

Perinatal Cannabis Use and Cannabis Use during Breastfeeding: the Role of Health Care Workers

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Abstract

Objective This study aimed to estimate the proportion of perinatal women reporting a health care worker (HCW) discussed cannabis use during pregnancy or breastfeeding with them and to evaluate the association between HCWs' discussions and perinatal cannabis use and cannabis use while breastfeeding.

Study Design Data from Health eMoms (a longitudinal, state-representative survey of Colorado mothers, collected from 2018 to 2020 [$n = 3,193$]) were utilized in logistic regressions assessing the relationship between HCW discussions about cannabis and perinatal cannabis use and cannabis use while breastfeeding at two time points postpartum, adjusting for sociodemographic factors.

Results A total of 5.8% of the sample reported cannabis use either during their most recent pregnancy or while breastfeeding at 3 to 6 months' postpartum. A total of 67.8% of the sample reported an HCW-discussed cannabis at prenatal visits. Women reporting perinatal use were more likely to report HCW discussing cannabis compared with nonusers (82.2 vs. 65.3%, $p < 0.01$). There was not a significant association between HCW discussions and cannabis use while breastfeeding at either time point postpartum. Compared with nonusers, women using perinatally were more likely to report cannabis Web sites (28.9 vs. 6.5%), cannabis stores (15.7 vs. 3.8%), or word-of-mouth (28.4 vs. 17.1%) as trusted sources of cannabis-related information.

Conclusion HCW discussions about cannabis use during pregnancy or breastfeeding are not universally reported. This study highlights the need for further encouragement of universal HCW discussions of cannabis use during pregnancy and breastfeeding, strengthening of messaging around cannabis use during these periods, and improved delivery of reliable cannabis-related health information to this population.

Keywords

- ▶ cannabis
- ▶ breastfeeding
- ▶ pregnancy
- ▶ health care worker
- ▶ longitudinal
- ▶ epidemiology

Key Points

- HCW discussions of perinatal cannabis use are not universally reported by women.
- Women reporting perinatal use were more likely to report HCW discussions of cannabis.
- Women reporting perinatal cannabis use were more likely to trust word-of-mouth or cannabis stores or Web sites.

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Increasing cannabis use among reproductive-aged women has raised concerns for cannabis use during pregnancy and the postpartum period.¹ Indeed, prevalence of perinatal cannabis use among American women increased 62% from 2004 to 2014.¹ Studies indicate cannabis can be present in breastmilk following maternal use^{2,3} and cross infants' blood-brain barrier.^{3,4} Perinatal cannabis use can have adverse outcomes in offspring, including impairments in cognition, attention, and behavioral control.⁵ Given these concerning consequences, the American College of Obstetricians and Gynecologists (ACOG) recommends health care workers (HCWs) advise against cannabis use during pregnancy,⁶ although little research exists regarding whether these guidelines are followed consistently or whether recommendations are associated with perinatal cannabis use. Additionally, the ACOG guidelines state effects of cannabis use during breastfeeding are unknown, possibly making counseling confusing or varied.^{4,6} Similarly, the American Academy of Pediatrics recommends that pregnant women and new mothers be counseled on the risks of using cannabis during pregnancy or while breastfeeding,⁷ and Clinical Protocol #21 put forth by the Academy of Breastfeeding Medicine states that breastfeeding mothers should be counseled to reduce or stop using cannabis to avoid risks to offspring.⁸ As such, the role of HCWs' discussions about cannabis use may have significant impacts on perinatal women's behavior. Our study aims to examine whether HCWs discussing cannabis is associated with perinatal cannabis use or cannabis use while breastfeeding.

Existing literature on perinatal cannabis use largely is descriptive in nature, finding that those who use tend to have lower socioeconomic status, lower education level, be younger, not married, non-Hispanic White,⁹ and likely to co-use other substances.^{10,11} However, little is known about the impact of HCWs' discussions regarding cannabis on perinatal cannabis use. Indeed, we only identified one study assessing this specific association: Bartlett et al explored the impact of HCW's discussions with pregnant women on decisions to continue using cannabis during pregnancy in Ontario, Canada.¹² Although an important clinical question, this study was limited by use of a relatively small sample (478 mothers), lack of information regarding reasons for use, and inability to adjust for other substance use. Our study expands on this topic, in a cannabis legal state with widespread access to recreational cannabis, using a larger, state-representative sample. We add a longitudinal component, assessing whether HCWs' prenatal discussions are associated with cannabis use during breastfeeding at 1-year follow-up, a significant addition to scientific literature as most studies conducted on this subject are cross-sectional.^{4,9,12}

Using a state-level longitudinal dataset, we investigated two aims. First, we examined the association between HCWs discussing cannabis and perinatal cannabis use. We described women's reasons for perinatal use and their trusted sources of information about cannabis. We hypothesized that women who currently use cannabis would be more likely to report receiving counseling from HCW about cannabis use during pregnancy. Second, we examined the association

between HCW prenatal discussions and cannabis use during breastfeeding at two time points postpartum. We hypothesized that women reporting receiving counseling about cannabis would be less likely to use while breastfeeding.

