

Use and Perceptions of Cannabidiol Products in Canada and in the United States

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Abstract

Objectives: This study aimed to characterize use and perceptions of cannabidiol (CBD) products.

Materials and Methods: Participants aged 16–65 years in Canada ($n = 15,042$) and the United States ($n = 30,288$) completed measures on prevalence and patterns of CBD product use and perceptions of CBD oil as part of the 2019 International Cannabis Policy Study online survey.

Results: Past 12-month CBD product use was significantly more prevalent among respondents in the United States (26.1%) than in Canada (16.2%). Consumers in the United States and Canada reported using a range of CBD products, including drops (46.3% vs. 47.3%, respectively), topicals (26.0% vs. 16.7%), edibles/foods (23.8% vs. 17.6%), vape oils (18.9% vs. 13.3%), capsules (13.3% vs. 16.7%), and dried flower (10.1% vs. 16.1%). CBD was most commonly reported for management of pain, anxiety, and depression. Over half of CBD consumers in both countries reported that CBD oil was beneficial for health.

Conclusions: Use of CBD products is common in both the United States and Canada, primarily to manage self-reported health conditions for which there is little or no evidence of efficacy. Clearer public health messaging regarding the therapeutic effects of CBD is warranted.

Keywords: cannabidiol; cannabis; marijuana; perceptions; substance use

Introduction

Cannabidiol (CBD) is 1 of over 100 cannabinoids identified in the cannabis plant. Although CBD is considered psychoactive, unlike tetrahydrocannabinol (THC), it does not cause impairment when used alone. CBD has been marketed as a treatment for a wide variety of medical conditions, often with limited evidence.¹ Research suggests that CBD is effective in controlling some types of seizures, and preliminary evidence indicates its potential for treating schizophrenia and anxiety disorders.^{1–3} There is little or weak evidence for the efficacy of CBD in treating pain, diabetes, and most other conditions.^{1,3} CBD has also been suggested to “offset” the psychotic symptoms and cognitive impairment associated with the effects of THC in cannabis products; however, there is no consistent evidence of this to date.^{4–6}

The legal status of CBD products differs in Canada and U.S. states, and has been met with confusion due

to illicit CBD sales by a variety of retailers.^{7,8} In the U.S., as of November 2020, 36 states have legalized medical use of cannabis; of those, 15 states and the District of Columbia have also legalized adult (or “non-medical”) cannabis use.⁹ However, “marijuana” (cannabis with >0.3% THC) remains illegal at the federal level, and CBD derived from marijuana remains prohibited federally. In 2018, the Agriculture Improvement Act of 2018 (“Farm Bill”) removed hemp and hemp-derived constituents from Schedule 1 of the Controlled Substances Act, classifying cannabis plants with THC concentrations $\leq 0.3\%$ as hemp, and effectively legalizing hemp- (but not marijuana-) derived CBD products.¹⁰ With the introduction of the Farm Bill, topical and edible CBD products were introduced by major retailers, leading to their increased availability in several states.¹¹ To date, all but three states permit hemp-derived CBD products under state law, but with varying regulations.^{12,13}

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In Canada, CBD is regulated in the same manner as all cannabis products. In October 2018, the sale of non-medical (“recreational”) cannabis was legalized under federal legislation.¹⁴ Recreational sales of orally ingested oils and dried flower were available in October 2018, whereas edibles, topicals, and other extracts were available a year later.¹⁵ Health claims for CBD products are prohibited, unless the products are classified as health products and approved as prescription drugs.¹⁶

Currently, cannabis products contain a wide range of CBD levels. In Canada, the average level of THC in dried flower is ~20%, compared with <2% CBD.¹⁷ CBD products used for therapeutic purposes are typically administered in other product forms, such as orally ingested oils, capsules, or topical ointments, and more recently, CBD edibles and vape oils.¹⁸ The CBD concentrations in these CBD products on the licit and illicit markets can range from a few milligrams to >50 mg per unit.^{19,20} There is currently no clear consensus on terminology: some use the term “CBD products” to refer to products that contain both THC and CBD, whereas others use the term exclusively for products with only trace amounts of THC, typically used for therapeutic reasons. In this article, we refer to “CBD products” as those with negligible levels of THC (e.g., <0.3% THC), and “cannabis products” to refer more broadly to the group of THC-containing products.

