Sleep Motives and Expectancies for Cannabis Use in Pregnancy

Cannabis
2026
© Author(s) 2026
researchmj.org
10.26828/cannabis/2026/000372
Volume 9, Issue 2

Mary Beth Miller[1,2], Margaret Lloyd Sieger[3], Katie R. Moskal[2], Emily Marut[1], Shikha Gupta[1] & Andrea M. Wycoff[1]
[1]Department of Psychiatry, University of Missouri School of Medicine
[2]Department of Psychological Sciences, University of Missouri
[3]Department of Population Health, University of Kansas School of Medicine

ABSTRACT

Objective: Sleep difficulties are a common motive for cannabis use during pregnancy. However, evidence supporting cannabis use as an effective sleep aid is limited, while substantial research demonstrates the efficacy of cognitive behavioral treatments. This study characterized the sleep complaints of adults using cannabis during pregnancy to inform prevention and intervention efforts. **Method:** Pregnant adults reporting cannabis use (a) in the month prior to or (b) after becoming pregnant were recruited from across the United States between May and August of 2025. Participants completed a cross-sectional research survey, and those who passed all fraudulent responding criteria were included in data analysis. Descriptive statistics, chi-square, and t-tests compared the demographic and clinical characteristics of pregnant adults who did and did not report using cannabis to help their sleep. **Results:** Of the 210 valid respondents (100% assigned female at birth, 93% cisgender; age M = 29.3 years; 53% White, 38% Black; 58% in second trimester), 185 persisted in cannabis use during pregnancy and 119 reported using "mostly" or "almost always" to help their sleep. Those using cannabis for sleep reported greater insomnia severity, earlier bedtimes, and more wake after sleep onset than those using cannabis for other reasons, but they were less likely to report taking >30 minutes to fall asleep, consistent with expectancies that cannabis would help their sleep. Three out of four using cannabis for sleep (78%) expressed interest in alternative sleep treatments. **Conclusions:** Sleep is a common reason for cannabis use during pregnancy that appears to be a promising target for prevention and intervention efforts.

Key words: = insomnia; women; marijuana; sleep health; child

In the United States, 56 to 74% of adults who use cannabis do so at least in part to manage sleep concerns (Bachhuber et al., 2019; Gelberg et al., 2024). The majority of those who use cannabis for sleep report that it is highly effective (Bachhuber et al., 2019), and they tend to report better sleep quality on days of cannabis use (Davis et al., 2025; Tervo-Clemmens et al., 2023). However, in a recent review (Velzeboer et al., 2022), only 7 out of 19 randomized controlled trials (37%) found that cannabis improved sleep over control: 4 in chronic pain, 1 among healthy adults, 1 in neurodegenerative disease, and 1 in sleep disorders. Authors also only found significant effects for self-reported, not objective, measures of sleep (Velzeboer et al., 2022). Ultimately,

Corresponding Author: Mary Beth Miller, PhD, University of Missouri School of Medicine, Department of Psychiatry, 1 Hospital Drive DC067.00, Columbia, Missouri, 65212. Phone: (573) 882-1813. Email: millmary@health.missouri.edu.

investigators leading this and other reviews concluded that the variety of methods, measures, patients, and cannabis formulations across trials render data insufficient for strong clinical recommendations (Suraev et al., 2020; Velzeboer et al., 2022). However, in a recent placebo-controlled trial among those with insomnia, cannabis negatively impacted objective measures of nighttime sleep and led to small increases in next-day sleepiness (Suraev et al., 2025). Thus, cannabis does not seem particularly promising in improving sleep among those with sleep disorders, although it may hold promise for those experiencing pain.

Pregnancy is a developmental period often characterized by both physical discomfort and sleep problems (Facco et al., 2022). Recent data suggest that pregnant adults are also turning to cannabis use to relieve discomfort. In the United States, between 2022-2023, estimates of prenatal cannabis use ranged from 4-17% of pregnancies (Subsance Abuse and Mental Health Services Administration [SAMHSA], 2024; Zaugg et al., 2024). However, rates are likely underestimated, as one clinic-based study using self-report and urinalysis to identify prenatal substance use between 2010-2015 (in a state where cannabis was not legal) found that 31% of women used cannabis during their pregnancies, and 69% of those would have been misclassified as NOT using cannabis if they had relied on self-report alone (Murnan et al., 2022). Underreporting of cannabis use during pregnancy is understandable, as the legal risks vary widely across states and, in some cases, can result in loss of custody or criminal charges (American College of Obstetricians and Gynecologists [ACOG], 2017). In either case, rates are significantly higher than in the last quarter century (Volkow et al., 2019). Increasing use of cannabis during pregnancy is concerning because prenatal cannabis use is associated with a range of short- and long-term effects in exposed offspring, including premature birth, internalizing/externalizing behaviors, sleep problems, impaired cognition, and gray matter volume (Lo et al., 2024; Paul et al., 2021). As such, preventing use of cannabis in pregnancy has high public health impact.

Few studies have examined use of cannabis for sleep among pregnant adults. However, based on available data, sleep motives are even more prevalent among pregnant adults than others who use cannabis. In one epidemiological survey of 946 adults reporting prenatal cannabis use, 79% reported using to help them sleep (Zaugg et al., 2024). The only more common reasons for use were to relieve nausea (80%) and to relieve stress or anxiety (81%; Zaugg et al., 2024). Although women who do and do not use cannabis during pregnancy report similarly poor sleep quality (Murnan et al., 2022), many pregnant adults report that cannabis is not only effective at self-managing symptoms but also safer than other treatment options (Gunn et al., 2024; Zaugg et al., 2024). The belief that cannabis is safer and more effective than alternative treatments indicates a treatment gap for pregnant adults, as cognitive behavioral therapy (CBT) for insomnia retains efficacy during pregnancy (Felder et al., 2020; Kalmbach et al., 2020; Manber et al., 2019; Silang et al., 2024) and is the recommended treatment of choice for prenatal insomnia (Palagini et al., 2022). However, prenatal "poor sleep quality" could be related to a variety of factors (e.g., nausea, anxiety) that are not necessarily insomnia. Studies to date have not characterized the sleep complaints of this population in a way that allows us to determine if they likely meet diagnostic criteria for insomnia; specifically, difficulty initiating or maintaining sleep (typically, >30 minutes) 3+ nights per week that causes distress or impairment and persists for 3+ months (American Psychological Association [APA], 2013; Edinger et al., 2004).

This study aimed to characterize the sleep complaints of adults using cannabis during pregnancy, particularly those using cannabis to help with sleep. Given the dearth of research in this area and the need to protect participant confidentiality, we focused on self-reported (versus objective) sleep parameters. First, we evaluated motives for cannabis use among pregnant adults. We expected sleep to be a common motive for cannabis use, based on previous population-based studies (Zaugg et al., 2024). As such, we planned to compare the demographic and clinical characteristics of pregnant adults who do and do not use cannabis to help their sleep. We examined type and duration of sleep problems, perceived efficacy of cannabis in improving sleep problems, and interest in alternative sleep treatments. We hypothesized (1) that sleep would be among the most common reasons for cannabis use among

pregnant adults, (2) that those using cannabis primarily for sleep would report worse sleep parameters and more severe insomnia than those using cannabis primarily for other reasons, and (3) that pregnant adults would express interest in alternative treatment strategies to improve their sleep. Hypotheses were not preregistered, so analyses are considered exploratory.

