Research Letter

Cannabidiol-Only Product Use in Pregnancy in the United States and Canada

Findings From the International Cannabis Policy Study

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This study aimed to characterize pregnant individuals' use of cannabidiol (CBD). Data are from the International Cannabis Policy Study (2019–2021), a repeated cross-sectional survey of individuals aged 16–65 years in the United States and Canada (N=66,457 women, including 1,096 pregnant women). The primary analysis compared pregnant and nonpregnant women's CBD-only product use patterns and reasons for use. The prevalence of CBD-only use in pregnant women was 20.4% compared with 11.3% among nonpregnant women, P<.001. Reasons for CBD use among pregnant women included anxiety (58.4%), depression (40.3%), posttraumatic stress disorder (32.1%); pain (52.3%), headache (35.6%), and nausea or vomiting (31.9%). Thus, CBD-only product use was prevalent in this large sample, with one in five pregnant women reporting use. Characterization of prenatal CBD use is an important first step to exploring potential risks to exposed offspring.

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Prenatal cannabis use (use of products containing tetrahydrocannabinol [THC] and cannabidiol [CBD] during pregnancy) is concerning due to the risk of adverse consequences for offspring.[1] Significantly less is known about prenatal use of *CBD-only products* (ie, products advertised to contain only CBD, which are largely legal in North America and often marketed as supplements).[2] However, because CBD product sales have increased dramatically in recent years,[3] and CBD is perceived as safer than other substances,[4] CBD use during pregnancy may occur at significant rates.

Due to CBD's increasing popularity and acceptability[4,5] and the paucity of information regarding its use in pregnancy, we assessed CBD use frequency, routes of administration, and reasons for use among pregnant women in the United States and Canada.

METHODS

This cross-sectional study used Waves 2–4 (collected from 2019 to 2021) of the International Cannabis Policy Study, an annual, self-completed, web-based survey of respondents aged 16–65 years in the United States and Canada. Sampling and survey design information is available on the International Cannabis Policy Study website (https://cannabisproject.ca/methods/) and in Appendix 1, available online at http://links.lww.com/AOG/D668. The study sample included 66,457 women (self-identified sex at birth female). The study received ethics clearance from the University of Waterloo Research Ethics Committee (ORE#31330).

Variable definitions are described in Appendix 1 (http://links.lww.com/AOG/D668) and on the International Cannabis Policy Study website.[6] Primary analyses compared nonpregnant and pregnant women's CBD use patterns and reasons for use.

Supplementary analyses compared sociodemographics (Appendix 2, available online at http://links.lww.com/AOG/D668), mental health diagnoses, and substance use between pregnant women currently (reporting past–30-day use) and not currently using CBD (Appendix 3, available online at http://links.lww.com/AOG/D668). Weighted comparisons of outcomes were evaluated using χ^2 tests. Logistic regressions evaluated the strength of associations between pregnancy and CBD-usage variables, which are adjusted for covariates and described in detail in Appendix 1, http://links.lww.com/AOG/D668.

RESULTS

Table 1 shows the comparison of nonpregnant (n=65,336) and pregnant (n=1,096) women's CBD-use behaviors. Adjusted odds ratios (aORs) of past-year CBD use were 1.55 times greater for pregnant women than for nonpregnant women (95% CI, 1.34–1.81). A total of 20.4% of pregnant women reported past–30-day ("current") CBD use, compared with 11.3% of nonpregnant women (aOR 1.82; 95% CI, 1.52–2.18). The most common CBD-only product type used in the past year among pregnant (70.9%) and nonpregnant (58.7%) women was CBD oils. Pregnant women were significantly less likely to report using "other" (including concentrates [eg, wax, shatter], hash or kief, dried herb, hemp oil, or other) CBD forms than nonpregnant women (aOR 0.69; 95% CI, 0.48–0.99).

In 2021, questions regarding past-month (current) modes of CBD delivery and having a CBD prescription were added to International Cannabis Policy Study surveys. Pregnant women currently using CBD were significantly less likely than nonpregnant women currently using CBD to report using "other" CBD product types (aOR 0.43; 95% CI, 0.19–0.99).

Table 1. Weighted Frequencies of Women Participating in the International Cannabis Policy Study (2019–2021) in the United States and Canada—Unadjusted and Adjusted Comparisons of Pregnant and Nonpregnant Women*