Materials and Methods

Participants

Data are from Health eMoms, a state-representative public health surveillance system of new mothers in Colorado.¹³ Longitudinal data collection began in 2018. Mothers were recruited monthly by mail from live birth certificates to join an online cohort. Enrolled mothers receive a total of six surveys by email or text message, starting shortly after they gave birth, until their child's third birthday. Responses were aggregated into three birth cohorts (2018, 2019, and 2020 births). Mothers complete the first survey, "Survey 1," at 3 to 6 months' postpartum and "Survey 2" at 10 to 12 months' postpartum. A total of 2,400 women were invited to join each year (see [Supplementary Material S1](#) for cohort sample sizes, available in online version).

To test the association between HCWs discussing cannabis and perinatal use, data from Survey 1 were used for the 2018, 2019, and 2020 cohorts ($n = 3193$). To test the association between HCW discussions and cannabis use during early and later breastfeeding, data from Surveys 1 and 2 were used for the 2018 and 2019 cohorts ($n = 1,741$), because the 2020 cohort had not yet reached the Survey 2 time point. The Colorado Multiple Institutional Review Board reviewed the protocol, which was deemed Not Human Subjects Research because data were deidentified and publicly available.

Measures

Independent Variables

Survey 1 queries whether an HCW asked during a prenatal visit if the mother was using cannabis or if cannabis was not discussed, and whether the HCW recommended the mother use or not to use cannabis. Postnatal HCW discussion of cannabis was queried in Survey 2.

Dependent Variables

Perinatal cannabis use was assessed in Survey 1 with answer choices including during the 3 months before pregnancy, at any time during pregnancy, since the baby was born, and no cannabis use during any of these time periods. Notably, wording of the frequency question changed slightly between the 2018/2019 and 2020 cohorts (see [Supplementary Material S2](#) for further details, available in online version); responses options were similar enough to combine across cohorts. Cannabis use during breastfeeding was queried at two time points postpartum in Surveys 1 and 2.

Reasons for using cannabis were assessed in Surveys 1 and 2 using a check-all-that-apply question with answer choices aggregated: to relieve nausea/vomiting, to relieve stress/anxiety, to relieve symptoms of a chronic condition/pain, to help sleep, for fun/to relax, other, none of these reasons.

Trusted sources of cannabis-related information were assessed in Survey 2 by a check-all-that-apply question with answer choices aggregated: HCWs, word-of-mouth, cannabis stores, cannabis Web sites, other, or none of these.

Covariates

Covariates available to be adjusted for included age, race/ethnicity, maternal education, marital status, health insurance, urbanicity, tobacco or other drug use during pregnancy, and conditions experienced during pregnancy (depression, gestational diabetes, high blood pressure). Race and ethnicity information was collected from birth certificate data, compiled by Health eMoms personnel.

Further details regarding variable definitions, including question and answer wording, are shown in [Supplementary Material S2](#) (available in online version).

Statistical Analyses

Data were weighted by iterative proportional fitting (raking) to ensure representativeness of all eligible births in Colorado. Data were analyzed using SAS, v9.4, incorporating weights in accordance with the sample design. Multiple logistic regressions, adjusting for covariates, were conducted using Proc SurveyLogistic to determine the strength of associations between HCW discussions and cannabis-related outcomes (perinatal cannabis use and cannabis use during breastfeeding). In all analyses, *p*-values of <0.05 were considered statistically significant.

Results

Participant Characteristics

Overall sample characteristics are presented in [Table 1](#). Overall, 19.2% were aged 15 to 24 years, 26.9% were 25 to 29 years, 33.3% were 30 to 34 years, and 20.6% were ≥35 years old. A majority were non-Hispanic White (61.7%), 22.6% were Hispanic, 4.0% were non-Hispanic Black, and 11.7% were some other race or ethnicity (including American Indian/Alaska Native, Asian American, and “other”).

Most mothers reported more than high school education (70.5%), and 77.7% were married. Relatively few reported tobacco use during pregnancy (4.4%), reported opioid or prescription stimulant use (3.3%), illicit drug use (6.3%), and 30.0% had a medical condition during pregnancy. About 53% had Medicaid; 31.8% had private insurance, and 33.6% reported using WIC (Women, Infants, and Children) services. The sample was disproportionately urban (87.9%), reflecting the population in Colorado.

Cannabis Use during Pregnancy and Breastfeeding

Overall, 94.1% of mothers reported no cannabis use during the perinatal period (not during pregnancy nor while breastfeeding; [Table 1](#)), 3.0% reported use only during their most recent pregnancy, 1.1% only while breastfeeding, and 1.8% during both their most recent pregnancy and while breastfeeding. In sum, 5.9% (*n* = 154) of women reported cannabis use during pregnancy or breastfeeding.