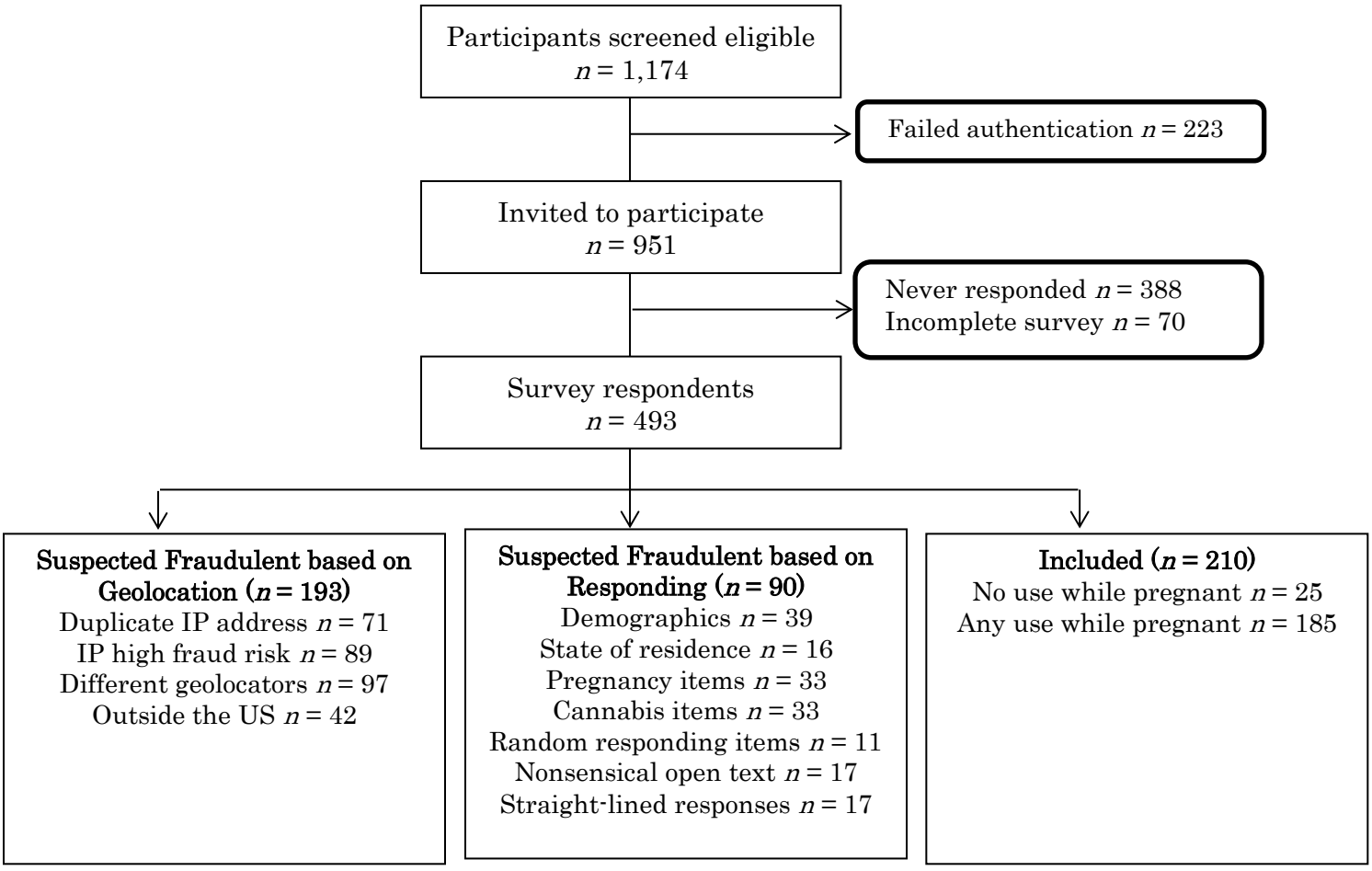
METHODS

Participants and Procedure

All methods and procedures were approved by the University of Missouri Institutional Review Board (IRB #2126108). Participants were recruited from across the United States between May and August 2025 by the digital marketing company BuildClinical. Advertisements were posted across a range of platforms, such as Google, Bing, Facebook, Instagram, Snapchat, and WebMD. Eligible participants (1) were over 18 years of age, (2) lived in the United States, (3) were currently pregnant, and (4) used cannabis "in the month prior to becoming pregnant or after becoming pregnant." As noted above, the legal ramifications of prenatal cannabis use vary across states. To avoid mandated reporting, we screened for cannabis use either during or shortly prior to pregnancy and we did not link participant names to their research data.

Individuals who screened eligible were sent a link to the informed consent, which they provided online from remote locations. They were then redirected to the online research survey and, separately, a contact information survey. Participants were compensated $10 via electronic gift card for participating. Participant flow is depicted in Figure 1. Demographics and clinical characteristics are reported in Tables 1 and 2.

Figure 1. *Participant Flow and Data Integrity*



Measures

Pregnancy. Participants were asked about their current pregnancy using items derived from the Women's Health Initiative (Matthews et al., 1997); specifically, how far along they were in weeks, how far along they were when they found out they were pregnant, and (if applicable) how far along they were when their pregnancy was confirmed by a medical practitioner.

Cannabis Use. Select items from the Daily Sessions, Frequency, Age of Onset, and Quantity of Cannabis Use Inventory (DFAQ-CU) were used to measure current cannabis use behaviors (Cutler & Spradlin, 2017). Participants reported when they last used cannabis: yesterday, this week, last week, less than one month ago, 1-3 months ago, 3-6 months ago, 6-9 months ago, 9-12 months ago, or over a year ago. They then responded to three separate items about frequency of use: before becoming pregnant, after becoming pregnant but before learning they were pregnant, and since learning they were pregnant. Response options were 0 (did not use cannabis), 1 (less than once a year), 2 (once a year), 3 (once every 3-6 months), 4 (once every 2 months), 5 (once a month), 6 (2-3 times per month), 7 (once per week), 8 (twice per week), 9 (3-4 times per week), 10 (5-6 times per week), 11 (once per day), and 12 (more than once per day). The "since learning you were pregnant" item was used to categorize participants as using or not using cannabis during [known] pregnancy. Participants also indicated the primary method they use to ingest cannabis, as well as any other methods they use regularly (at least 25% of the time that they use) and the amount they consume in a typical day (in grams).

Participants completed the Cannabis Use Disorders Identification Test-Revised (CUDIT-R; Adamson et al., 2010) in reference to their use in the six months before they became pregnant. The CUDIT-R is an 8-item measure of quantity, frequency, and problems related to cannabis use. A cut-score ≥13 is recommended, as it demonstrates 91% sensitivity and 90% specificity in identifying Cannabis Use Disorder as diagnosed using a structured clinical interview (Adamson et al., 2010).

Cannabis motives. Motives for cannabis use were derived from the Comprehensive Marijuana Motive Questionnaire (CMMQ; Lee et al., 2009) and Gunn and colleagues' (2024) paper examining motives for cannabis use specifically in pregnancy. Investigators added four additional motive items: a single item for each of the four substance use motives described by Cooper and colleagues (1994; coping, enhancement, social, and conformity). The wording and response options for all items are depicted in Table 3. Items are grouped together for ease of interpretation; no total or subscale scores were derived.

Cannabis expectancies. Participants completed the 12-item Sleep-Related Cannabis Expectancies Questionnaire (Goodhines et al., 2020), which assesses both positive and negative expectancies as they relate to sleep. Abbreviated items and response options are depicted in Table 4. Given the descriptive aims of this study, no total or subscale scores were computed.

Insomnia symptoms. Past-month symptoms of insomnia were measured using the 7-item Insomnia Severity Index (Morin et al., 2011), which assesses difficulty falling and staying asleep, distress, and daytime dysfunction. Responses options range from 0 to 4, with higher total scores indicating more severe insomnia. Internal consistency in this sample was good (α = .85). A cut-score of 15 has historically been used to indicate clinical insomnia (Bastien et al., 2001), although a cut-score of 10 is recommended for screening in community samples (Morin et al., 2011). For those reporting difficulty falling or staying asleep, we also assessed how long they had been having sleep problems: 0-2 months, 3-5 months, 6-8 months, 9-11 months, ~1 year, ~2 years, ~3 years, etc. (up to 20 years).

Sleep pattern. Consensus sleep diary items (Carney et al., 2012) were modified to assess patterns "on your most TYPICAL night of sleep in the past month (ignoring the extremes)." Participants reported what time they try to go to sleep (bedtime); how long it usually takes to fall asleep (sleep onset latency); how many times (in one night) they typically wake up and then fall back asleep again (number of awakenings); if they added all those times together, how long they are awake at night (wake after sleep onset); and the time of their final awakening (waketime). They also rated the quality of their sleep on a scale from 0 (very poor) to 4 (very good).

Sleep treatment. Participants indicated if they had ever talked to a professional or sought treatment for their sleep (no, in the past, current)

and what (if any) strategies they had tried to help their sleep (open text response). They also indicated if they had ever used a sleep medication and, if so, which medication (open text). They also indicated if they were "interested in treatment for your sleep." Response options were 0 (no, not right now), 1 (a little interested), 2 (moderately interested), 3 (much interested), and 4 (very much interested).

Comorbid mental health symptoms. The four-item version of the Patient Health Questionnaire (PHQ-4) was used to measure symptoms of depression and anxiety in the past two weeks (Kroenke et al., 2009). The PHQ-4 includes two items for depression ("feeling down, depressed, or hopeless" and "little interest or pleasure in doing things") and two items for anxiety ("feeling nervous, anxious, or on edge" and "not being able to stop or control worrying"). Items are scored on a scale from 0 (not at all) to 3 (nearly every day), and summed scores ≥3 for either set of items indicates a positive screen (Kroenke et al., 2003). Internal consistency for both subscales was good (depression α = .80; anxiety α = .87).

The four-item version of the PTSD Checklist for DSM-5 was used to assess symptoms of PTSD (Price et al., 2016). Responses range from 0 (not at all) to 3 (extremely) and are summed to create a total score. Scores ≥10 are categorized as a positive PTSD screen. Internal consistency in this sample was good (α = .86).