	Nonpregnant Women (n=65,336)	Pregnant Women (n=1,096)	P From Unadjusted χ^2 Test	Weighted aOR (95% CI)[†]
Past-year CBD use	15,339 (25.3)	388 (37.8)	**<.001**	**1.55 (1.34–1.81)**
Current CBD use	7,400 (11.3)	224 (20.4)	**<.001**	**1.82 (1.52–2.18)**
Women currently using CBD[‡]	n=7,400	n=224		
Daily or near daily CBD use	1,965 (26.6)	45 (20.2)	.10	0.92 (0.64–1.32)
CBD type past year	109 missing, n=7,291	1 missing, n=223		
Oils (oral)[§]	4,278 (58.7)	158 (70.9)	**<.001**	1.49 (0.82–2.69)
Oils (vaping)	943 (12.9)	51 (22.9)	**<.001**	0.74 (0.33–1.67)
Edibles or in food or drink	2,016 (27.6)	79 (35.4)	**.008**	1.08 (0.79–1.49)
Topical ointments	2,885 (39.6)	72 (32.3)	**.04**	0.91 (0.63–1.32)
Other[‖]	1,438 (19.7)	39 (17.5)	.45	**0.69 (0.48–0.99)**
Women in 2021 reporting currently using CBD[¶]	n=2,374	n=82		
Prescription for CBD	683 (28.8)	44 (53.7)	**<.001**	2.33 (1.37–3.96)
CBD type used in past 30 d				
Oils (oral)	1,143 (49.7)	50 (62.5)	**.02**	1.62 (0.92–2.84)
Oils (vaping)	252 (11.0)	8 (10.0)	.80	0.66 (0.25–1.70)
Edibles or in food or drink	572 (24.9)	15 (18.8)	.25	0.58 (0.30–1.13)
Topical ointments	880 (38.3)	26 (32.5)	.30	1.06 (0.57–1.96)
Other	382 (16.6)	8 (10)	.12	**0.43 (0.19–0.99)**

aOR, adjusted odds ratio, CBD, cannabidiol.
Data are n (%) unless otherwise specified.
Bold indicates statistically significance.
* Missing data due to nonresponse were not included in analyses. Past-year CBD: n=4,846 (69 for pregnant women); CBD type used in past year: n=110 (1 for pregnant women); CBD type used in past 30 days: n=77 (2 for pregnant women). The other variables had no missing data due to nonresponse.
[†] Adjusted for age, ethnicity (binary), education, income adequacy, condition (legality), and device; referent group=nonpregnant women.
[‡] *Current CBD use* was defined as reporting past–30-day CBD use; comparator=no past–30-day use (including less recent use, eg, past-year use, or no use). Pregnant women currently using CBD indicates participants reporting currently being pregnant and reporting past–30-day use of CBD.
[§] Includes oil or liquid drops or capsules, tinctures.
[‖] Includes concentrates (eg, wax, shatter), hash or kief, dried herb, hemp oil, and other.
[¶] Past-month CBD use by type and having a prescription for CBD were questions added to the International Cannabis Policy Study survey in 2021; therefore, analyses related to these outcomes were restricted to women surveyed in 2021.

Pregnant women had 2.33 times greater adjusted odds of having a CBD prescription compared with nonpregnant women (95% CI, 1.27–2.88).

Table 2 depicts reasons for CBD use among pregnant (n=224) and nonpregnant (n=7,400) women reporting current CBD use. Pregnant women were more likely to report using CBD for posttraumatic stress disorder, eating disorder, bipolar disorder, psychosis, another mental health problem, nausea or vomiting, appetite, seizures, and cancer compared with nonpregnant women. Nonpregnant women were significantly more likely to report using CBD for pain, sleep, general well-being, and "other" physical or mental health reasons, or to not use CBD for mental health.

DISCUSSION

This study explores prenatal CBD-only use in humans. In a large North American sample, more than one in five pregnant women reported using CBD in the past 30 days. Pregnant women reported nearly double the rate of CBD use compared with nonpregnant women. Thus, CBD use in pregnancy occurs at a high frequency despite limited available data on potential adverse outcomes.[7]

Consistent with previous literature in nonpregnant populations,[8] substantial proportions of pregnant women reported using CBD for mental or physical health reasons. This is in line with previous work demonstrating motivations for cannabis use shifting

Table 2. Reasons for CBD-Only Use Among Nonpregnant and Pregnant Women Using Cannabidiol in the Untied States and Canada—Weighted, Unadjusted Comparisons From the International Cannabis Policy Study (2019–2021)*

Reason for Use[†]	Nonpregnant Women Using CBD (n=7,400)	Pregnant Women Using CBD (n=224)[‡]	Unadjusted OR (95% CI)[§]
Mental health			
Anxiety	3,948 (54.7)	129 (58.4)	1.15 (0.84–1.59)
Depression	2,445 (33.9)	89 (40.3)	1.31 (0.95–1.79)
PTSD	1,304 (18.1)	71 (32.1)	**2.15 (1.55–2.98)**
Bipolar disorder	682 (9.4)	46 (20.8)	**2.54 (1.75–3.68)**
Psychosis	298 (4.1)	31 (14.0)	**3.85 (2.45–6.04)**
Schizophrenia	127 (1.8)	16 (7.2)	**4.34 (2.41–7.81)**
Substance use	331 (4.6)	12 (5.4)	1.21 (0.71–2.06)
Eating disorder	332 (4.6)	24 (10.9)	**2.53 (1.51–4.24)**
ADHD	551 (7.6)	20 (9.0)	1.17 (0.74–1.85)
Other	896 (12.4)	7 (3.2)	**0.23 (0.12–0.44)**
I have never used CBD-only products to treat or improve mental health symptoms	2,089 (28.9)	17 (7.7)	**0.21 (0.10–0.43)**
Physical health			
Headache	2,668 (36.8)	79 (35.6)	0.95 (0.68–1.34)
Pain	4,745 (65.5)	116 (52.3)	**0.58 (0.43–0.79)**
Nausea or vomiting	957 (13.2)	71 (31.9)	**3.08 (2.21–4.29)**
Appetite	745 (10.2)	50 (22.5)	**2.55 (1.80–3.62)**
Seizures	332 (4.6)	36 (16.2)	**4.034 (2.66–6.12)**
Spasms	1,203 (16.6)	35 (15.8)	0.93 (0.60–1.44)
Cancer	180 (2.5)	31 (14.0)	**6.44 (3.88–10.68)**
Sleep	2,657 (36.7)	36 (16.2)	**0.34 (0.24–0.48)**
GI issues	661 (9.1)	21 (9.5)	1.02 (0.61–1.71)
Fibromyalgia	678 (9.4)	12 (5.4)	0.55 (0.29–1.05)
General well-being	1,324 (18.3)	26 (11.7)	**0.60 (0.39–0.94)**
Other	278 (3.8)	2 (0.9)	**0.27 (0.09–0.80)**
I have never used CBD-only products to treat or improve physical health symptoms	450 (6.2)	8 (3.6)	0.57 (0.20–1.65)