Women who reported use only during pregnancy tended to be younger, unmarried, and have less education than those who did not report use ([Table 1](#)). Those who reported use during breastfeeding tended to be older and have more than high school education. Those who reported use perinatally were more likely to have private health insurance and less likely to use WIC services.

Reasons for Cannabis Use

Among those reporting perinatal cannabis use, reasons for use were as follows (not mutually exclusive): 81.0% to relieve nausea/vomiting, 65.6% to relieve stress/anxiety, 60.5% to help sleep, 47.3% to relieve symptoms a chronic condition/pain, 20.2% for fun/to relax, and 18.9% for another reason ([Table 2](#)). Among those reporting perinatal cannabis use and use while breastfeeding at 3 to 6 months' postpartum, relief from nausea/vomiting remained the most prevalent reason for use (86.1%). At 10 to 12 months' postpartum, reasons for cannabis use shifted: 71.7% reported using to relieve stress/anxiety, 63.1% to help sleep, 43.0% to relieve symptoms of a chronic condition/pain, 49.4% for fun or to relax, 13.5% to relieve nausea/vomiting, and 9% for another reason.

Trusted Sources of Cannabis-Related Information

The most frequently chosen trusted source of cannabis-related information was HCWs, both among those that reported using cannabis perinatally (68.9%) and among those that did not (77.7%; response options not mutually exclusive; [Table 3](#)). There was a large difference in the proportion that trusted word-of-mouth and/or information from cannabis stores or Web sites by perinatal cannabis use: 28.4% of those reporting using cannabis perinatally trusted word-of-mouth sources versus 17.1% of those not reporting use. Among those that reported using perinatally, 28.9% trusted cannabis Web sites versus 6.5% of those that did not. Further, 15.7% of those reporting perinatal cannabis use reported trusting cannabis stores versus 3.8% of those that did not.

Health Care Workers Discussing Cannabis

Overall, 67.8% (95% confidence interval [CI]: 66.0, 69.5) of women reported an HCW discussing cannabis during pregnancy (data not shown). [Table 4](#) presents proportions of mothers reporting HCWs discussed cannabis by the period in which cannabis was used and frequency of use. A total of 81.4% of those who reported use prior to pregnancy versus 82.2% of those that reported use during pregnancy reported an HCW discussed cannabis. Among those reporting no cannabis use, significantly fewer (65.3%, *p* < 0.01) stated an HCW discussed cannabis with them. We did not find a significant difference in reported use frequency by whether they reported an HCW discussed cannabis; the proportion ranged from 77.8% among those using 1 to 2 days a week to 83.7% for those using 1–3 days a month and the same for those using every day ([Table 4](#)).

Among women who reported HCWs discussed cannabis, a follow-up question queried whether the HCW advised for or

Table 1 Overall participant characteristics and demographics by perinatal cannabis use among 2018, 2019, and 2020 cohorts