Data Screening and Analysis

Responses were vetted thoroughly for fraudulent and inconsistent responding (see Figure 1). All responses from duplicate IP addresses were excluded. Duplicate latitudes/longitudes were allowed based on Qualtrics communication that these estimates are typically only valid at the city (sometimes state) level. IP addresses were also vetted through malicious virtual private network (VPN) detection software (e.g., ip.teoh.io/vpn-detection, ipqualityscore.com/vpn-ip-address-check), and those flagged as high fraud risk by 2+ websites were excluded. Geolocations for research and contact information surveys were required to match unless the participant was using a VPN, which was allowed due to the confidential nature of survey items. Participant responses were also excluded if (a) the demographics and state of residence reported on the screener did not match demographics and state of residence reported on the research survey, (b) participants no longer reported being pregnant or use of cannabis, (c) pregnancy, cannabis, or other responses were not realistic (e.g., doctor confirmed pregnancy at 2 weeks gestation), (d) they failed 2+ random responding items, (e) they provided non-sensical open text responses (e.g., "Gggg"), or (e) they chose the same multiple choice response for all items on multiple measures ("straight-lined" responses).

Descriptive statistics were used to evaluate motives for cannabis use among those reporting prenatal use, as well as the nature and onset of sleep problems and interest in alternative treatment strategies. Chi-square and independent samples t-tests were used to compare the demographic and clinical characteristics of those reporting cannabis use primarily for sleep vs. other reasons. Effect sizes were estimated using odds ratios for chi-square analyses and Cohen's *d* for t-tests. Participants were categorized as using cannabis primarily for sleep if they reported using to help with sleep (CMMQ #24) "most of the time" or "almost always / always." Hypothesized associations (i.e., differences in sleep parameters) were considered statistically significant at alpha < .05. All other comparisons were interpreted at alpha ≤ .005.

RESULTS

The final sample included 210 participants, all assigned female at birth, from 36 different states. Their average age was 29.32 years (*SD* = 4.37). Most participants (*n* = 195; 93%) identified as cisgender, 3 as non-binary, and 12 declined to respond. Collectively, 88% of participants reported continued cannabis use – and 77% reported weekly cannabis use – after learning they were pregnant. Only three participants reported an increase in frequency of use after learning they were pregnant: all three transitioned from using multiple times per week to using daily. Other demographic and clinical characteristics are reported in Tables 1 and 2.

Table 1. *Demographic Characteristics of Pregnant Adults Who Use Cannabis (N = 210)*

	Full sample (*N* = 210)	**No prenatal cannabis use (*n* = 25)**	**Cannabis use not for sleep (*n* = 66)**	**Cannabis use mostly for sleep (*n* = 119)**	**Cannabis group differences**			
Characteristics	*M* or *n*	*M* or *n*	*M* or *n*	*M* or *n*	$\chi^2(1)$; *t*(*df*)	*p*	Effect size	95% CI
Age, *M* (*SD*)	29.32 (4.37)	30.12 (4.94)	29.23 (4.45)	29.21 (4.22)	0.03 (183)	.979	0.004	-0.30, 0.31
Gestational age, *M* (*SD*)	19.32 (8.35)	18.48 (8.75)	19.05 (7.35)	19.66 (8.83)	0.48 (183)	.634	-0.07	-0.37, 0.23
First trimester, *n* (%)	47 (22%)	9 (36%)	12 (18%)	26 (22%)	0.35 (1)	.554	1.26	0.59, 2.70
Second trimester, *n* (%)	121 (58%)	10 (40%)	43 (65%)	68 (57%)	1.14 (1)	.287	0.71	0.38, 1.33
Third trimester, *n* (%)	42 (20%)	6 (24%)	11 (17%)	25 (21%)	0.51 (1)	.475	1.33	0.61, 2.91
Race/ethnicity, *n* (%)	---	---	---	---	---	---	---	---
Asian or Asian American	2 (1%)	0 (0%)	1 (2%)	1 (<1%)	0.18 (1)	.671	0.55	0.03, 8.95
Black or African American	80 (38 %)	8 (32%)	27 (41%)	45 (38%)	0.09 (1)	.764	0.91	0.49, 1.68
Latine	9 (4%)	3 (12%)	1 (2%)	5 (4%)	0.98 (1)	.323	2.85	0.33, 24.93
Multiracial or Other	3 (1%)	0 (0%)	1 (2%)	2 (2%)	0.20 (1)	.652	1.68	0.17, 16.49
Nat Am or Alaskan Nat	4 (2%)	0 (0%)	2 (3%)	2 (2%)	0.01 (1)	.912	0.92	0.50, 1.68
White or Caucasian	112 (53%)	14 (56%)	34 (52%)	64 (54%)	0.08 (1)	.781	0.92	0.21, 3.98
Marital status, *n* (%)	---	---	---	---	---	---	---	---
Never married	68 (32%)	10 (40%)	17 (26%)	41 (35%)	1.49 (1)	.222	1.52	0.78, 2.96
Married/living with partner	135 (64%)	14 (56%)	48 (73%)	73 (61%)	2.43 (1)	.119	0.60	0.31, 1.15
Divorced, separated, widow	7 (3%)	1 (4%)	1 (2%)	5 (4%)	0.98 (1.)	.323	2.85	0.33, 24.93
Committed partner, *n* (%)	194 (92%)	21 (84%)	64 (97%)	109 (92%)	2.02 (1)	.155	0.34	0.07, 1.60
Highest education, *n* (%)	---	---	---	---	---	---	---	---
High school or less	42 (20%)	3 (12%)	15 (23%)	24 (20%)	0.17 (1)	.683	0.86	0.41, 1.78
Some college	54 (26%)	8 (32%)	15 (23%)	31 (26%)	0.25 (1)	.616	1.20	0.59, 2.43
Assoc / bachelor's degree	98 (47%)	8 (32%)	34 (52%)	56 (47%)	0.34 (1)	.561	0.84	0.46, 1.53
Grad / professional degree	16 (8%)	6 (24%)	2 (3%)	8 (7%)	1.13 (1)	.287	2.31	0.48, 11.19
Employment, *n* (%)	---	---	---	---	---	---	---	---
Employed full-time	93 (44%)	14 (56%)	22 (33%)	57 (48%)	3.87 (1)	.049	1.87	1.00, 3.50
Employed part-time	40 (19%)	3 (12%)	16 (24%)	21 (18%)	1.10 (1)	.295	0.68	0.33, 1.41
Unemployed or disability	73 (35%)	7 (29%)	28 (42%)	38 (33%)	1.70 (1)	.192	0.66	0.35, 1.23
Health insurance, *n* (%)	189 (90%)	23 (92%)	55 (83%)	111 (93%)	4.56 (1)	.033	2.78	1.06, 7.29

Note. Assoc = associate's degree. CI = confidence interval. Nat = Native. For cross-tabs (*n*, %), odds ratios used to indicate effect size. For t-tests (*M*, *SD*), Cohen's *d* used to indicate effect size.

Table 2. *Cannabis Use, Sleep Patterns, and Comorbid Mental Health Symptoms Among Pregnant Adults Who Use Cannabis (N = 210)*

