BRIEF REPORTS

Tobacco and Cannabis Use During and After Pregnancy in California

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Abstract

Objectives As the social and legal acceptance of cannabis use grows, health professionals must understand and mitigate the impact of cannabis use in the perinatal period. Here we compare the prevalence of tobacco and cannabis use during and after pregnancy in California, a state that recently legalized cannabis use.

Methods Measures of tobacco and cannabis use during and after pregnancy were obtained from California's Maternal and Infant Health Assessment, an annual population-based survey of California resident women with a live birth. To allow analysis of county-level variation, we pooled data from the 35 counties with the largest numbers of births from 2017 to 2019.

Results Cannabis use was more than twice as common as cigarette smoking among pregnant women (4.9% vs. 2.1%) in California. This difference was even more pronounced in some counties; for example, in Los Angeles, cannabis use was four times more prevalent than cigarette use. Either during or soon after birth, 7.3% of women in California reported cannabis use. Of those who smoked tobacco cigarettes prior to pregnancy, 73% quit before their third trimester of pregnancy, though 33.0% of these women reported a post-partum relapse in cigarette use.

Conclusions States that have legalized cannabis must attend to the increasing prevalence of perinatal cannabis use, as well as concurrent use with tobacco and other substances. Efforts to support cannabis cessation should draw from successful public health approaches in tobacco control.

Keywords Maternal health · Cannabis · Tobacco · Postpartum care · Prenatal care

Significance

What is Already Known on This Subject? The legalization of cannabis has been associated with higher rates of cannabis use. Concerningly, cannabis use during pregnancy has been linked to poor maternal and infant outcomes.

What This Study Adds? We compare cannabis and tobacco use reported by women during and after pregnancy in California, a state that recently legalized cannabis. Our data show that public health resources—such as the media campaigns, a free Quitline, and clinician-driven patient education used in tobacco cessation—are needed to educate women about the harms of cannabis use in the perinatal period, particularly in some counties.

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Introduction

Although cannabis, or marijuana, remains illegal at the federal level, a growing number of US states have legalized cannabis use. In November 2016, California legalized the sale, possession, growing, and consumption of recreational cannabis for adults 21 and older. California is now the largest legal cannabis market in the world and has seen record sales of cannabis in recent years (Yakowicz, 2021).

Legalization of cannabis has created new challenges in providing perinatal care, as legalization has been associated

with higher rates of cannabis use during and after pregnancy (Skelton & Benjamin-Neelon, 2021; Skelton et al., 2021). In states where cannabis has been legalized, women report cannabis use during pregnancy due to its perceived benefit for nausea or anxiety (Barbosa-Leiker et al., 2020; Pike et al., 2021). Increases in psychosocial stress, isolation, and greater burdens of childcare during the COVID-19 pandemic may have contributed to more frequent use among some women (Young-Wolff et al., 2021).

Despite its growing social acceptance, cannabis has been identified as a reproductive toxin. Maternal use during pregnancy is associated with preterm birth, infants that are born small for gestational age, neonatal intensive care unit admission, as well as neuropsychiatric disease later in life (California Office of Environmental Health Hazard Assessment, 2020; Marchand et al., 2022; Nguyen & Harley, 2021; Paul et al., 2021; Ryan et al., 2021; Shi et al., 2021; Smith et al., 2020). In utero exposure to cannabis has also been associated with childhood obesity, although existing observational data cannot control for lifestyle factors (Cajachagua-Torres et al., 2021). Of particular concern, given the increased risks of mental illness in the postpartum period, maternal cannabis use has been associated with postpartum depression and psychosis (Cao et al., 2021; Patel et al., 2021).