The North American CBD market has expanded rapidly in recent years.²¹ Despite widespread consumer interest, there is relatively little evidence on the use of CBD products, and no national estimates of prevalence or patterns of use. To our knowledge, the only publicly accessible research on use and/or consumer perceptions of CBD in the general population is limited to convenience samples or public opinion polls from the United States. A published study of CBD consumers estimated that 62% used CBD products to manage a medical condition,²² and 18% of cannabis consumers at an advocacy event reported “CBD-only” product use.²³ Data from commercial survey firms suggest that the majority of Americans have heard of CBD, and that 14–18% have tried and/or currently use CBD products.^{24,25}

This study sought to examine the prevalence of CBD product use in the United States and Canada, including frequency of use, product types, and use for medical conditions. The study also examined the perceived health benefits of CBD oil and its perceived ability to cause a “high.”

Materials and Methods

Data are cross-sectional findings from the 2019 International Cannabis Policy Study (ICPS),²⁶ conducted in Canada and the United States. Data were collected through self-completed web-based surveys conducted in September–October 2019 with respondents aged 16–65 years. Respondents were recruited through the Nielsen Consumer Insights Global Panel and their partners’ panels. E-mail invitations were sent to a random sample of panelists; those residing outside the United States or Canada or aged <16 or >65 years were not invited. Surveys were conducted in English in the United States and English or French in Canada. Median survey time was 25 min. Respondents provided consent before completing the survey. Respondents received remuneration in accordance with their panel’s usual incentive structure (e.g., points-based or monetary rewards, chances to win prizes). The study was reviewed by and received ethics clearance through a University of Waterloo Research Ethics Committee (ORE#31330). A full description of the study methods is described in the ICPS 2019 Technical Report and methodology article.^{27,28}

Measures

Full item wording is available in the ICPS 2019 survey.²⁶ All questions included “don’t know” and “refuse to answer” options.

Sociodemographic factors. Sociodemographic factors included gender, age, ethnicity, highest education level, and perceived income adequacy. Suspected device type used to complete the survey was also recorded. See Table 1 for coding of response options.

Cannabis use status. Cannabis use status was categorized as never user, used >12 months ago, used in the past 12 months, or daily/almost daily cannabis user.

CBD product use. CBD product use was assessed by asking “have you used any CBD products with no THC (including CBD oil) in the past 12 months?” (yes, no, don’t know). Those who responded “yes” to using CBD products in the past 12 months were asked the following questions about their product use.

Frequency of using CBD products. “How often do you use any CBD products with no THC?” (Less than once per month, one or more times per month, one or more times per week, every day or almost every day.)

Type of CBD products used. “In the past 12 months, what type of CBD products with no THC did you use? Select all that apply. I’ve used CBD-only...,” followed by a list of 12 product types (Fig. 2).

Money spent on CBD products. “How much money have you spent on all types of CBD-only products with no THC in the past 12 months?” (numeric entry). All Canadian dollar values were converted to USD (exchange rate as of September 1, 2019). Values were winsorized: those between the 95th and 99th percentiles were set to the 95th percentile, and those exceeding the 99th percentile ($n=73$) were excluded.

Therapeutic use of CBD products. “Have you ever used CBD-only products with no THC to improve or manage symptoms for any of the following? Select all that apply” followed by lists of mental and physical health concerns on separate screens (Table 3).

Perceptions of CBD oil. Perceptions of CBD oil was assessed using two items: (1) “In your opinion, is this cannabis oil...” (5-point scale where 1=very bad for your health and 5=very good for your health) and (2) “In your opinion, would this cannabis oil get someone...” (5-point scale where 1 = not at all high and 5 = extremely high). Respondents saw an image of an unbranded dropper bottle containing 100 mg CBD oil with 10 mg/mL CBD and 0 mg/mL THC (Supplementary Fig. S1).

Statistical analysis

After exclusions due to poor data quality or duplicate entries, the 2019 cross-sectional sample comprised 45,735 respondents.²⁸ A subsample of 45,330 were included in the current analysis after excluding respondents with missing data on past 12-month CBD product use or education level.