	Full sample (*N* = 210)	**No prenatal cannabis use (*n* = 25)**	**Cannabis use not for sleep (*n* = 66)**	**Cannabis use mostly for sleep (*n* = 119)**	**Cannabis group differences**			
Characteristics	*M* or *n*	*M* or *n*	*M* or *n*	*M* or *n*	$\chi^2(1)$; *t*(*df*)	*p*	Effect size	95% CI
Prenatal cannabis use, *n* (%)	---	---	---	---	---	---	---	---
Less than monthly	10 (5%)	0 (0%)	5 (8%)	5 (4%)	0.95 (1)	.331	0.54	0.15, 1.92
On a monthly basis	15 (7%)	0 (0%)	4 (6%)	11 (9%)	0.58 (1)	.447	1.58	0.48, 5.17
At least 1x per week	106 (51%)	0 (0%)	46 (70%)	60 (50%)	6.45 (1)	.011	0.44	0.23, 0.84
At least 1x per day	54 (26%)	0 (0%)	**11 (17%)**	**43 (36%)**	**7.79 (1)**	**.005**	**2.83**	**1.34, 5.98**
Regular forms of use, *n* (%)	---	---	---	---	---	---	---	---
Marijuana	185 (88%)	20 (80%)	57 (86%)	108 (91%)	0.85 (1)	.357	1.55	0.61, 3.96
Concentrates	67 (32%)	8 (32%)	23 (35%)	36 (30%)	0.41 (1)	.520	0.81	0.43, 1.54
Edibles	65 (31%)	11 (44%)	22 (33%)	32 (27%)	0.85 (1)	.356	0.74	0.38, 1.41
CUDIT score, *M* (*SD*)	18.67 (8.57)	16.28 (8.52)	17.80 (6.07)	19.66 (9.62)	1.60 (179)	.111	-0.16	-0.47, 0.14
CUDIT ≥13, *n* (%)	141 (67%)	14 (56%)	47 (71%)	80 (67%)	0.31 (1)	.576	0.83	0.43, 1.60
Insomnia severity, *M* (*SD*)	12.73 (5.29)	12.76 (7.17)	**11.06 (4.37)**	**13.66 (5.10)**	**3.48 (183)**	**<.001**	**-0.53**	**-0.84, -0.23**
ISI ≥10, *n* (%)	161 (77%)	15 (60%)	47 (71%)	99 (83%)	3.66 (1)	.056	2.00	0.98, 4.10
ISI ≥15, *n* (%)	69 (33%)	9 (36%)	**13 (20%)**	**47 (40%)**	**7.59 (1)**	**.006**	**2.66**	**1.31, 5.41**
Duration (years), *M* (*SD*)	3.22 (5.94)	3.97 (6.24)	**1.74 (4.40)**	**3.94 (6.52)**	**2.54 (154)**	**.012**	**-0.38**	**-0.70, -0.05**
Bedtime (military time)	23.1 (1.68)	22.45 (1.18)	**23.66 (2.06)**	**22.87 (1.44)**	**2.99 (178)**	**.003**	**0.47**	**0.16, 0.78**
Sleep onset latency (min)	36.67 (28.30)	38.20 (29.65)	41.82 (27.81)	33.41 (28.06)	1.95 (180)	.053	0.30	-.003, 0.60
SOL >30min, *n* (%)	88 (42%)	11 (44%)	**38 (58%)**	**39 (33%)**	**10.75 (1)**	**.001**	**0.36**	**0.19, 0.67**
Wake after sleep onset	42.6 (45.91)	60.40 (54.79)	**29.15 (35.42)**	**46.21 (47.42)**	**2.53 (179)**	**.012**	**-0.39**	**-0.70, -0.09**
WASO >30min, *n* (%)	83 (40%)	11 (44%)	20 (30%)	52 (44%)	3.20 (1)	.072	1.79	0.94, 3.38
Waketime (military time)	6.8 (1.93)	6.95 (2.21)	6.61 (2.06)	6.91 (1.80)	1.02 (181)	.310	-0.16	-0.46, 0.15
Total sleep time (hours)	6.2 (1.49)	6.62 (1.59)	5.92 (1.48)	6.28 (1.46)	1.58 (180)	.116	-0.24	-0.55, 0.06
Sleep quality (0 to 4)	1.8 (0.98)	1.80 (1.19)	1.79 (0.89)	1.77 (1.00)	0.10 (183)	.920	0.02	-0.29, 0.32
Anxiety (PHQ ≥3), *n* (%)	58 (28%)	7 (28%)	**9 (14%)**	**42 (35%)**	**9.97 (1)**	**.002**	**3.46**	**1.56, 7.67**
Depression (PHQ ≥3), *n* (%)	57 (27%)	5 (20%)	**9 (14%)**	**43 (36%)**	**10.63 (1)**	**.001**	**3.58**	**1.62, 7.95**
PTSD (PCL ≥10), *n* (%)	21 (10%)	3 (12%)	2 (3%)	16 (13%)	5.24 (1)	.022	4.97	1.11, 22.34

Note. Avg = average. CI = confidence interval. CUDIT = Cannabis Use Disorder Identification Test. ISI = Insomnia Severity Index. Med = medication. PCL = PTSD Checklist for DSM-5 (4-item version). PHQ = Patient Health Questionnaire (4-item version). SOL=sleep onset latency. WASO = wake after sleep onset. For cross-tabs (*n*, %), odds ratios used to indicate effect size. For t-tests (*M*, *SD*), Cohen's *d* used to indicate effect size.

In total, 119 participants (57%) reported using cannabis primarily for sleep (see Table 3). After adjusting for inflation in Type I error ($p \leq .005$), participants who reported using cannabis primarily for sleep did not differ from those using for other reasons on demographic variables (see Table 1); however, those using cannabis for sleep were more likely to screen positive for anxiety and depression and were more likely to report daily cannabis use (see Table 2).

Sleep Motives and Expectancies for Cannabis Use

As expected, "to help with sleep" (64%) was among the most common motives for cannabis use among those who persisted in cannabis use (N = 185), alongside "to relax" (72%), "to feel good" (66%), "to calm down" (65%), and "to improve my mood" (64%; see Table 3). Roughly half of participants (50-52%) reported mostly or almost always using cannabis to manage their appetite or help with physical symptoms like nausea or pain. Sleep differences between those who did and did not report use of cannabis mostly for sleep are depicted in Tables 2 and 4. As hypothesized, those using cannabis for sleep reported greater insomnia severity (M = 13.66 vs. 11.06) and longer wake after sleep onset (M = 46.21 vs. 29.15) than those using for other reasons (see Table 2). However, groups did not differ in total sleep time (M = 6.28 vs. 5.92) or sleep quality (M = 1.77 vs. 1.79), and those using cannabis for sleep were less (not more) likely than those using cannabis for other reasons to report sleep onset latency >30 minutes (33% vs. 58%; see Table 2). In terms of sleep expectancies for cannabis use, those using cannabis for sleep reported stronger beliefs that cannabis would lead to faster (M = 3.65 vs. 3.14), longer (M = 3.06 vs. 2.56), better-quality (M = 3.45 vs. 3.03), and more satisfying sleep (M = 3.50 vs. 2.97; see Table 4).

Table 3. *Motives for Cannabis Use Among Adults Reporting Use During Pregnancy (N = 185)*

	Average score	"Mostly" or "almost always"
Motives for cannabis use	*M* (*SD*)	*n* (%)
Coping motives		
To relax (G1)	2.89 (0.96)	134 (72%)
To calm down (G2)	2.81 (1.14)	121 (65%)
To help with sleep (CMMQ24)	2.76 (1.18)	119 (64%)
To improve my mood (G4)	2.63 (1.16)	119 (64%)
To manage stress (G10)	2.69 (1.22)	117 (63%)
To help with anxiety (G3)	2.71 (1.29)	115 (62%)
Because I am having problems sleeping (CMMQ30)	2.51 (1.37)	99 (54%)
To avoid a negative mood or emotion (T1)	2.44 (1.23)	99 (54%)
To manage my appetite (G7)	2.43 (1.26)	96 (52%)
To help with nausea (G8)	2.38 (1.36)	93 (50%)
To manage physical symptoms (G6)	2.32 (1.28)	92 (50%)
To help with pain (G9)	2.37 (1.24)	92 (50%)
Because I am depressed (CMMQ6)	1.93 (1.39)	73 (40%)
To increase energy (G5)	1.96 (1.38)	67 (36%)
To forget my problems (CMMQ14)	1.72 (1.37)	57 (31%)
To escape from my life (CMMQ21)	1.58 (1.37)	53 (29%)
Enhancement motives		
To feel good (CMMQ34)	2.82 (1.10)	122 (66%)
To enjoy the effects of it (CMMQ15)	2.62 (1.17)	116 (63%)
To enhance my positive mood (T2)	2.28 (1.14)	88 (48%)
Because it is fun (CMMQ7)	2.10 (1.29)	80 (43%)
Social motives		
To have fun in a social setting (T3)	2.05 (1.30)	76 (41%)
To celebrate (CMMQ13)	1.95 (1.28)	69 (37%)
Because it is a special occasion (CMMQ25)	1.88 (1.33)	64 (35%)
Because it is a special day (CMMQ4)	1.69 (1.28)	56 (30%)

Conformity motives		
To be cool (CMMQ8)	1.40 (1.47)	59 (32%)
To avoid being socially isolated (T4)	1.46 (1.41)	54 (29%)
Because I feel pressure from others to use (CMMQ5)	1.04 (1.33)	39 (21%)
I don't want to be the only one not using (CMMQ20)	0.97 (1.28)	28 (15%)
Other motives		
I was under the influence of alcohol (CMMQ1)	0.95 (1.08)	26 (14%)

Note. Sleep motives highlighted in gray. Items were derived from the Comprehensive Marijuana Motives Questionnaire (CMMQ), Gunn and colleagues' 2024 paper ("G"), and theory ("T"). Response options were (0) almost never / never, (1) some of the time, (2) half of the time, (3) most of the time, and (4) almost always / always

Table 4. *Sleep-Related Cannabis Expectancies Among Pregnant Adults Who Use Cannabis (N = 210)*