National data likely underestimate actual cannabis use during pregnancy, given concerns in communities where cannabis use is illegal that disclosure may result in being reported to child protective services (Woodruff et al., 2021). Nonetheless, nationally, it is estimated that 4.4% of women report cannabis use both before and during pregnancy (Sood et al., 2021). In states where recreational cannabis use is legal, 9.8% of women report cannabis use prior to pregnancy (Ko et al., 2020). Disparities in perinatal cannabis use have been identified in California, where use during pregnancy is more common among younger women, women who live in neighborhoods with lower median household income, and Black non-Hispanic women, compared to White or Hispanic women (California Department of Public Health, 2016; Young-Wolff et al., 2019). In addition, prenatal cannabis use has been reported to be more common among women who also smoke tobacco prior to or during pregnancy (Haight et al., 2021; Pike et al., 2021), as well as women with concurrent alcohol or opioid use disorder (Page et al., 2022).

Efforts to support smoking cessation have been an important part of prenatal care for many years, as perinatal tobacco use is widely recognized as harmful to fetal and maternal health (American College of Obstetricians and Gynecologists, ACOG, 2020). However, whether current approaches to perinatal smoking cessation are adequate to address both tobacco and cannabis use is unknown (Substance Abuse and Mental Health Services Administration, SAMHSA, 2019). Recent surveys evaluating clinician counseling on perinatal cannabis use in the US showed that counseling was often not addressed or overly focused on legal implications of cannabis use (Panday et al., 2021; Pike et al., 2021). Using population-representative data from California, the present study compares reported tobacco and cannabis use during and after pregnancy among women in California, a state that recently legalized recreational cannabis use. To support regional public health efforts, we explore variation in perinatal tobacco and cannabis use at the county level.

Methods

California's Maternal and Infant Health Assessment (MIHA) is an annual survey of a stratified random sample of English- or Spanish-speaking women residing in California who had a live birth. The survey collects self-reported information on maternal and infant experiences in the perinatal period. MIHA data are weighted to be representative of California residents with a live birth each year, excluding those who were younger than 15 years old at delivery, had a multiple birth greater than triplets, or had a missing address on the birth certificate. Most participants responded between 2 and 6 months after a live birth. Three years of MIHA were pooled for this analysis (n = 18,638), with a statewide sample size of 6430 women in 2017, 6131 in 2018, and 6077 in 2019. Only 0.2–0.7% of values were missing for the variables used in this analysis and were therefore excluded. The MIHA study is reviewed by two Institutional Review Boards: the California Department of Health and Human Services and the University of California, San Francisco.

Data obtained include tobacco and cannabis use during and/or after pregnancy, as well as data on preconception tobacco use. Specifically, the MIHA survey asks participants to quantify tobacco use by asking: "During the 3 months before you got pregnant, how many cigarettes or packs of cigarettes did you smoke on an average day;" "During the last 3 months of your pregnancy, how many cigarettes or packs of cigarettes did you smoke on an average day;" and to assess postpartum use, "How many cigarettes do you smoke on an average day now?" We dichotomized responses to consider any cigarette use during the perinatal period. We further calculated the proportion of women who smoked tobacco before pregnancy but quit by the third trimester of their pregnancy, and the proportion of those who quit during pregnancy that experienced a postpartum relapse in cigarette use.

Regarding cannabis use, the MIHA survey asks two yes/no questions: "During your most recent pregnancy, did you use marijuana or weed in any way (like smoking, eating or vaping)" and "Since your most recent birth, have you used marijuana or weed in any way (like smoking, eating or vaping)?" (California Department of Public Health, 2017a). We used this data to further calculate the proportion of women

who had used cannabis either during or after pregnancy. Data was not obtained on cannabis use before pregnancy.

To allow examination of county-level variation, we combined data from 2017 to 2019 MIHA surveys for the 35 counties with the largest numbers of births. Prevalence (%) and 95% confidence interval (95% CI) of cannabis and tobacco use were calculated overall and by county. SAS Survey procedures were used to account for stratification and weights, as previously described (California Department of Public Health, 2017b). Data analysis was performed by the Maternal, Child, and Adolescent Health Division of the California Department of Public Health.