| Sociodemographic factors | Total Unweighted n (%) | Total weighted n (%) | Use during pregnancy (weighted) n (%) (95% CI) | Use while breastfeeding: (3–6 mo) (weighted) n (%) (95% CI) | Use during pregnancy and breastfeeding (weighted) n (%) (95% CI) | No use during pregnancy or breastfeeding (weighted) n (%) (95% CI) | p-Value |
|-------------------------------------|------------------------|----------------------|--|---|--|--|---------|
| Overall | 3,193 (100%) | – | 72 (2.9%) | 32 (1.1%) | 50 (1.8%) | 2,752 (94.1%) | <0.01 |
| Age (y) | | | | | | | |
| 15–24 | 503 (15.8%) | 435 (19.2%) | 26 (36.1%) 39.9% (27.9–52.0) | 4 (12.5%) 14.8% (1.1–28.5) | 4 (8.0%) 10.0% (0.3–19.4) | 401 (14.6%) 18.8% (17.1–20.5) | <0.01 |
| 25–29 | 841 (26.3%) | 763 (26.9%) | 25 (34.7%) 36.5% (24.7–48.3) | 9 (28.1%) 32.5% (15.2–49.8) | 15 (30.0%) 33.2% (19.3–47.2) | 714 (25.9%) 26.4% (24.7–28.1) | |
| 30–34 | 1,136 (35.6%) | 1,050 (33.3%) | 24 (19.4%) 16.0% (7.9,24.1) | 11 (34.4%) 30.7% (14.9–46.5) | 22 (44.0%) 40.5% (26.5–54.4) | 1,003 (36.4%) 33.8% (31.9–35.6) | |
| ≥35 | 713 (22.3%) | 658 (20.6%) | 7 (9.7%) 7.5% (2.0–13.0) | 8 (25.0%) 22.0% (8.0–36.1) | 9 (18.0%) 16.4% (6.2–26.6) | 634 (23.0%) 21.1% (19.5–22.6) | |
| Race and ethnicity ^a | | | | | | | |
| Black, Non-Hispanic | 113 (3.6%) | 99 (4.0%) | 5 (7.1%) 7.8% (0.7–15.0) | 1 (3.4%) 2.9% (0.0–8.4) | 2 (4.2%) 3.7% (0.0–8.7) | 91 (3.4%) 3.9% (3.1–4.8) | 0.18 |
| Hispanic | 561 (18.1%) | 504 (22.6%) | 18 (25.7%) 27.7% (16.6–38.9) | 3 (10.3%) 12.9% (0.0–26.9) | 4 (8.3%) 10.9% (0.8–21.0) | 479 (17.9%) 22.8% (21.0–24.6) | |
| Other | 327 (10.6%) | 293 (11.7%) | 11 (15.7%) 17.1% (7.7–26.5) | 3 (10.3%) 11.7% (0.0–24.6) | 4 (8.3%) 10.6% (0.6–20.5) | 275 (10.3%) 11.5% (10.2–12.8) | |
| White, non-Hispanic | 2,097 (67.7%) | 1,925 (61.7%) | 36 (51.4%) 47.3% (35.1–59.6) | 22 (75.9%) 72.5% (54.9–90.1) | 38 (79.2%) 74.9% (61.4–88.4) | 1,829 (68.4%) 61.8% (59.8–63.8) | |
| Highest level of maternal education | | | | | | | |
| Less than high school | 213 (6.7%) | 178 (9.9%) | 9 (13.0%) 15.8% (6.1–25.5) | 3 (9.4%) 12.4% (0.0–25.5) | 3 (6.1%) 9.0% (0.0–18.6) | 163 (6.0%) 9.7% (8.2–11.1) | <0.01 |
| High school | 467 (14.8%) | 406 (19.7%) | 25 (36.2%) 41.7% (29.3–54.2) | 2 (6.3%) 8.6% (0.0–20.0) | 7 (14.3%) 20.1% (7.1–33.2) | 372 (13.7%) 19.1% (17.4–20.8) | |
| More than high school | 2,477 (78.5%) | 2,288 (70.5%) | 35 (50.7%) 42.4% (30.5–54.3) | 27 (84.4%) 79.0% (63.0–95.0) | 39 (79.6%) 70.9% (56.4–85.4) | 2,722 (80.3%) 71.2% (69.2–73.2) | |
| Marital status | | | | | | | |
| Married | 2,639 (82.7%) | 2,425 (77.7%) | 43 (61.4%) 54.2% (41.8–66.6) | 23 (71.9%) 66.8% (49.5–84.1) | 13 (73.5%) 68.0% (53.9–82.2) | 2,323 (84.4%) 78.8% (77.0–80.5) | <0.01 |
| Other | 551 (17.3%) | 478 (22.3%) | 27 (38.6%) 45.8% (33.4–58.2) | 9 (28.1%) 33.2% (15.9–50.5) | 49 (26.5%) 32.0% (17.8–46.1) | 478 (15.6%) 21.2% (19.5–23.0) | |

(Continued)

Table 1 (Continued)