	No prenatal cannabis use (*n* = 25)	**Cannabis use not for sleep (*n* = 66)**	**Cannabis use mostly for sleep (*n* = 119)**	**Cannabis group differences**			
If I used cannabis before bed…	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*t* (df)	*p*	Cohen's *d*	95% CI
1. Fall asleep faster	2.92 (1.19)	**3.14 (0.82)**	**3.65 (0.53)**	**5.13 (183)**	**<.001**	**-0.79**	**-1.10, -0.48**
2. More tired the next day	1.24 (1.30)	0.91 (0.84)	1.12 (1.17)	1.28 (183)	.202	-0.20	-0.50, 0.11
3. Sleep poorly	0.56 (0.65)	0.65 (0.75)	0.64 (0.92)	0.97 (183)	.923	0.02	-0.29, 0.32
4. Difficulty concentrating	0.96 (1.31)	0.67 (0.88)	0.80 (1.06)	0.86 (183)	.393	-0.13	-0.43, 0.17
5. Sleep longer	2.56 (1.33)	**2.56 (1.08)**	**3.06 (0.88)**	**3.20 (113)**	**.002**	**-0.52**	**-0.83, -0.22**
6. Increase wakefulness next day	1.92 (1.32)	2.23 (0.89)	2.18 (1.08)	0.33 (183)	.745	0.05	-0.25, 0.35
7. Improve quality of my sleep	2.80 (1.12)	**3.03 (0.74)**	**3.45 (0.66)**	**3.99 (183)**	**<.001**	**-0.61**	**-0.92, -0.31**
8. More alert during the day	1.84 (1.21)	2.53 (1.21)	2.57 (1.18)	0.23 (183)	.822	-0.04	-0.34, 0.27
9. More satisfied with my sleep	2.80 (1.32)	**2.97 (0.91)**	**3.50 (0.62)**	**4.64 (183)**	**<.001**	**-0.71**	**-1.02, -0.40**
10. Get more things done	2.24 (1.27)	2.52 (1.10)	2.94 (1.01)	2.66 (183)	.008	-0.41	-0.71, -0.10
11. Wake up more times	0.96 (1.02)	0.82 (0.99)	1.08 (1.09)	1.59 (183)	.114	-0.24	-0.55, 0.06
12. Harder for me to function	0.92 (0.95)	0.67 (0.98)	0.89 (1.05)	1.43 (183)	.156	-0.22	-0.52, 0.08

Note. Response options were (0) strongly disagree, (1) disagree, (2) neutral, (3) agree, and (4) strongly agree. Items 1, 5, 6, 7, 8, 9, and 10 represent positive expectancies; and items 2, 3, 4, 11, and 12 represent negative expectancies. CI = confidence interval.

Treatment History and Interest

Approximately half of participants (47%) reported talking to a professional or seeking treatment for their sleep, and two out of five (39%) had tried a sleep medication (e.g., melatonin, trazadone, doxylamine). When asked what strategies they had tried to help their sleep, many participants reported environmental strategies like turning off the television, using a white noise machine, or making their room cool (47%); incorporating relaxation or yoga into their bedtime routine (20%); mobile phone apps (15%); and exercise (8%).

Of the 119 using cannabis to help with sleep, 93 (78%) reported at least some level of interest in

alternative treatments for their sleep: 13 (11%) a little interest, 12 (10%) moderate interest, 30 (25%) much, and 38 (32%) very much interest. All but five participants (98%) expressed interest in participating in a future study examining how cannabis use affects sleep that night, and 93% expressed interest in research that would teach them skills to improve their sleep.

Exploratory Analyses

In an exploratory set of analyses, hierarchical linear regression was used to determine if use of cannabis for sleep predicts unique variance in insomnia severity (ISI total score) after accounting for other common predictors of insomnia. To determine which cannabis motives should be included in the model, we first conducted a linear regression including all 29 cannabis motives as predictors (see Table 3 for list of items). The only single-item motive associated with insomnia severity was "because I am having problems sleeping" (B = 1.23 ,95% CI: 0.48, 1.98, p=.001); therefore, this was the only cannabis motive included in the final model. Step 1 predictors included participant age, gestational age, current frequency of cannabis use (from 0 "no use" to 12 "more than once a day"), symptoms of anxiety and depression (PHQ subscale scores), and symptoms of PTSD (PCL total score). This set of predictors accounted for 14% of variance in insomnia severity, $F(6, 203) = 6.70$, $p < .001$; adj. R^2 = .141. In Step 2, use of cannabis for sleep problems accounted for 10% unique variance in insomnia severity, $F(7,202) = 10.50$, $p < .001$; ΔR^2 = .022, p = .102. See Table 5 for coefficients.

Table 5. *Final Step of Hierarchical Regression Predicting Insomnia Severity Among Pregnant Women Who Use Cannabis (N = 210)*

Predictor	*B* (*SE*)	95% CI	ß	*p*
Intercept	9.65 (2.46)	4.79, 14.50	---	<.001
Age (years)	-0.08 (0.07)	-0.22, 0.07	-0.06	.305
Gestational age (weeks)	0.04 (0.04)	-0.04, 0.11	0.06	.366
Frequency of cannabis use	-0.10 (0.09)	-0.28, 0.09	-0.07	.291
Symptoms of anxiety (PHQ)	0.49 (0.30)	-0.10, 1.07	0.15	.106
Symptoms of depression (PHQ)	0.58 (0.31)	-0.02, 1.19	0.19	.059
Symptoms of PTSD (PCL)	0.04 (0.09)	-0.14, 0.22	0.03	.633
Use of cannabis for sleep problems	1.39 (0.26)	0.87, 1.91	0.34	<.001

Note. CEQ = Cannabis Expectancy Questionnaire. PHQ = Patient Health Questionnaire (four-item version). PCL = PTSD Checklist for DSM-5 (four-item version).

DISCUSSION

In this study designed for adults who used cannabis the month before or during pregnancy, 88% persisted in use after learning they were pregnant. This is not a true persistence rate, since participants were selected for cannabis use; however, a recent population-based study on cannabis use in pregnancy found a persistence rate of 58% (Roberts et al., 2023). This is higher than the 45-50% persistence rates found for nicotine use during pregnancy (Kim, 2020; Kipling et al., 2024) and much higher than the 10-15% persistence rates for alcohol use (Brown et al., 2016; Gosdin et al., 2022). Indeed, the persistence rate for prenatal cannabis use is closer to the 60-75% persistence rates in use of caffeine during pregnancy (Weng et al., 2008; Zhang et al., 2022). Given the negative effects of prenatal cannabis on exposed offspring (Lo et al., 2024; Paul et al., 2021), such high persistence rates warrant discussion on how to prevent or intervene on cannabis use during pregnancy. Sleep appears to be a promising target for such intervention efforts, as 119 (64%) of the 185 pregnant adults who persisted in cannabis during pregnancy reported doing so "most of the time," if not "always," to help their sleep.

Consistent with the one other study examining sleep among those who use cannabis during pregnancy, "poor sleep was the rule" in this sample (Murnan et al., 2022). Three out of four participants (77%) screened positive for clinically significant insomnia, and one in three (33%) reported an insomnia severity score that demonstrates 98-100% specificity in classifying

DSM-5 Insomnia Disorder (ISI ≥15; Morin et al., 2011). Consistent with hypotheses, those using cannabis for sleep reported greater insomnia severity than those who do not, even after controlling for common confounding variables. In terms of sleep patterns on a typical night, the sleep of those using cannabis as a sleep aid largely mirrored the sleep of those using cannabis for other reasons (as well as those who discontinued cannabis use). They went to bed ~45 minutes earlier, but reported similar time awake at night (~30-45 minutes), sleep duration (~6.5-7.0 hours), and sleep quality (on average, poor to fair). Thus, our data do not support cannabis as a particularly effective sleep aid during pregnancy.

We found only one potential insight into why pregnant adults may continue using cannabis for sleep when their sleep (with cannabis) continues to be poor: sleep onset latency. Although both groups reported taking ~30-45 minutes to fall asleep, a smaller proportion of those using cannabis for sleep reported taking >30 minutes to fall asleep on a typical night (33% vs. 58%). This finding is consistent with their positive sleep-related expectancies for cannabis use and raises the possibility that cannabis use before bedtime facilitates sleep onset in this population. This would be consistent with day-level and experimental research indicating that bedtime cannabis use is linked to quicker sleep onset among those who regularly use cannabis (Gorelick et al., 2013; Sznitman et al., 2020; Sznitman et al., 2023). Although individuals may build tolerance to cannabis' sleep-inducing effects (Gorelick et al., 2013), this day-level association between cannabis and quicker sleep onset is one of only two cannabis/sleep associations that is found consistently in the literature. Interestingly, the only other consistent association links cannabis use to greater next-day sleepiness/fatigue (Goodhines et al., 2019; Gorelick et al., 2013; Nicholson et al., 2004). Micro-longitudinal and experimental studies have found conflicting results for every other aspect of sleep health tested. For example, although many studies have linked cannabis use to better subjective sleep quality that night (Bidwell et al., 2024; Davis et al., 2025; Graupensperger et al., 2021; Tervo-Clemmens et al., 2023), some studies have failed to find such day-level associations (Nance et al., 2025; Wycoff et al., 2024). For nighttime wakefulness, studies have found positive (Nicholson et al., 2004), negative (Goodhines et al., 2019), and null associations (Sznitman et al., 2020; Sznitman et al., 2023). Similarly, in terms of total sleep time, studies have found positive (Goodhines et al., 2019; Nance et al., 2025; Sznitman et al., 2023), negative (Gorelick et al., 2013), and null associations (Wycoff et al., 2024). The pattern of findings from this study seem to concur with the gestalt of this literature: that cannabis use may result in modest improvements in sleep onset among pregnant adults, but this perceived benefit is likely outweighed by disruptions in sleep throughout the night. However, such statements are speculative, as no research has tested within-person associations between prenatal cannabis use and same-night sleep parameters.

