tend to decline during pregnancy (Bailey, Hill, Hawkins, Catalano, & Abbott, 2008; Gilchrist et al., 1996), an estimated 11% of women continue to use cannabis during pregnancy, with over 16% of pregnant cannabis users reporting near daily use (Ko, Farr, Tong, Creanga, & Callaghan, 2015). Women who are younger, less educated, single, unemployed, socioeconomically disadvantaged, or belong to a racial or ethnic minority group are more likely to use cannabis during pregnancy (El Marroun et al., 2008; Ko et al., 2015) as are multigravid women and women with unplanned pregnancies (El Marroun et al., 2008). Importantly, women who use tobacco and cannabis concurrently are at particular risk of continuing to use both substances during pregnancy (El Marroun et al., 2008; Ko et al., 2015; Lester et al., 2001), and women with a history of CUD are nearly three times more likely to continue using cannabis during pregnancy than are women without such a history (El Marroun et al., 2008).

Given the high concurrence between cannabis and tobacco use, the rates of prenatal cannabis use, and the specific health consequences of prenatal cannabis use, we sought to document the prevalence of a lifetime CUD among women who had quit smoking tobacco as a result of pregnancy and to examine the relative contributions of psychosocial and psychiatric factors commonly associated with cannabis use in predicting a lifetime CUD. We focused on demographic, pregnancy, health, psychosocial, and tobacco use factors as well as lifetime psychiatric disorders as predictors of a lifetime CUD. We hypothesized that

factors related to greater nicotine dependence and more severe psychiatric problems would be most strongly related to a lifetime CUD among pregnant former tobacco smokers.

2. Material and methods

2.1. Participants and procedures

The procedures for this study were approved by the University of Pittsburgh Institutional Review Board, and participants provided written informed consent. Participants were part of a larger randomized controlled trial investigating the efficacy of a postpartum tobacco relapse prevention intervention that included a specialized focus on women's postpartum concerns about mood and weight (Levine, Marcus, Kalarichian, & Cheng, 2013). Participants were pregnant women who self-reported smoking cigarettes daily for at least 1 month during the 3 months prior to pregnancy, smoked at least 5 cigarettes per day before quitting, had not smoked cigarettes during the past 2 weeks, and were motivated to remain abstinent postpartum. Women reported demographic and pregnancy-related information and also completed measures of tobacco use and psychosocial factors during their third trimester of pregnancy between 34 and 38 weeks gestation. Participants also completed semi-structured psychiatric interviews at the time of study enrollment or after delivery. Psychiatric interviews that occurred prenatally ($n = 214$) were conducted between 34 and 41 weeks gestation ($M = 36.24$; $SD = 1.61$) and those that were conducted postpartum ($n = 62$) were completed within 55 weeks of delivery ($M = 20.07$; $SD = 17.58$).

2.2. Measures

2.2.1. Demographic factors

Women reported demographic information, including age, race, income, and education.

2.2.2. Pregnancy factors

Women reported pregnancy information, including parity, whether their current pregnancy was intentional, and whether they intended to breastfeed after delivery.

2.2.3. Health and psychosocial factors

Weight and height were measured and body mass index was calculated as weight in kilograms divided by height in meters squared. Current depressive symptoms were assessed using the Center for Epidemiological Studies-Depression Scale (CES-D; Radloff, 1977), a 20-item measure shown to be less sensitive than other depression scales to somatic symptoms that are common during pregnancy (Coyle & Roberge, 1992). A CES-D score of 16 or greater is considered an indicator for clinically meaningful depressive symptoms (Radloff, 1977). Women also reported the degree to which they appraised situations as stressful in the past month using the 14-item Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983). Past month sleep quality and disturbances were assessed using the 19-item Pittsburgh Sleep Quality Index (PSQI), for which a score greater than 5 is considered indicative of poor sleep (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989). The internal consistency coefficients for the CES-D, PSS, and PSQI in the present study were 0.77, 0.65, and 0.65, respectively.

2.2.4. Tobacco use factors

Women were asked to think back to the last time they had smoked cigarettes every day for at least one month and complete the Fagerstrom Test of Nicotine Dependence (FTND), a 6-item scale assessing the intensity of physical addiction to nicotine (Heatherton, Kozlowski, Frecker, & Fagerstrom, 1991). The internal consistency coefficient for the FTND in the present study was 0.62. Women also provided information on the number of cigarettes they smoked daily prior to quitting, their age at

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