Poststratification sample weights were constructed based on the Canadian and U.S. census estimates. A raking algorithm^{29,30} was applied to the original sample ($n=45,735$) to compute weights that were calibrated to age, gender, education, region (and in the United States, racial groupings), and rescaled to the sample sizes of Canada and the United States as a whole.²⁸ Weighted estimates are reported.

Descriptive statistics were used to describe overall patterns of CBD product use and perceptions. Binary logistic regression was used to examine correlates of past 12-month CBD product use (1=yes vs. 0=no/don’t know). Two additional binary logistic regression models

were conducted to test differences between past 12-month CBD product consumers and nonconsumers on: (1) likelihood of perceiving CBD oil as beneficial for health (1 = good/very good for health vs. 0 = neither good nor bad/bad/very bad for health/don’t know) and (2) likelihood of correctly responding that CBD oil with 0 mg THC would not get someone high (1 = not at all high vs. 0 = a little high/high/very high/extremely high/don’t know). All models were adjusted for country, age, gender, education level, ethnicity, income adequacy, survey device type, and cannabis use status; adjusted odds ratios (AORs) are reported. Analyses were not pre-registered and should be considered exploratory. Analyses were conducted using survey procedures in SAS 9.4.

Results

Sample characteristics are given in Table 1. Mean respondent age in the United States and Canada was 40.1 (standard deviation [SD]=14.7) years and 40.8 (SD = 14.7) years, respectively.

Table 1. Weighted Sample Characteristics of 2019 International Cannabis Policy Study ($n=45,330$)

	Canada ($n=15,042$) % (n)	United States ($n=30,288$) % (n)
Gender		
Male	50.1 (7541)	49.8 (15,078)
Female	49.9 (7501)	50.2 (15,210)
Age group (years)		
16–25	18.5 (2785)	19.8 (5989)
26–35	20.8 (3127)	21.7 (6584)
36–45	19.8 (2973)	19.1 (5793)
46–55	20.0 (3015)	19.8 (5994)
56–65	20.9 (3142)	19.6 (5928)
Ethnicity		
White	73.8 (11,099)	76.3 (23,095)
Other/mixed/unstated	26.2 (3943)	23.7 (7193)
Highest education level		
Less than high school	15.6 (2348)	10.4 (3143)
High school diploma or equivalent	26.7 (4024)	22.0 (6676)
Some college/university or technical training	32.8 (4928)	37.8 (11,452)
Bachelor’s degree or higher	24.9 (3743)	29.8 (9016)
Income adequacy (difficulty making ends meet)		
Unstated	3.4 (518)	2.5 (753)
Very difficult/difficult	32.0 (4809)	33.6 (10,185)
Neither easy nor difficult	35.2 (5290)	33.1 (10,038)
Easy/very easy	29.4 (4425)	30.7 (9313)
Survey device type		
Smartphone	42.6 (6412)	52.1 (15,777)
Tablet	9.5 (1427)	6.1 (1862)
Computer	47.9 (7203)	41.8 (12,649)
Cannabis use status		
Never user	38.0 (5711)	35.9 (10,869)
Used > 12 months ago	26.9 (4050)	31.5 (9548)
Past 12-month user	23.9 (3597)	19.8 (6009)
Daily/almost daily user	11.2 (1684)	12.7 (3861)

CBD product use

Table 2 gives the odds of CBD product use in the past 12 months, among all respondents. CBD use was significantly more prevalent among respondents in the United States (26.1%) than in Canada (16.2%) ($p < 0.001$). As Table 2 indicates, CBD product use was also significantly more common among females, young adults aged 26–35 years versus 16–25 years, Caucasian respondents, more educated respondents, those who reported that it was “easy” or “very easy” to make ends meet versus those with unstated or lower perceived income adequacy, and cannabis consumers versus nonconsumers. As shown in Figure 1, frequency of use among past 12-month CBD consumers was similar in the United States and Canada, with ~4 in 10 consumers reporting consumption of CBD less than once a month.

Figure 2 shows the CBD products used in the past 12 months among past 12-month CBD consumers.