Results

Table 1 shows the demographic characteristics of the 18,638 women who participated in MIHA from 2017 to 2019. Most women (72%) were between 20 and 34 years of age, with some above age 35 (23.7%) and fewer aged 15 to 19 years (3.7%). While about half of participants (48.3%) identify as Hispanic, fewer identify as non-Hispanic White (29.2%), Asian or Pacific Islander (16.5%), and non-Hispanic Black (5.7%). About one third of women were born outside the US

(35.7%), speak a non-English language at home (29.5%), had Medicaid insurance during pregnancy (Medi-Cal, 36.3%), or live in households where income is below the federal poverty guideline (33.0%).

Cannabis use during pregnancy was reported by 4.9% (95% CI 4.5–5.3) of Californian women and by 5.7% (95% CI 5.3–6.1) of respondents postpartum. However, 7.3% (95% CI 6.8–7.8) of postpartum respondents reported cannabis use either during or after pregnancy. As shown in Fig. 1, cannabis use during and after pregnancy varied considerably across the 35 Californian counties for which county-level data was available. Highest rates of cannabis use during pregnancy was seen in Humboldt (29.0%, 95% CI 22.7–35.4) and lowest (2.5%, 95% CI 1.0–4.0) in Santa Clara. Three northern counties reported the highest rates of cannabis use both before and after birth: Butte 10.7% and 11.8%; Shasta 12.8% and 13.8%; and Humboldt 25.4% and 25.3%.

The prevalence of any tobacco cigarette use during the third trimester of pregnancy was 2.1% (95% CI 1.9–2.4) but increased in the postpartum period, when 3.9% (95% CI 3.5–4.2) reported smoking any tobacco. Among the 7.9% (95% CI 7.3–8.4) of Californian women who reported smoking tobacco prior to pregnancy, 73.9% (95% CI 70.8–76.9) quit by their third trimester of pregnancy. Of women who

Table 1 Participant demographics and population estimates in the Maternal and Infant Health Assessment (MIHA) Survey, 2017–2019

	Actual Number of participants in MIHA sample	Weighted estimate for population	
		Percent[a]	95% Confidence Interval
Age (years)			
15–19	735	3.7	3.3–4.1
20–34	13,727	72.6	71.7–73.5
>35	4176	23.7	22.9–24.6
Race/Ethnicity			
Asian/Pacific Islander	1962	16.5	15.6–17.3
Black	2014	5.7	5.5–5.8
Hispanic	8365	48.3	47.3–49.3
White	5628	29.2	28.3–30.1
Born outside the US	6034	35.7	34.7–36.7
Speaks non-English language at home	5099	29.5	28.5–30.4
Prenatal Health Insurance			
Medi-Cal	7265	36.3	35.4–37.2
Private	8607	49.7	48.7–50.7
Uninsured	1981	10.4	9.8–11.0
Income (percentile of Federal Poverty Guidelines)			
0–100% FPG	5934	33.0	32.1–34.0
101–200% FPG	3834	21.4	20.5–22.2
>200% FPG	7263	45.6	44.6–46.6