CBD, cannabidiol; OR, odds ratio; PTSD, posttraumatic stress disorder; ADHD, attention deficit/hyperactivity disorder.
Data are n (%) unless otherwise specified.
Bold indicates statistically significance.
* Missing data due to nonresponse were not included in analyses. Mental health reasons: n=184 (three missing among pregnant women currently using CBD); physical health reasons: n=155 (two missing among pregnant women currently using CBD).
[†] The questions for reasons for use were select-all-that-apply, and response options are not mutually exclusive and do not sum to 100%. The answer choices were coded as binary outcomes (eg, the participant checked or left blank the reason, "anxiety"); thus, the referent group is "unchecked" or "no" to the answer option.
[‡] Pregnant women using CBD included women identifying as currently being pregnant and reporting past–30-day CBD-only product use.
[§] The referent group for unadjusted OR was nonpregnant women using CBD.

to symptom management in pregnancy.[9] Health care professionals should be aware of these associated characteristics and consider addressing potential physical and mental health drivers to address prenatal CBD use.

Our study is limited by the cross-sectional design, self-report nature of survey-based responses, participants' potentially limited ability to accurately distinguish between CBD-only and THC-containing products, and limitations inherent to the International Cannabis Policy Study data set (recruitment by non–probability-based sampling and that the survey is targeted to the general population and thus lacking pregnancy-related questions, eg, trimester, parity). Limitations are included in detail in Appendix 1 (http://links.lww.com/AOG/D668).

This study addresses gaps in knowledge regarding the characteristics of pregnant women currently using CBD-only products, informs clinicians about reasons for CBD use that may require treatment, and encourages routine screening for perinatal CBD-only use. Importantly, these findings warrant initiating a robust study of perinatal CBD-only use for pregnancy- and offspring-related outcomes.

REFERENCES

1. Marchand G, Masoud AT, Govindan M, Ware K, King A, Ruther S, et al. Birth outcomes of neonates exposed to marijuana in utero: a systematic review and meta-analysis. JAMA Netw Open 2022;5:e2145653. doi: 10.1001/jamanetworkopen.2021.45653

2. Svensson CK. CBD for the treatment of pain: what is the evidence? J Am Pharm Assoc (2003) 2020;60:e80–3. doi: 10.1016/j.japh.2020.06.009

3. Grand View Research. Cannabidiol market size, share & trends analysis report by source type (hemp, marijuana), by sales channel (B2B, B2C), by end-use (medical, personal use), by region, and segment forecasts, 2024–2030. Accessed April 8, 2024. https://www.grandviewresearch.com/industry-analysis/cannabidiol-cbd-market

4. Eisenstein M. The reality behind cannabidiol's medical hype. Nature 2019;572:S2–4. doi: 10.1038/d41586-019-02524-5

5. Sarrapfour S, Urits I, Powell J, Nguyen D, Callan J, Orhurhu V, et al. Considerations and implications of cannabidiol use during pregnancy. Curr Pain Headache Rep 2020;24:48. doi: 10.1007/s11916-020-00872-w

6. Hammond D. International cannabis policy study. Accessed April 8, 2024. https://cannabisproject.ca/methods/

7. Lowe DJE, Sasiadek JD, Coles AS, George TP. Cannabis and mental illness: a review. Eur Arch Psychiatry Clin Neurosci 2019;269:107–20. doi: 10.1007/s00406-018-0970-7

8. Casanova C, Ramier C, Fortin D, Carrieri P, Mancini J, Barré T. Cannabidiol use and perceptions in France: a national survey. BMC Public Health 2022;22:1628. doi: 10.1186/s12889-022-14057-0

9. Vanstone M, Taneja S, Popoola A, Panday J, Greyson D, Lennox R, et al. Reasons for cannabis use during pregnancy and lactation: a qualitative study. CMAJ 2021;193:e1906–14. doi: 10.1503/cmaj.211236

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