| Sociodemographic factors | Total Unweighted n (%) | Total weighted n (%) | Use during pregnancy (weighted) n (%) (95% CI) | Use while breastfeeding; (3–6 mo) (weighted) n (%) (95% CI) | Use during pregnancy and breastfeeding (weighted) n (%) (95% CI) | No use during pregnancy or breastfeeding (weighted) n (%) (95% CI) | p-Value |
|--|------------------------|----------------------|--|---|--|--|---------|
| Tobacco use during pregnancy | | | | | | | |
| Yes | 122 (3.8%) | 104 (4.4%) | 14 (20.6%) 23.6% (12.6–34.7) | 1 (3.1%) 4.1% (0.0–12.0) | 6 (12.2%) 13.5% (3.1–23.8) | 83 (3.0%) 3.6% (2.8–4.4) | <0.01 |
| No | 3,064 (96.2%) | 2,796 (95.6%) | 54 (79.4%) 76.4% (65.3–87.4) | 31 (96.9%) 95.9% (88.0–100.0) | 43 (87.8%) 86.5% (76.2–96.9) | 2,668 (97.0%) 96.4% (95.6–97.1) | |
| Other substance use during pregnancy | | | | | | | |
| OTC pain relievers | 1,782 (56.3%) | 1,632 (55.3%) | 37 (52.1%) 50.4% (38.2–62.6) | 16 (50.0%) 47.0% (29.3–64.7) | 26 (52.0%) 49.8% (35.4–64.2) | 1,553 (56.9%) 55.6% (53.7–57.6) | 0.15 |
| Opioids/Rx stimulants | 101 (3.2%) | 88 (3.3%) | 4 (5.6%) 5.8% (0.2–11.4) | 1 (3.1%) 2.7% (0.0–8.1) | 2 (4.0%) 3.1% (0.0–7.3) | 81 (3.0%) 3.2% (2.5–3.9) | |
| Other/illicit drugs | 207 (6.5%) | 184 (6.3%) | 5 (7.0%) 7.9% (1.0–14.8) | 1 (3.1%) 2.9% (0.0–8.6) | 8 (16.0%) 16.8% (5.7–27.9) | 170 (6.2%) 6.1% (5.2–7.0) | |
| No drug use | 1,073 (33.9%) | 980 (35.1%) | 25 (35.2%) 35.9% (24.2–47.6) | 14 (43.8%) 47.3% (29.4–65.3) | 14 (28.0%) 30.3% (16.7–43.9) | 927 (33.9%) 35.1% (33.2–37.0) | |
| Conditions during pregnancy (gestational diabetes, high blood pressure, depression) | | | | | | | |
| Yes | 922 (29.2%) | 837 (30.0%) | 35 (50.0%) 50.2% (37.9–62.5) | 10 (31.3%) 30.4% (14.1–46.6) | 19 (38.8%) 38.0% (23.9–52.1) | 773 (28.4%) 29.2% (27.4–31.0) | <0.01 |
| No | 2,231 (70.8%) | 2,040 (70.0%) | 35 (50.0%) 49.8% (37.5–62.1) | 22 (68.7%) 69.6% (53.4–85.9) | 30 (61.2%) 62.0% (47.9–76.1) | 1,953 (71.6%) 70.8% (69.0–72.6) | |
| Health insurance | | | | | | | |
| Private | 764 (25.8%) | 674 (31.8%) | 42 (65.6%) 73.4% (63.0–83.7) | 8 (25.8%) 32.3% (14.5–50.0) | 20 (44.4%) 52.3% (37.2–67.3) | 604 (23.6%) 30.2% (28.2–32.2) | <0.01 |
| Medicaid | 1,788 (60.4%) | 1,650 (53.3%) | 13 (20.3%) 14.6% (6.9–22.4) | 21 (67.7%) 60.0% (41.6–78.4) | 19 (42.2%) 36.6% (22.5–50.7) | 1,597 (62.5%) 54.7% (52.6–56.7) | |
| Other | 406 (13.7%) | 371 (14.9%) | 9 (14.1%) 12.0% (4.4–19.6) | 2 (6.5%) 7.7% (0.0–18.6) | 6 (13.3%) 11.1% (2.5–19.8) | 354 (13.9%) 15.2% (13.7–16.7) | |
| Used WIC services | | | | | | | |
| Yes | 880 (72.2%) | 774 (33.6%) | 25 (35.2%) 29.4% (18.9–39.9) | 24 (75.0%) 68.1% (50.6–85.6) | 32 (64.0%) 60.2% (45.9–74.6) | 2,028 (74.3%) 67.6% (65.7–69.6) | <0.01 |
| No | 2,281 (27.8%) | 2,109 (66.4%) | 46 (64.8%) 70.6% (60.1–81.1) | 8 (25.0%) 31.9% (14.4–49.4) | 18 (34.0%) 39.8% (25.4–54.1) | 702 (25.7%) 32.4% (30.4–34.3) | |

Table 1 (Continued)

| Sociodemographic factors | Total Unweighted n (%) | Total weighted n (%) | Use during pregnancy (weighted) n (%) % (95% CI) | Use while breastfeeding: (3–6 mo) (weighted) n (%) % (95% CI) | Use during pregnancy and breastfeeding (weighted) n (%) % (95% CI) | No use during pregnancy or breastfeeding (weighted) n (%) % (95% CI) | p-Value |
|--------------------------|------------------------|----------------------|--|---|--|--|---------|
| Rural vs. urban | | | | | | | |
| Urban | 2,857 (89.5%) | 2,593 (87.9%) | 63 (87.5%) 87.2% (79.1–95.3) | 29 (90.6%) 90.0% (79.2–100.0) | 42 (84.0%) 82.3% (70.7–93.8) | 2,459 (89.4%) 88.0% (86.7–89.3) | 0.69 |
| Rural | 336 (10.5%) | 313 (12.1%) | 9 (12.5%) 12.8% (4.7–20.9) | 3 (9.4%) 10.0% (0.0–20.8) | 8 (16.0%) 17.7% (6.2–29.3) | 293 (10.6%) 12.0% (10.7–13.3) | |

Abbreviations: CI, confidence interval; OTC, over-the-counter; WIC, Women, Infants, and Children.
 Note: Bold numbers represent weighted percent and 95% CIs.
 *Race/ethnicity was ascertained by birth certificate data, compiled by Health eMoms personnel.

against perinatal cannabis use. Although most reported HCWs advised against use, 2.3% of those that reporting use prior to pregnancy, and 5.3% of those reporting use during pregnancy, stated that the HCW advised to use. Less than 1% of mothers with no use reported an HCW advised cannabis use (→Table 5).