In both jurisdictions, CBD oil/liquid drops were the most common CBD product used, at close to half of consumers. Use of certain products—especially CBD topicals, edibles, and vape oils—was more common in the United States, whereas the use of CBD dried flower was more common in Canada.

Money spent on CBD

CBD consumers in the United States spent a mean and median of USD \$106.77 (SD=138.64) and \$50.00, respectively, on CBD products in the past 12 months. Consumers in Canada reported spending a mean and median of USD \$128.53 (SD=154.60) and \$66.56, respectively.

Therapeutic CBD use

Overall, 60.3% ($n=6225$) of respondents reported using CBD to improve or manage symptoms, including 61.7% ($n=4874$) in the United States and 55.6%

Table 2. Correlates of Past 12-Month Cannabidiol Product Use ($n=45,330$)

Variable ^a	Use of CBD products in past 12 months % (<i>n</i>)	Odds of past 12-month CBD use (vs. no/don't know) AOR (95% CI)	<i>p</i> -Value
Country			
Canada (ref)	16.2 (2433)	Reference	—
United States	26.1 (7895)	1.91 (1.78–2.05)	<0.001
Gender			
Male (ref)	22.5 (5091)	Reference	—
Female	23.1 (5237)	1.14 (1.06–1.22)	<0.001
Age (years)			
16–25 (ref)	21.2 (1856)	Reference	—
26–35	31.6 (3073)	1.18 (1.05–1.32)	0.005
36–45	25.0 (2195)	0.92 (0.82–1.03)	0.141
46–55	20.0 (1803)	0.74 (0.65–0.84)	<0.001
56–65	15.4 (1401)	0.56 (0.49–0.63)	<0.001
Ethnicity			
Other/mixed/unstated (ref)	21.7 (2411)	Reference	—
White	23.2 (7917)	1.12 (1.03–1.23)	0.009
Highest education level			
Less than high school (ref)	15.7 (860)	Reference	—
High school diploma or equivalent	22.2 (2374)	1.40 (1.20–1.63)	<0.001
Some college/university or technical training	24.9 (4086)	1.57 (1.36–1.81)	<0.001
Bachelor's degree or higher	23.6 (3009)	1.71 (1.48–1.99)	<0.001
Income adequacy (difficulty making ends meet)			
Easy/very easy (ref)	24.8 (3406)	Reference	—
Neither easy nor difficult	21.0 (3218)	0.81 (0.74–0.89)	<0.001
Very difficult/difficult	23.8 (3562)	0.90 (0.82–0.98)	0.016
Unstated	11.1 (141)	0.47 (0.36–0.60)	<0.001
Cannabis use status			
Never user (ref)	7.3 (1203)	Reference	—
Used >12 months ago	21.8 (2959)	3.56 (3.19–3.97)	<0.001
Past 12-month user	38.7 (3715)	8.13 (7.30–9.05)	<0.001
Daily/almost daily user	44.2 (2452)	9.93 (8.78–11.24)	<0.001

Values $p < 0.05$ are indicated in bold.

^aModel was also adjusted for survey device type; no significant difference between smartphone (reference) versus computer or tablet use ($p > 0.05$ for both).

AOR, adjusted odds ratio; CBD, cannabidiol; CI, confidence interval; Ref, reference category.

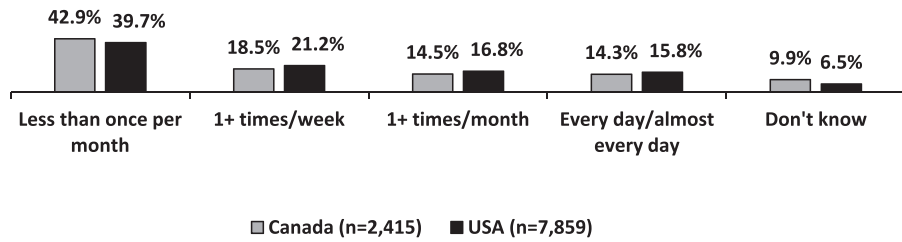


FIG. 1. Frequency of use of CBD products among past 12-month CBD consumers in the United States and Canada. CBD, cannabidiol.