[a]Prevalence estimates are weighted to represent people giving birth in California during this time period. Total sample size may not equal the sum of subgroup categories due to missing data for a given characteristic or because not all subcategories are shown
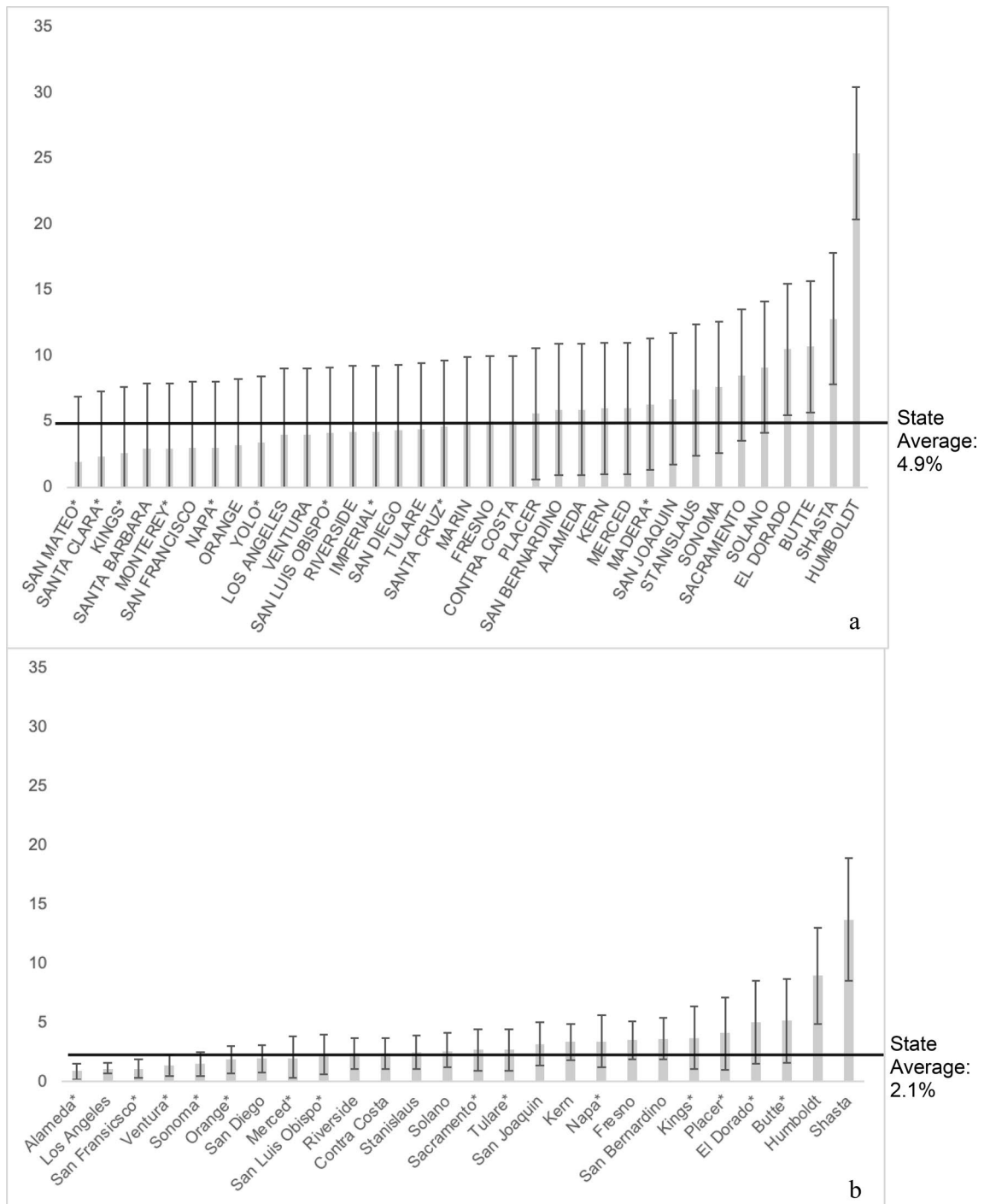
quit smoking tobacco during pregnancy, an estimated 33.0% (95% CI 29.1–36.9) experienced a post-partum relapse in smoking tobacco. County-level variation of cigarette use was notable before, during, and after pregnancy. Highest rates of cigarette use before pregnancy was again seen in northern

California, including Shasta (23.9%, 95% CI 17.8–30.0), Humboldt (18.7%, 95% CI 13.4–24.0), and Butte (18.2%, 95% CI 12.2–24.2) counties. Figure 1 depicts county-level variation of cigarette use during pregnancy. In all California counties, rates of cigarette use were substantially lower

Fig. 2 Prevalence of women who reported (**a**) cannabis and (**b**) tobacco cigarette use during pregnancy in 35 Californian counties. Data is not available from counties in grey

during the third trimester of pregnancy and after pregnancy than before pregnancy.