Longitudinal Associations with Cannabis Use during Breastfeeding

Among mothers reporting cannabis use before or during pregnancy, the relationship between reported prenatal HCW discussion and cannabis use while breastfeeding at 3 to 6 months (adjusted odds ratio [aOR]: 1.0; 95% CI: 0.3, 3.3) and 10 to 12 months' postpartum (aOR: 0.1; 95% CI: 0.0, 2.4) failed to reach statistical significance (→Table 6). Similarly, among women reporting perinatal cannabis use, postnatal HCW discussions were not found to be significantly associated with differences in cannabis use during breastfeeding at 10 to 12 months' postpartum (aOR: 2.06; 95% CI: 0.2, 19.3).

Perinatal Cannabis Use and Breastfeeding

Our results indicated that breastfeeding rates fell by 10 to 12 months' postpartum (69.2% at 3–6 months vs. 40.6% at 10–12 months' postpartum; data not shown), prompting follow-up analyses assessing whether perinatal cannabis use itself was associated with breastfeeding and whether these associations differed by HCW discussions. Multiple logistic regressions were performed with breastfeeding at 10 to 12 months' postpartum as the outcome (Supplementary Material S3, available in online version). First, all covariates were included and found to significantly predict breastfeeding ($\chi^2 = 2.72$; $p < 0.01$). Second, reported cannabis use (before or during pregnancy) was added to the model: cannabis use did not significantly reduce odds of future breastfeeding (aOR: 0.7; 95% CI: 0.5, 1.1). Finally, an interaction term (HCW discussion × cannabis use) was added and was not significant in the model, suggesting the relationship between perinatal cannabis use and future breastfeeding did not differ by HCW discussions.

Discussion

This is the first study to examine the relationship between HCWs discussing cannabis and perinatal cannabis use and use while breastfeeding in a U.S. state-representative sample. Our study aimed to understand (1) the prevalence, sources of information, and reasons for perinatal use in a large and recent sample of Colorado women and (2) the role that HCWs discussing cannabis plays in perinatal cannabis use and, longitudinally, use while breastfeeding.

Six percent of our sample reported using cannabis during pregnancy or while breastfeeding. Despite this study being conducted in an established recreational cannabis retail market, the rate of reported use during pregnancy (2.9%) is lower than other Colorado estimates (6.8% per Pregnancy Risk Assessment Monitoring System 2020 data¹⁴) but falls between other national studies' prevalence estimates

Table 2 Reasons for cannabis use among those that used any time during their most recent pregnancy (weighted)

| Reasons | Among perinatal cannabis users N = 154 % (95% CI) | Among perinatal cannabis use + cannabis use while breastfeeding (3–6 mo) N = 107 % (95% CI) | Among cannabis use while breastfeeding (10–12 mo) N = 30 % (95% CI) |
|--|---|---|---|
| Relieve nausea/vomiting | 81.0% (74.2–87.9) | 86.1% (77.3–95.1) | 13.5% (0.0–27.0) |
| Relieve stress/anxiety | 65.6% (56.7–74.5) | 61.7% (48.5–74.9) | 71.7% (53.9–89.4) |
| Help sleep | 60.5% (51.2–69.8) | 55.4% (41.5–69.2) | 63.1% (44.3–82.0) |
| Relieve symptoms of chronic condition/Pain | 47.3% (37.9–56.8) | 47.9% (34.0–61.8) | 43.0% (23.3–62.8) |
| For fun or to relax | 20.2% (12.8–27.7) | 11.0% (2.8–19.2) | 49.4% (29.6–69.2) |
| Other | 18.9% (11.5–26.3) | 23.4% (11.7–35.0) | 9.0% (0.0–19.5) |

Abbreviation: CI, confidence interval.

Notes: Frequencies are weighted. The question was check-all-that-apply; response options are not mutually exclusive and do not sum to 100%.

Table 3 Trusted sources of information on marijuana use during pregnancy by any use of cannabis during pregnancy (weighted)

| Sources | Use of cannabis during pregnancy % (95% CI) | No use of cannabis during pregnancy % (95% CI) |
|---------------------|--|---|
| Health care workers | 68.9% (58.4–79.5) | 77.7% (75.5–79.8) |
| Word of mouth | 28.4% (18.1–38.7) | 17.1% (15.1–19.0) |
| Cannabis web site | 28.9% (17.6–40.2) | 6.5% (5.0–8.0) |
| Cannabis store | 15.7% (6.4–25.0) | 3.8% (2.6–5.0) |
| Other | 51.4% (40.0–62.8) | 58.1% (55.5–60.6) |
| None | 14.9% (6.8–23.0) | 15.4% (13.6–17.3) |

Abbreviation: CI, confidence interval.

Notes: Frequencies are weighted. The question was check-all-that-apply and response options are not mutually exclusive and do not sum to 100%.