(*n* = 1352) in Canada. Table 3 shows the prevalence of using CBD for each condition. In both countries, the three most common mental health concerns for which consumers used CBD were anxiety (49.7%), depression (33.2%), and post-traumatic stress disorder/traumatic event (14.6%). In terms of physical health, CBD was most commonly used for pain

(50.8%), headaches/migraines (32.6%), and problems sleeping (27.2%).

Perceptions of CBD oil

In total, 34.4% of respondents in the United States and 26.3% of respondents in Canada believed that CBD oil containing 10 mg CBD and 0 mg THC was “good” or

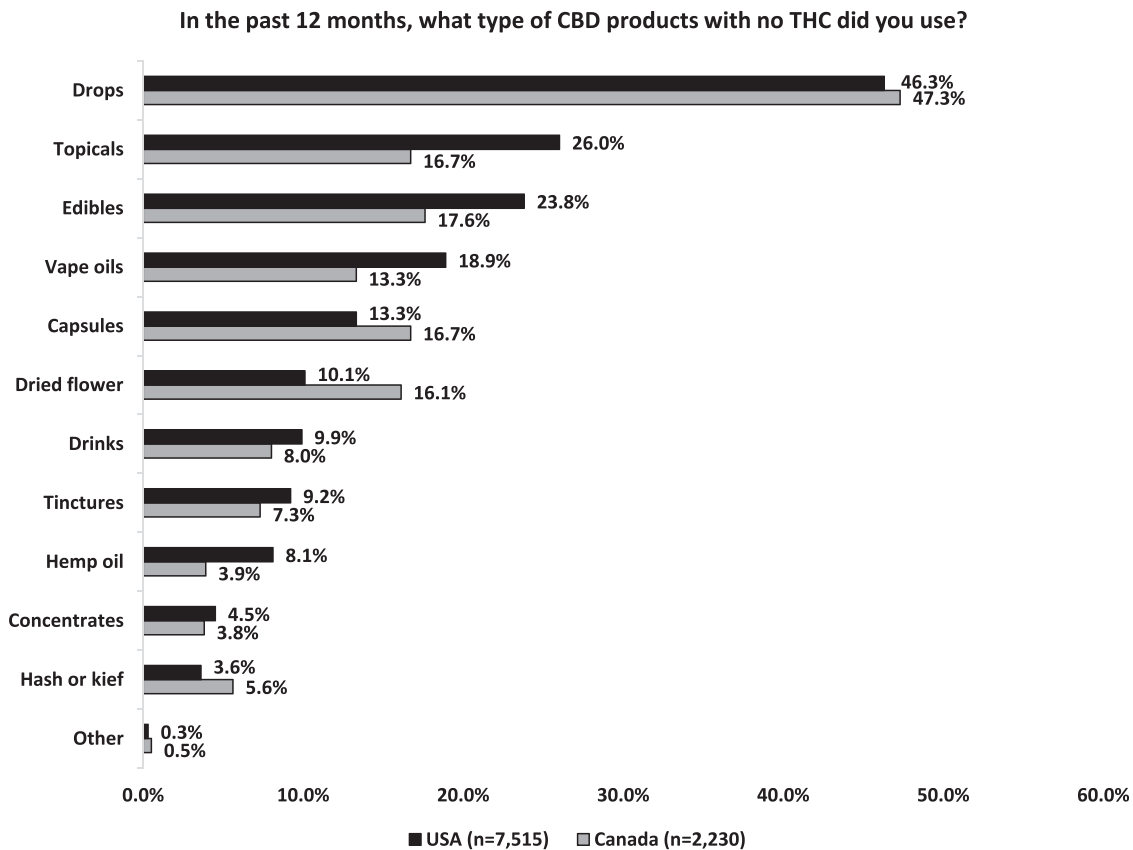


FIG. 2. Proportion (%) of CBD products used in past 12 months among CBD product consumers in the United States and Canada.