Notably, during pregnancy, cannabis use (4.9%) was more than twice as common as cigarette smoking (2.1%). This difference is more pronounced in some counties where cannabis use is more than three times that of cigarette use (i.e., Los Angeles 4.0% vs. 1.0%, Humboldt 25.4% vs. 9.0%, Solano 9.1% vs. 2.6%). In four counties in northern California where cannabis use rates are more than 10% during pregnancy, only one of these counties (Shasta) reported higher cigarette than cannabis use rates among pregnant women. Figure 2 visually compares county-level variation in women who used cannabis and tobacco during pregnancy.

Conclusions for Practice

In this population representative survey of women with a recent live birth in California**,** we found cannabis use to be more common than tobacco cigarette use during and after pregnancy. We estimated that over 25,000 Californian women report cannabis use within the first 10 months after giving birth. These data are in line with other Californian studies, which also demonstrate a rising prevalence of cannabis use among pregnant women since the early 2000s (Young-Wolff et al., 2017, 2019, 2021). In addition, county-level variation demonstrates highest use of cannabis in northern counties, which are known for high cannabis production rates. This county-specific variation merits targeted public health intervention with further investigation of the role age, socioeconomic class, race/ethnicity, and perinatal care play in cannabis use (Unger et al., 2020). We note that our data are limited to 35 counties with the largest numbers of births; data from 23 less populous counties did not allow stable estimates and so are not included.

Our data also show that one third of women who quit smoking cigarettes during pregnancy relapsed in the first 10 months after giving birth. As ongoing cannabis use can make quitting tobacco more difficult (De Genna et al., 2021), cannabis use may play a role in these relapses. More studies are needed to assess dual use of tobacco and cannabis in pregnant women, as well as use with other recreational substances (Haight et al., 2021; Page et al., 2022). Understanding the factors that promote use of these substances, such as perceived benefit and psychosocial stressors (Barbosa-Leiker et al., 2020; Pike et al., 2021; Young-Wolff et al., 2021), will inform clinical and public health strategies to mitigate their use.

When considering this data, we recognize several limitations. For example, social desirability bias may shape maternal reports of tobacco and cannabis use during pregnancy. In one study, urine drug testing revealed nearly twice the rates of cannabis use when compared to self-reporting in pregnant women (Young-Wolff et al., 2017). We also note that MIHA data measure cigarette use during the third trimester, rather than throughout pregnancy, and do not include tobacco consumption other than cigarette use (i.e., via vaping or e-cigarettes). Data were, however, obtained to address cannabis use via any route, including cannabis edibles, vaping, and topical lotions used by women during pregnancy (Young-Wolff et al., 2020). In addition, the MIHA survey does not collect information on cannabis use before pregnancy, limiting assessment of trajectories of cannabis use throughout the perinatal period. Finally, we acknowledge that data from California may not be generalizable to other states or countries. Nonetheless, as a growing number of governments legalize recreational cannabis use, additional resources will be needed to effectively address the risks of maternal cannabis use.

These data show the need for perinatal cannabis cessation resources, such as those recommended by the Substance Abuse and Mental Health Services Administration, American College of Obstetrics and Gynecology, and the American Academy of Pediatricians (Braillon & Bewley, 2018; Ryan et al., 2018; Substance Abuse and Mental Health Services Administration, SAMHSA, 2019). In the US, as with tobacco use (National Center for Chronic Disease Prevention and Health Promotion, 2021), Medicaid should incentivize documentation of cannabis use in electronic health records and provide financial reimbursement for clinicians to provide cannabis cessation for pregnant women. At the policy level, state licensing and regulations should address risks of cannabis use for pregnant women, as well as promote awareness of harms via media campaigns and a free Quitline. In one multi-state Quitline study, one in four callers reported cannabis use and 43% shared interest in reducing their cannabis use (Carpenter et al., 2020). Investment in maternal cannabis cessation, particularly where recreational cannabis use is legal, must leverage those strategies found to be effective for tobacco control.

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