Studies testing the acute or day-level effects of cannabis on sleep among pregnant adults are non-existent. Since cannabis has demonstrated efficacy in improving sleep among those with chronic pain (Velzeboer et al., 2022), it is possible that cannabis relieves pain or perhaps nausea during pregnancy, which may make it easier to fall asleep at the day level, even in the absence of between-person associations. Experimental studies testing this hypothesis would not be ethical, given the harms of prenatal cannabis use to the fetus. However, if confidentiality could be ensured, daily diary or ecological momentary assessment studies could be used to characterize event-level associations between naturalistic cannabis use and same-night sleep in pregnancy. This study provides preliminary data on the feasibility of recruiting this population: with assurances of confidentiality and legal protections in place, we were able to recruit 210 respondents in a three-month period, and almost all expressed interest in participating in future research studies. Thus, it seems pregnant adults who use cannabis are willing – if not eager – to help advance this science.

It is also possible that prospective studies would document different motives for prenatal cannabis use than retrospective studies. For example, only ~50% of participants reported using cannabis to help with nausea in this study, while use of cannabis to relieve nausea was endorsed by ~80% of participants in prior studies (Zaugg et al., 2024). We speculate that our findings may differ from previous studies because prior research asked about reasons for use during pregnancy

retrospectively (e.g., why did you use when you were pregnant), in which case participants are likely considering reasons for use throughout their entire pregnancy. In contrast, since our participants were currently pregnant, they may have been reporting on cannabis motives in the current moment, which may differ based on trimester (e.g., nausea may seem more relevant for those still in the first trimester of pregnancy, while pain or anxiety may be more salient for those in their third trimester).

From a clinical perspective, findings emphasize the need to address sleep concerns among pregnant adults, particularly those with a history of cannabis use. Many participants reported seeking treatment for sleep problems in the past, which raises concern that cannabis is the most effective sleep aid they have tried. Still, three out of four pregnant adults who used cannabis for sleep (78%) expressed interest in alternative treatments for sleep, and 32% reported "much" or "very much" interest. Notably, those using cannabis for sleep also reported higher rates of anxiety, depression, and PTSD than those using cannabis for other reasons. Depression and anxiety commonly co-occur with insomnia (Morin & Jarrin, 2022), and they are also conditions for which medical cannabis is often pursued (Metrik et al., 2018; Park & Wu, 2017). In a nationally representative sample of pregnant and postpartum women in the United States, rates of anxiety and depression were 16 to 19%, and odds of cannabis use were higher among those with mood and anxiety disorders (Brown et al., 2023). Thus, symptoms of anxiety and depression are likely the norm among pregnant adults who use cannabis. Fortunately, the recommended first line of treatment for insomnia – cognitive behavioral therapy – maintains efficacy in improving sleep in the context of comorbid mental health and medical disorders (Hertenstein et al., 2022; Zhou et al., 2020).

Limitations

Findings should be interpreted with a few limitations in mind. First, participants did not report identifying information on the research survey because we wanted to protect them from potential legal repercussions of reporting prenatal cannabis use. As a result, we were unable to verify participant identities and had to rely on rigorous data integrity review to ensure valid responding. Longitudinal studies aiming to recruit pregnant adults who use cannabis may need to consult a lawyer or general counsel office to conduct a state-by-state survey of reporting laws before recruiting participants. This will allow investigators to safeguard confidentiality and ensure that participants have no legal reason to underreport their substance use. We strongly encourage these methods for future research, given the documented long-term consequences of prenatal cannabis use and corresponding public health impact (Lo et al., 2024; Paul et al., 2021).

Given the cross-sectional nature of available data, it is also impossible to determine the directionality of potential associations. Specifically, do sleep problems lead to cannabis use, does cannabis use lead to poor sleep, is there an unmeasured confounding variable, or maybe all are true? These data were not designed and are insufficient to answer these research questions. The modified, retrospective daily sleep diary items also fail to capture the ecological validity and night-to-night variability of true daily diary designs. Similarly, this study focused on self-reported (not objective) sleep. We chose to focus on self-reported sleep to protect data anonymity, because objective measures of sleep are not required for diagnosis of insomnia (Buysse et al., 2006), and because subjective sleep experiences may be more relevant to self-medication. However, research documenting associations between prenatal cannabis use and objective sleep parameters (measured using actigraphy or polysomnography) would also provide valuable clinical information. Finally, participants were recruited via digital marketing, which limits generalizability to those who have regular access to the internet. Our sample was similar to a large (N=2063) national sample of pregnant adults in the United States (Roberts et al., 2023) in terms of education, White race, and marital status; however, relative to the national sample of pregnant adults, Black and young adults were overrepresented while Latine and sexual/gender minority adults were underrepresented.

Conclusion

The persistence of cannabis use during pregnancy is common and concerning. This study

highlights improved sleep as a prevalent motive for prenatal cannabis use that may be an ideal target for prevention and intervention efforts. Specifically, insomnia symptoms (difficulty falling and staying asleep) were common sleep complaints among the pregnant adults in this sample, those using cannabis to help with sleep expressed interest in alternative treatments for insomnia, and highly effective behavioral treatments for insomnia exist. We strongly encourage providers to ask pregnant adults about their sleep, particularly if they have a known history of cannabis use, and to provide recommendations that are consistent with evidence-based practice if referrals for cognitive behavioral therapy are not available (e.g., start one's day at the same time every day, get out of bed when awake). We also strongly recommend longitudinal studies to better understand how naturalistic cannabis use affects prenatal sleep within persons at the day level.

REFERENCES

American College of Obstetricians and Gynecologists. (2017). Committee Opinion: Marijuana use during pregnancy and lactation. *Obstetrics & Gynecology*, *130*, e205–209. https://www.ncsbn.org/public-files/ACOG_Marijuana_Use_During_Pregnancy_and_Lactation.pdf

Adamson, S. J., Kay-Lambkin, F. J., Baker, A. L., Lewin, T. J., Thornton, L., Kelly, B. J., & Sellman, J. D. (2010). An improved brief measure of cannabis misuse: The Cannabis Use Disorders Identification Test-Revised (CUDIT-R). *Drug and Alcohol Dependence*, *110*, 137–143. https://doi.org/10.1016/j.drugalcdep.2010.02.017

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*. American Psychiatric Association.

Bachhuber, M., Arnsten, J. H., & Wurm, G. (2019). Use of cannabis to relieve pain and promote sleep by customers at an adult use dispensary. *Journal of Psychoactive Drugs*, *51*, 400–404. https://doi.org/10.1080/02791072.2019.1626953

Bastien, C. H., Vallieres, A., & Morin, C. M. (2001). Validation of the Insomnia Severity Index as an outcome measure for insomnia research. *Sleep Medicine*, *2*, 297–307. https://doi.org/10.1016/s1389-9457(00)00065-4

Bidwell, L. C., Snitzman, S. R., Martin-Willett, R., & Hitchcock, L. H. (2024). Daily associations with cannabis use and sleep quality in anxious cannabis users. *Behavioral Sleep Medicine*, *22*, 150–167. https://doi.org/10.1080/15402002.2023.2217969

Brown, Q. L., Hasin, D. S., Keyes, K. M., Fink, D. S., Ravenell, O., & Martins, S. S. (2016). Health insurance, alcohol and tobacco use among pregnant and non-pregnant women of reproductive age. *Drug and Alcohol Dependence*, *166*, 116–124. https://doi.org/10.1016/j.drugalcdep.2016.07.001

Brown, Q. L., Shmulewitz, D., Sarvet, A. L., Young-Wolff, K. C., Howard, T., & Hasin, D. S. (2023). Cannabis use, cannabis use disorder, and mental health disorders among pregnant and postpartum women in the US: A nationally representative study. *Drug and Alcohol Dependence*, *248*, 1–8. https://doi.org/10.1016/j.drugalcdep.2023..109940

Buysse, D. J., Ancoli-Israel, S., Edinger, J. D., Lichstein, K. L., & Morin, C. M. (2006). Recommendations for a standard research assessment of insomnia. *Sleep*, *29*, 1155–1173. https://doi.org/10.1093/sleep/29.9.1155

Carney, C. E., Buysse, D. J., Ancoli-Israel, S., Edinger, J. D., Krystal, A. D., Lichstein, K. L., & Morin, C. M. (2012). The consensus sleep diary: Standardizing prospective sleep self-monitoring. *Sleep: Journal of Sleep and Sleep Disorders Research*, *35*, 287–302. https://doi.org/10.5665/sleep.1642