Table 3. Reported Use of Cannabidiol Products to Manage Symptoms of Health Concerns, Among Past 12-Month Cannabidiol Consumers

Health concern ^a	Canada (n = 2433)	United States (n = 7895)
Mental health	% (n)	% (n)
Anxiety (including phobia, obsessive compulsive disorder, or panic disorder)	44.1 (1073)	51.5 (4064)
Depression (including dysthymia)	30.3 (736)	34.0 (2688)
PTSD or traumatic event (e.g., abuse or loss)	14.2 (346)	14.7 (1159)
Bipolar disorder, mania, or borderline personality disorder	6.4 (155)	9.4 (94)
ADD/ADHD	6.3 (154)	7.0 (552)
Alcohol or other drug use	4.4 (106)	5.9 (464)
Eating disorder	4.7 (114)	4.3 (336)
Psychosis (e.g., paranoia, disorganized thinking, hearing voices that others can't hear) or dissociative identity disorder	4.7 (114)	4.6 (362)
Schizophrenia	2.6 (63)	3.1 (247)
Other significant emotional or mental health problem	7.3 (179)	6.7 (531)
I have never used CBD products for any of the above	34.0 (828)	27.5 (2168)
Unstated	4.7 (115)	5.2 (413)
Physical health		
Pain (including muscle pain, arthritis, neuropathy, or PMS)	46.9 (1141)	52.1 (4110)
Headaches/migraines	29.9 (726)	33.5 (2643)
Problems sleeping	27.4 (667)	27.1 (2140)
General well being	13.9 (338)	14.6 (1155)
Muscle spasms	10.9 (265)	13.4 (1057)
Nausea/vomiting or chemotherapy symptoms	11.0 (268)	12.8 (1011)
Lack of appetite	10.8 (263)	11.7 (922)
Digestion/gastrointestinal issues (Crohn's disease, colitis, IBS, IBD, etc.)	6.7 (163)	6.2 (491)
Fibromyalgia	5.1 (125)	5.5 (437)
Seizures/epilepsy	5.1 (124)	4.7 (371)
To shrink tumors or treat cancer	3.1 (75)	2.9 (232)
Other condition(s)	3.4 (83)	2.7 (212)
I have never used CBD products for any of the above	14.1 (342)	11.8 (934)
Unstated	4.8 (117)	4.6 (364)

^aRespondents were asked: "Have you ever used CBD-only products with no THC to improve or manage symptoms for any of the following?" Mental and physical health conditions were shown on separate screens. Respondents could select all responses that applied; therefore, values do not sum to 100%.

ADD, attention deficit disorder; ADHD, attention deficit hyperactivity disorder; CBD, cannabidiol; IBD, inflammatory bowel disease; IBS, irritable bowel syndrome; PMS, pre-menstrual syndrome; PTSD, post-traumatic stress disorder; THC, tetrahydrocannabinol.

"very good" for health. Table 4 shows perceptions of CBD oil in those who had and had not used CBD products in the past 12 months. Almost 60% of CBD consumers in the United States and over half of those in Canada believed that CBD oil was good/very good for health. CBD consumers were significantly more likely than nonconsumers to perceive CBD oil as good/very good for health (AOR=2.91, 95% confidence interval [CI]=2.70–3.14, $p < 0.001$). In contrast, among those who had not used CBD products, only approximately a quarter in the United States and a fifth in Canada responded this way. Moreover, many nonconsumers were unsure of CBD's effects on health (over a third in both countries responded "don't know"), whereas only ~1 in 10 CBD consumers responded "don't know."

Overall, 39.6% of respondents in the United States and 31.9% of respondents in Canada correctly reported that CBD oil would not get someone high. Past 12-month CBD consumers were significantly more likely than CBD nonconsumers to correctly report that the

CBD oil would get someone "not at all high" (AOR = 1.98, 95% CI = 1.84–2.13, $p < 0.001$). As shown in Table 4, over half of CBD-product consumers in both countries responded correctly. In contrast, among nonconsumers, just over a third of respondents in the United States and < 3 in 10 in Canada responded correctly.