Table 4 Mothers reporting a health care worker discussed cannabis use by perinatal period and frequency of cannabis use during pregnancy (weighted)

| | | HCW discussed MJ use % (95% CI) | HCW did not discuss MJ use % (95% CI) | p-Value |
|---|-----------|------------------------------------|--|---------|
| Cannabis use during pregnancy | | | | |
| No perinatal use | N = 2,704 | 65.3% (63.4–67.3) | 34.7% (32.7–36.6) | <0.01 |
| Use in 3 mo before pregnancy | N = 420 | 81.4% (77.4–85.3) | 18.6% (14.7–22.6) | <0.01 |
| Use at any time during pregnancy | N = 122 | 82.2% (74.9–89.5) | 17.8% (10.5–25.1) | <0.01 |
| Frequency of cannabis use during pregnancy | | | | |
| Every day | | 83.7% (71.1–96.3) | 16.3% (3.7–28.9) | 0.94 |
| 3–6 d/wk | | 79.2% (60.0–97.8) | 20.8% (2.2–39.4) | |
| 1–2 d/wk | | 77.8% (54.6–100.0) | 22.2% (0.0–45.4) | |
| 1–3 d/mo | | 83.7% (72.9–94.4) | 16.3% (5.6–27.1) | |
| 10–12 mo' postpartum | | | | |
| Using cannabis at 10–12 mo' postpartum (regardless of breastfeeding status) | | 47.8% (39.4–56.2) | 52.2% (43.8–60.6) | – |
| Using cannabis at 10–12 mo' postpartum (while breastfeeding) | | 29.5% (14.3–44.7) | 70.5% (55.3–85.7) | – |

Abbreviations: CI, confidence interval; HCW, health care worker; MJ, marijuana.

Note: Frequencies are weighted.

Table 5 Among pregnant mothers who had a health care worker discuss cannabis use, the proportion who received advice for or against cannabis use during pregnancy by period of cannabis use (weighted)

| | | HCW advises for cannabis use % (95% CI) | HCW advises against cannabis use % (95% CI) |
|----------------------------------|-----------|--|--|
| Perinatal cannabis use | | | |
| Use in 3 mo before pregnancy | N = 308 | 2.3% (0.0–4.6) | 97.7% (95.4–100.0) |
| Use at any time during pregnancy | N = 91 | 5.3% (0.0–11.2) | 94.7% (88.8–100.0) |
| No perinatal use | N = 1,606 | 0.7% (0.1–1.3) | 99.3% (98.7–99.9) |

Abbreviations: CI, confidence interval; HCW, health care worker.
Note: Frequencies are weighted.

Table 6 Logistic regressions testing the association of a health care worker discussing cannabis use with maternal cannabis use during breastfeeding, among those that used cannabis at any time during pregnancy, adjusting for sociodemographic factors

| | Use during breastfeeding, at 3–6 months' postpartum (n = 195) | | Use during breastfeeding, at 10–12 months' postpartum (n = 62) | |
|----------------------------|---|---------------|--|-----------------|
| | OR (95% CI) | aOR (95% CI) | OR (95% CI) | aOR (95% CI) |
| HCW discussion prenatally | 1.4 (0.6–3.2) | 1.0 (0.3–3.3) | 0.4 (0.1–1.6) | 0.1 (0.0–2.4) |
| HCW discussion postnatally | – | – | 1.62 (0.6–4.7) | 2.06 (0.2–19.3) |

Abbreviations: aOR, adjusted odds ratio; CI, confidence interval; HCW, health care worker; OR, odds ratio.

Note: aOR adjusts for age, race and ethnicity, education, marital status, tobacco smoking status, other (noncannabis) drug use, pregnancy complications, insurance status.

(range from 1.4¹⁵ to 4.3%¹¹). Although Health eMoms surveys were conducted electronically, desirability bias to underreport perinatal use or recall bias may exist.

The demographic makeup of women using cannabis perinatally (e.g., younger age, less education) largely conforms to prior literature conducted in previous years.⁹ There have been limited studies of prenatal cannabis,^{9,11,16} but even fewer examining use during the postpartum and breastfeeding period.^{4,17,18} Mothers that used during breastfeeding tended to be older and report having more than high school education. Differences in demographic characteristics between those using prenatally and postnatally suggest different factors at play in decision-making of whether to use cannabis by perinatal period.