Cooper, M. L. (1994). Motivations for alcohol use among adolescents: Development and validation of a four-factor model. *Psychological Assessment*, *6*, 117–128. https://doi.org/10.1037/1040-3590.6.2.117

Cutler, C., & Spradlin, A. (2017). Measuring cannabis consumption: Psychometric properties of the daily sessions, frequency, age of onset, and quantity of cannabis use inventory (DFAQ-CU). *PLOS One*, *12*. https://doi.org/e0178194

Davis, J. P., Saba, S. K., Leightley, D., Pedersen, E. R., Prindle, J., Senator, B., Dilkina, B., Dworkin, E., Howe, E., Cantor, J., & Sedano, A. (2025). Daily associations between sleep quality, stress, and cannabis or alcohol use among veterans. *Drug and Alcohol Dependence*, *271*, 1–7. https://doi.org/10.1016/j.drugalcdep.2025.112661

Edinger, J. D., Bonnet, M. H., Bootzin, R. R., Doghramji, K., Dorsey, C. M., Espie, C. A., Jamieson, A. O., McCall, W. V., Morin, C. M., & Stepanski, E. J. (2004). Derivation of research diagnostic criteria for insomnia: Report of an American Academy of Sleep Medicine work group. *Sleep*, *27*, 1567–1596. https://doi.org/10.1093/sleep/27.8.1567

Facco, F. L., Chan, M., & Patel, S. R. (2022). Common sleep disorders in pregnancy. *Obstetrics & Gynecology*, *140*, 321–339. https://doi.org/10.1097/AOG.0000000000004866

Felder, J. N., Epel, E. S., Neuhaus, J., Krystal, A. D., & Prather, A. A. (2020). Efficacy of digital cognitive behavioral therapy for the treatment of insomnia symptoms among pregnant women: A randomized clinical trial. *JAMA Psychiatry*, *77*, 484–492. https://doi.org/10.1001/jamapsychiatry.2019.4491

Gelberg, L., Beck, D., Koerber, J., Akabike, W. N., Dardick, L., Lin, C., Shoptaw, S., & Javanbakht, M. (2024). Cannabis use reported by patients receiving primary care in a large health system. *JAMA Network Open*, *7*, 1–13. https://doi.org/10.1001/jamanetworkopen.2024.14809

Goodhines, P. A., Gellis, L. A., Ansell, E. B., & Park, A. (2019). Cannabis and alcohol use for sleep aid: A daily diary investigation. *Health Psychology*, *38*(11), 1036–1047. https://doi.org/10.1037/hea0000765; 10.1037/hea0000765.supp (Supplemental)

Goodhines, P. A., LaRowe, L. R., Gellis, L. A., Ditre, J. W., & Park, A. (2020). Sleep-Related Cannabis Expectancy Questionnaire (SR-CEQ): Initial development among college students. *Journal of Psychoactive Drugs*, *52*(5), 401–411. https://doi.org/10.1080/02791072.2020.1800151

Gorelick, D. A., Goodwin, R. S., Schwilke, E., Schroeder, J. R., Schwope, D. M., Kelly, D. L., Ortemann-Renon, C., Bonnet, D., & Huestis, M. A. (2013). Around-the-clock oral THC effects on sleep in male chronic daily cannabis smokers. *Am J Addict*, *22*(5), 510–514. https://doi.org/10.1111/j.1521-0391.2013.12003.x

Gosdin, L. K., Deputy, N. P., Kim, S. Y., Dang, E. P., & Denny, C. H. (2022). Alcohol consumption and binge drinking during pregnancy among adults aged 18-49 years - United States, 2018-2020. *Morbidity and Mortality Weekly Report (MMWR)*, *71*, 10–13. https://doi.org/10.15585/mmwr.mm7101a2

Graupensperger, S., Fairlie, A. M., Vitiello, M. V., Kilmer, J. R., Larimer, M. E., Patrick, M. E., & Lee, C. M. (2021). Daily-level effects of alcohol, marijuana, and simultaneous use on young adults' perceived sleep health. *Sleep: Journal of Sleep and Sleep Disorders Research*, *44*(12), 1–12. https://doi.org/10.1093/sleep/zsab187

Gunn, R. L., Aston, E. R., Artis, L., Nesi, J., Pedersen, E. R., & Micalizzi, L. (2024). Use of cannabis to manage symptoms of mental and physical health conditions during pregnancy: Analysis of a pro-cannabis pregnancy forum. *Frontiers in Psychiatry*, *2024*, 1–11. https://doi.org/10.3389/fpsyt.2024.1478505

Hertenstein, E., Trinca, E., Wunderlin, M., Schneider, C. L., Zust, M. A., Feher, K. C., Su, T., Straten, A. V., Berger, T., Baglioni, C., Johann, A., Spiegelhalder, K., Riemann, D., Feige, B., & Nissen, C. (2022). Cognitive behavioral therapy for insomnia in patients with mental disorders and comorbid insomnia: A systematic review and meta-analysis. *Sleep Medicine Reviews*, *62*, 1–14. https://doi.org/10.1016/j.smrv.2022.101597

Kalmbach, D. A., Cheng, P., O'Brien, L. M., Swanson, L. M., Sangha, R., Sen, S., Guille, C., Cuamatzi-Castelan, A., Henry, A. L., Roth, T., & Drake, C. L. (2020). A randomized controlled trial of digital cognitive behavioral therapy for insomnia in pregnant women. *Sleep Medicine*, *72*, 82–92. https://doi.org/10.1016/j.sleep.2020.03.016

Kim, S. (2020). Changes in multiple and different tobacco product use behaviors in women before and during pregnancy: An analysis of longitudinal population assessment of tobacco

and health data. *American Journal of Preventive Medicine*, *59*, 588–592. https://doi.org/10.1016/j.amepre.2020.05.006

Kipling, L., Bombard, J., Wang, X., & Cox, S. (2024). *Cigarette smoking among pregnant women during the perinatal period: Prevalence and health care provider inquiries - Pregnancy Risk Assessment Monitoring System, United States, 2021*. Retrieved from http://dx.doi.org/10.15585/mmwr.mm7317a2

Kroenke, K., Spitzer, R. L., & Williams, J. B. (2003). The Patient Health Questionnaire-2: Validity of a two-item depression screener. *Medical Care*, *41*, 1284–1292. https://doi.org/10.1097/01.MLR.0000093487.78664.3C

Kroenke, K., Spitzer, R. L., Williams, J. B., & Löwe, B. (2009). An ultra-brief screening scale for anxiety and depression: the PHQ-4. *Psychosomatics*, *50*(6), 613–621. https://doi.org/10.1176/appi.psy.50.6.613

Lee, C. M., Neighbors, C., Hendershot, C. S., & Grossbard, J. R. (2009). Development and preliminary validation of a comprehensive marijuana motives questionnaire. *Journal of Studies on Alcohol and Drugs*, *70*, 279–287. https://doi.org/10.15288/jsad.2009.70.279

Lo, J. O., Shaw, B., Robalino, S., Ayers, C. K., Durbin, S., Rushkin, M. C., Olyaei, A., Kansagara, D., & Harrod, C. S. (2024). Cannabis Use in Pregnancy and Neonatal Outcomes: A Systematic Review and Meta-Analysis. *Cannabis and Cannabinoid Research*, *9*(2), 470–485. https://doi.org/10.1089/can.2022.0262

Manber, R., Bei, B., Simpson, N. S., Asarnow, L. D., Rangel, E., Sit, A., & Lyell, D. (2019). Cognitive Behavioral Therapy for prenatal insomnia: A randomized controlled trial. *Obstetrics & Gynecology*, *133*, 911–919. https://doi.org/10.1097/AOG.0000000000003216

Matthews, K. A., Shumaker, S. A., Bowen, D. J., Langer, R. D., Hunt, J. R., Kaplan, R. M., Klesges, R. C., & Ritenbaugh, C. (1997). Women's health initiative: Why now? What is it? What's new? *American Psychologist*, *52*, 101–116. https://doi.org/10.1037//0003-066x.52.2.101

Metrik, J., Bassett, S. S., Aston, E. R., Jackson, K. M., & Borsari, B. (2018). Medical versus recreational cannabis use among returning Veterans. *Translational Issues in Psychological Science*, *4*, 6–20. https://doi.org/10.1037/tps0000133

Morin, C. M., Belleville, G., Belanger, L., & Ivers, H. (2011). The Insomnia Severity Index: Psychometric indicators to detect insomnia cases and evaluate treatment response. *Sleep: Journal of Sleep and Sleep Disorders Research*, *34*, 601–608. https://doi.org/10.1093/sleep/34.5.601

Morin, C. M., & Jarrin, D. C. (2022). Epidemiology of insomnia: prevalence, course, risk factors, and public health burden. *Sleep Medicine Clinics*, *17*, 173–191. https://doi.org/10.1016/j.jsmc.2022.03.003