Discussion

The findings suggest that ~26% of respondents in the United States and 16% in Canada used CBD products in the past year. These rates are somewhat higher than previous estimates of CBD use generated from the United States-based convenience samples, which ranged from 7% to 14% of Americans or 11% to 18% of cannabis users.^{23–25} For context, the proportion reporting CBD use in this study is somewhat lower than national estimates of past-year cannabis use in Canada and higher than national estimates of "marijuana" use in the United States, but broadly similar to rates in U.S. states that have legalized recreational cannabis.^{31–33} Approximately 60%

Table 4. Perceptions of Cannabis Oil Among Respondents Who Had Versus Had Not Used Cannabidiol Products in the Past 12 Months

	CBD product use in past 12 months		No CBD product use in past 12 months		All respondents	
	% (n)		% (n)		% (n)	
"In your opinion, is this cannabis oil..."	Canada (n = 2420)	United States (n = 7880)	Canada (n = 12,548)	United States (n = 22,393)	Canada (n = 14,968)	United States (n = 30,167)
Very bad for your health	2.5 (60)	3.2 (250)	8.5 (1062)	6.8 (1511)	7.5 (1122)	5.8 (1761)
Bad for your health	5.3 (128)	3.6 (287)	8.5 (1067)	6.1 (1364)	8.0 (1195)	5.5 (1651)
Neither good nor bad for your health	26.9 (652)	24.0 (1888)	25.2 (3167)	25.9 (5762)	25.5 (3819)	25.4 (7649)
Good for your health	33.0 (799)	34.3 (2702)	15.8 (1982)	18.8 (4181)	18.6 (2781)	22.8 (6882)
Very good for your health	22.9 (554)	24.9 (1963)	4.8 (600)	6.9 (1527)	7.7 (1154)	11.6 (3490)
Don't know	9.4 (227)	10.0 (791)	37.2 (4669)	35.6 (7942)	32.7 (4896)	28.9 (8733)
"In your opinion, would this cannabis oil get someone..."	Canada (n = 2422)	United States (n = 7875)	Canada (n = 12,544)	United States (n = 22,275)	Canada (n = 14,966)	United States (n = 30,288)
Not at all high	52.8 (1277)	55.4 (4363)	27.8 (3489)	34.0 (7578)	31.9 (4767)	39.6 (11,940)
A little high	13.9 (337)	12.0 (945)	12.8 (1611)	12.3 (2731)	13.0 (1948)	12.2 (3676)
High	10.9 (263)	9.7 (767)	11.2 (1403)	9.5 (2109)	11.1 (1666)	9.5 (2875)
Very high	7.2 (175)	7.0 (548)	4.5 (571)	3.5 (772)	5.0 (746)	4.4 (1319)
Extremely high	5.5 (134)	7.0 (554)	3.7 (470)	3.8 (852)	4.0 (605)	4.7 (1409)
Don't know	9.7 (235)	8.9 (699)	39.9 (4999)	37.0 (8231)	35.0 (5234)	29.6 (8930)

of CBD consumers reported using CBD to improve/manage symptoms of a health concern, consistent with the 62% reported in previous research.²² Half of consumers reported using CBD to manage pain and/or anxiety, and a third used CBD to manage depression, similar to previous studies.^{22,34,35} In contrast to patterns of cannabis use,³³ CBD use was more common among women and was most prevalent among those with some college/university or technical/vocational education, consistent with previous research on CBD use.^{24,25} Females may be more likely to use CBD for its therapeutic potential, as several conditions commonly reported to be managed with CBD in this study are unique to or more prevalent among women, including premenstrual pain, anxiety, and depression.³⁶ Similar to previous research, CBD product use was also higher among younger adults,^{24,25,33} with the highest use reported by those aged 26–35 years. CBD use was also more common among those with higher perceived income adequacy; this may reflect more disposable income to spend on CBD products. Finally, CBD product use was more prevalent among those who reported more frequent cannabis use. This is unsurprising given that many cannabis consumers report its use for therapeutic purposes, often to manage the same conditions reported by CBD consumers.