Although not the primary aim, data from this study afforded examination of reasons for cannabis use at multiple times perinatally. The most prevalent reasons for use during pregnancy were to relieve nausea/vomiting, stress/anxiety, and symptoms related to a chronic condition or pain. Thus, it is likely that perinatal cannabis use may represent an attempt to self-medicate or alleviate negative symptoms. This is in line with a previous study conducted in Colorado in which researchers contacted cannabis dispensaries posing as pregnant women seeking advice about cannabis to relieve pregnancy-related nausea,¹⁹ most of whose employees suggested use of cannabis. Although this study was conducted early in Colorado's recreational legalization implementation, its findings highlight that cannabis is viewed societally as a potentially self-medicating agent. A substantially smaller portion of women using cannabis perinatally reported using cannabis for fun or to relax, although this population is not to

be ignored. The shift in primary reasons for use at 10 to 12 months to stress/anxiety relief may indicate need for improved accessibility and adequacy of mental health care at this time. Future studies may assess patterns of use and outcomes of women using for different reasons during pregnancy.

Discussion of cannabis with HCWs was commonly, but not universally, reported (~66%). Those who used cannabis before and during pregnancy were significantly more likely to report HCW discussions about cannabis compared with women reporting no use. This suggests that HCWs may have used other information or clues to decide which mothers to approach about cannabis. Although universal screening is desirable, when time, resources, or other limitations are present, HCWs may prioritize whom to talk with about cannabis. Alternately, HCWs' selective discussions may reflect stigma associated with populations more likely to use cannabis perinatally (e.g., younger, less educated). Women may also selectively initiate conversations with HCWs about perinatal cannabis use. Conversely, HCW discussions were not significantly associated with frequency of perinatal cannabis use: those with more frequent use were not more likely to report discussions than those using infrequently.

Although encouraging that many women regard HCWs as trusted sources of cannabis-related information, it is concerning that a significant proportion of women report trusting word-of-mouth sources, and even more concerning, trusting cannabis companies or Web sites. Given that nearly 33% of pregnant women report HCWs did not discuss cannabis, women may seek information from other, potentially less reliable, sources. This may represent an opportunity for

HCWs to work with community facilities to provide more reliable cannabis-related information. Additionally, a small number of women reported HCWs advised cannabis use. Details regarding circumstances leading to HCW advice in favor of perinatal cannabis use were not available. Possibly, the HCW determined some level of use could be continued at low risk, that cannabis use represented a harm-reduction strategy, or that some numbers of these responses were in error (misunderstanding or misreporting), as can occur in any large data collection system.

Our second aim addressed whether HCW discussions were associated with subsequent cannabis use during breastfeeding. The hypothesis was not supported in that we failed to find a significant effect of HCWs discussing cannabis on use during breastfeeding at either postpartum time points. Reasons why HCWs' discussion of cannabis may have had limited influence on perinatal cannabis use and use while breastfeeding could include variability in information being discussed, infrequency of delivery of information regarding cannabis, or in participants' interpretations of information being discussed. Nevertheless, our results indicate need for improvement in information delivery from HCWs to pregnant women, both in frequency (dose) and in message (effectiveness). Discussion about the reliability of other cannabis information sources will be important, as it appears information is disseminated from a variety of sources, each potentially with their own biases.

Results of this study should be interpreted with a few limitations in mind. First, the sample yielded relatively low prevalence of perinatal cannabis use, limiting our ability to provide granular analysis of use (frequency, modes of delivery, etc.) or of specific conditions experienced during pregnancy. Second, less than half of women reported breastfeeding at 10 to 12 months' postpartum, limiting the power of temporal associations between HCWs' prenatal discussions and subsequent use during breastfeeding. Although our results do not indicate that cannabis use is a significant deterrent for breastfeeding, we query whether substance use in general deters mothers from breastfeeding. HCW discussions about this issue may better inform new mothers making these decisions. Third, results are based on self-report, which may result in recall or acceptability bias, accounting for lower observed prevalence of socially unacceptable behavior, including perinatal cannabis use. Fourth, our sample was limited in the number of women over 40 that could have been included as a separate category from 35 to 39-year-olds; although more women are becoming pregnant later in life, these women were not adequately sampled in the Health eMoms survey, and therefore, the final age group could not be separated viably into these two categories, thus perhaps somewhat limiting the generalizability of our results. Fifth, due to the nature of the questions asked in this survey, we were unable to describe specific modes of cannabis delivery. Lastly, although an online survey may be helpful in some regard, it may limit the scope of individuals accessing the Health eMoms survey due to lack of internet access or knowledge, possibly contributing to selection or participation bias.

These limitations notwithstanding, our study benefits from use of recent and relevant data on an important population. We report robust information on reasons for perinatal cannabis use and trusted sources of cannabis-related information, thus providing insights into where prevention efforts may be focused. We report the first study to evaluate whether the ACOG's guidelines regarding discussion of cannabis are being followed in a U.S. population-based sample. Further, understanding patterns of perinatal cannabis use and use while breastfeeding, as well as how HCWs address cannabis with mothers in Colorado, a state with robust retail markets for recreational cannabis, is crucial as the nation looks potentially to broaden recreational legalization. Our study indicates the need for further study of practices of HCWs interfacing with perinatal women, a strengthening of messaging around cannabis to this population, both in health care and community settings, to impact behavior change.

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Conflict of Interest

None declared.

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