Murnan, A. W., Keim, S. A., Li, R., & Klebanoff, M. A. (2022). Marijuana use and sleep quality during pregnancy. *The Journal of Maternal-Fetal & Neonatal Medicine*, *35*(25), 7857–7864. https://doi.org/10.1080/14767058.2021.1937987

Nance, M., Miller, M. B., Ellingson, J. M., & Carpenter, R. W. (2025). Sleep quality and duration following the use and co-use of alcohol and cannabis in the daily life of community adults. *Drug and Alcohol Dependence*, *277*, 1–7. https://doi.org/10.1016/j.drugalcdep.2025.112946

Nicholson, A. N., Turner, C., Stone, B. M., & Robson, P. J. (2004). Effect of Δ-9-Tetrahydrocannabinol and Cannabidiol on Nocturnal Sleep and Early-Morning Behavior in Young Adults. *Journal of Clinical Psychopharmacology*, *24*(3), 305–313. https://doi.org/10.1097/01.jcp.0000125688.05091.8f

Palagini, L., Bramante, A., Baglioni, C., Tang, N. K. Y., Grassi, L., Altena, E., Johann, A. F., Geoffroy, P. A., Biggio, G., Mencacci, C., Sharma, V., & Riemann, D. (2022). Insomnia evaluation and treatment during peripartum: A joint position paper from the European Insomnia Network task force "Sleep and Women," the Italian Marce Society, and international experts task force for perinatal mental health. *Archives of Women's Mental Health*, *25*, 561–575. https://doi.org/10.1007/s00737-022-01226-8

Park, J., & Wu, L. (2017). Prevalence, reasons, perceived effects, and correlates of medical

marijuana use: A review. *Drug and Alcohol Dependence*, *177*, 1–13. https://doi.org/10.1016/j.drugalcdep.2017.03.009

Paul, S. E., Hatoum, A. S., Fine, J. D., Johnson, E. C., Hansen, I., Karcher, N. R., Moreau, A. L., Bondy, E., Qu, Y., Carter, E. B., Rogers, C. E., Agrawal, A., Barch, D. M., & Bogdan, R. (2021). Associations Between Prenatal Cannabis Exposure and Childhood Outcomes: Results From the ABCD Study. *JAMA Psychiatry*, *78*(1), 64–76. https://doi.org/10.1001/jamapsychiatry.2020.2902

Price, M., Szafranski, D. D., van Stolk-Cooke, K., & Gros, D. F. (2016). Investigation of abbreviated 4 and 8 item versions of the PTSD Checklist 5. *Psychiatry Research*, *239*, 124–130. https://doi.org/10.1016/j.psychres.2016.03.014

Roberts, S. C. M., Zaugg, C., & Biggs, M. A. (2023). Association of mandatory warning signs for cannabis use during pregnancy with cannabis use beliefs and behaviors. *JAMA Network Open*, *6*. https://doi.org/10.1001/jamanetworkopen.2023.17138

Substance Abuse and Mental Health Services Administration. (2024). *Substance Use in Past Month: Among Females Aged 15 to 44; by Pregnancy Status, Percentages, 2022 and 2023 (Table 8.26B)*

Silang, K., Mackinnon, A. J., Madsen, J., Giesbrecht, G. F., Campbell, T., Keys, E., Freeman, M., Dewsnap, K., Jung, J. W., & Thomfohr-Madsen, L. M. (2024). Sleeping for two: A randomized controlled trial of cognitive behavioral therapy for insomnia (CBT-I) delivered in pregnancy and secondary impacts on symptoms of depression. *Journal of Affective Disorders*, *362*, 670–678. https://doi.org/10.1016/j.jad.2024.07.117

Suraev, A., McGregor, I. S., McCartney, D., Marshall, N. S., Kao, C., Wassing, R., D'Rozario, A. L., Wong, K. K. H., Yee, B. J., Sivam, S., Kevin, R. C., Vandrey, R., Irwin, C., Gordon, C. J., Bartlett, D. J., Arnold, J. C., Grunstein, R. R., & Hoyos, C. M. (2025). Acute effects of oral cannabinoids on sleep and high-density EEG in insomnia: A pilot randomized controlled trial. *Journal of Sleep Research*, 1–13. https://doi.org/10.1111/jsr.70124

Suraev, A. S., Marshall, N. S., Vandrey, R., McCartney, D., Benson, M. J., McGregor, I. S., Grunstein, R. R., & Hoyos, C. M. (2020). Cannabinoid therapies in the management of sleep disorders: A systematic review of preclinical and clinical studies. *Sleep Medicine Reviews*, *53*. https://doi.org/10.1016/j.smrv.2020.101339

Sznitman, S. R., Shochat, T., & Greene, T. (2020). Is time elapsed between cannabis use and sleep start time associated with sleep continuity? An experience sampling method. *Drug and Alcohol Dependence*, *208*. https://doi.org/10.1016/j.drugalcdep.2020.107846

Sznitman, S. R., Shochat, T., van Rijswijk, L., Greene, T., & Cousijn, J. (2023). Cannabis and alcohol use and their associations with sleep: A daily diary investigation of single-use and co-use in college students. *Cannabis and Cannabinoid Research*, *8*, 527–536. https://doi.org/10.1089/can.2021.0106

Tervo-Clemmens, B., Schmitt, W., Wheeler, G., Cooke, M. E., Schuster, R. M., Hickey, S., Pachas, G. N., Evins, A. E., & Gilman, J. M. (2023). Cannabis use and sleep quality in daily life: An electronic daily diary study of adults starting cannabis for health concerns. *Drug and Alcohol Dependence*, *243*, 1–9. https://doi.org/10.1016/j.drugalcdep.2022.109760

Velzeboer, R., Malas, A., Boerkoel, P., Cullen, K., Hawkins, M., Roesler, J., & Lai, W. W.-K. (2022). Cannabis dosing and administration for sleep: A systematic review. *Sleep: Journal of Sleep and Sleep Disorders Research*, *45*(11), 1–14. https://doi.org/10.1093/sleep/zsac218

Volkow, N. D., Han, B., Compton, W. M., & McCance-Katz, E. F. (2019). Self-reported Medical and Nonmedical Cannabis Use Among Pregnant Women in the United States. *Jama*, *322*(2), 167–169. https://doi.org/10.1001/jama.2019.7982

Weng, X., Odouli, R., & Li, D. (2008). Maternal caffeine consumption during pregnancy and the risk of miscarriage: A prospective cohort study. *American Journal of Obstetrics and Gynecology*, *198*, 1–8. https://doi.org/10.1016/j.ajog.2007.10.803

Wycoff, A. M., Miller, M. B., & Trull, T. J. (2024). Bidirectional associations between sleep and alcohol/cannabis (co)-use in daily life. *Alcohol:*

Clinical and Experimental Research, *48*, 2099–2112. https://doi.org/10.1111/acer.15448.

Zaugg, C., Terplan, M., Mailman, K., & Roberts, S. C. M. (2024). Reasons pregnant people use cannabis to self-treat health conditions during pregnancy: Results from a US population-based survey. *Drug Alcohol Rev*, *43*(7), 1742–1752. https://doi.org/10.1111/dar.13934

Zhang, R., Manza, P., & Volkow, N. D. (2022). Prenatal caffeine exposure: Association with neurodevelopmental outcomes in 9- to 11-year-old children. *Journal of Child Psychology and Psychiatry*, *63*, 563–578. https://doi.org/10.1111/jcpp.13495

Zhou, F., Yang, Y., Wang, Y., Rao, W., Zhang, S. C., Zeng, L., Zheng, W., Ng, C. H., Ungvari, G. S., Zhang, L., & Xiang, Y. T. (2020). Cognitive behavioral therapy for insomnia monotherapy in patients with medical or psychiatric comorbidities: A meta-analysis of randomized controlled trials. *Psychiatric Quarterly*, *91*, 1209–1224. https://doi.org/10.1007/s11126-020-09820-8

Funding and Acknowledgements: Investigator contributions to this project were supported by the National Institutes of Health (K01DA058060, PI Lloyd Sieger; T32AA013526, PI McCarthy; K23AA031517, PI Wycoff). The NIH had no role in study design; data collection, analysis, or interpretation; manuscript preparation; or the decision to submit for publication. Analyses and hypotheses were not pre-registered. The authors have no conflicts of interest or other financial support to report.

Copyright: © 2026 Authors et al. This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction, provided the original author and source are credited, the original sources is not modified, and the source is not used for commercial purposes.

Issue Date: July 15, 2026

Citation: Miller, M. B., Sieger, M. L., Moskal, K. R., Marut, E., Gupta, S., & Wycoff, A. M. (2026). Sleep motives and expectancies for cannabis use in pregnancy. *Cannabis*, *9*(2), 135–151. https://doi.org/10.26828/cannabis/2026/000372