The current findings suggest use of a wide variety of CBD products. Similar to previous research on CBD

consumers, noncombustible extract products were most popular, particularly orally ingested oils.²² Use of dried flower was less common, likely because most strains with higher CBD levels often contain meaningful levels of THC.¹⁷ Extracts may also allow for superior dosing of CBD compared with smoked cannabis or edibles. In the United States, the lower prevalence of dried flower may also be related to bans on smokable hemp sales.³⁷

Study results also confirm that many CBD consumers perceive CBD oil as beneficial for health. The evidence base on CBD products is rapidly increasing and will provide much needed empirical scrutiny to the wide variety of therapeutic claims; although CBD may prove effective in managing some conditions, it is likely that consumer perceptions of the therapeutic benefits of CBD exceed clinical effectiveness for many of the conditions for which it is currently used.³⁸ Moreover, little is known regarding the potential harms of CBD. Preliminary research suggests it may interact with prescription drugs, increase liver function, and cause drowsiness and gastrointestinal issues.¹ Lastly, research suggests that CBD-rich products with < 1% THC can produce detectable levels of blood THC (reaching 2.7 and 4.5 ng/mL THC in new and chronic users, respectively).³⁹ Such concentrations fall within the range of traffic violations in Canada and in states such as Montana, Nevada, and Ohio.^{40,41}

Finally, the current findings suggest poor understanding of the lack of impairment associated with CBD. Previous research suggests that most consumers learned about CBD from the Internet and other informal sources, whereas <1 in 10 were informed by a physician.²² As credible sources of health information, physicians, and government agencies—including those responsible for cannabis provision in Canada and in U.S. states with legal sales—are well positioned to dispel misperceptions and provide accurate information on the effects of CBD.

Limitations

This study is subject to limitations common to survey research, including self-report bias. Survey questions referred to “CBD-only products with no THC” and the CBD oil label indicated “0 mg THC”; yet most CBD products contain some amount of THC.⁴² There may have been some uncertainty regarding the definition of a “CBD-only” product, and respondents who consume cannabis products with trace amounts of THC, consider CBD to be a cannabis product, and/or live in jurisdictions where cannabis remains illegal may have under-reported their CBD use. Moreover, our interpretation of CBD versus THC-containing cannabis products may be inconsistent with assumptions made by other researchers or the public, influencing interpretation of our results. Respondents were recruited using nonprobability-based sampling; therefore, the findings do not provide nationally representative estimates. Compared with the national population, the U.S. sample had fewer respondents with low education levels and Hispanic ethnicity. Cannabis use estimates were within the range of national estimates for young adults, whereas estimates among the full ICPS sample were generally higher than estimates in the United States and Canada, likely because national surveys included older adults, who are known to have lower rates of cannabis use. In both countries, the ICPS sample also had poorer self-reported general health than the national population. This is a feature of many nonprobability samples, and may be partly due to the use of online surveys, which provide greater perceived anonymity than in-person or telephone-assisted interviews often used in national surveys.^{43,44}

Conclusions

The findings suggest that CBD products are used by a considerable portion of consumers in the United

States and Canada. More than half of consumers believe that CBD is beneficial for health and report using it to manage a wide range of health conditions, despite limited evidence of its impact for those conditions.¹ Overall, the CBD market appears to be at an important stage, characterized by significant growth but relatively low levels of knowledge and understanding. Indeed, the extent to which consumers distinguish between THC-containing “cannabis products” and “CBD products” is unclear—perhaps due to the wide range of products with varied combinations of THC and CBD. From a research perspective, there is a need to better understand how consumers report CBD-containing products in population-based surveys: if CBD-only products are reported as cannabis products, estimates of cannabis prevalence will be inflated over time as the popularity of CBD increases. Although there is a general movement to adopt the term “cannabis” to avoid the stigma associated with “marijuana”, “marijuana” may better differentiate CBD-only products from other cannabis products. Overall, there is a need to clarify how these terms are used by consumers and researchers to ensure that usage of CBD- versus THC-containing cannabis is accurately and consistently reported.

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Supplementary Material

Supplementary Figure S1

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Abbreviations Used

ADD = attention deficit disorder
ADHD = attention deficit hyperactivity disorder
AOR = adjusted odds ratio
CBD = cannabidiol
CI = confidence interval
IBD = inflammatory bowel disease
IBS = irritable bowel syndrome
ICPS = International Cannabis Policy Study
PMS = pre-menstrual syndrome
PTSD = post-traumatic stress disorder
SD = standard deviation
THC = tetrahydrocannabinol