

## Patient characteristics from a medical cannabis provider

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### Abstract

Medical cannabis has been prescribed by physicians to treat a variety of symptoms including pain, nausea and vomiting, anxiety, depression, and sleep disorders in patients with severe or chronic illnesses. This paper presents the baseline demographics and characteristics of patients using medical cannabis in Canada. Patients were invited to complete a voluntary online survey after registering with a single medical cannabis provider. The survey included questions on demographics, medical history, current medical conditions and symptoms, and their corresponding severities. A total of 2,753 patients completed the survey (average age of 43.0 years old, SD = 13.7). Patients were predominantly male (68.4%, n = 1,882) and Caucasian (80.3%, n = 2,089). Most patients were employed (49.4%, n = 1133), while 18.7% (n = 428) were retired, and 3.9% (n = 89) were students. Of the surveyed patients, 25.1% (n = 580) smoked tobacco cigarettes, and 74.9% (n = 1782) reported having previous experience with cannabis. The most frequently reported conditions were anxiety disorder (31.7%, n = 723), depression (31.6%, n = 729), pain (29.5%, n = 681), and sleep disorder (25.5%, n = 589). The most frequently reported symptoms included pain (73.0%, n = 2011), anxiety (72.6%, n = 1998), and sleep problems (69.8%, n = 1922). These findings are consistent with results from other North American studies, suggesting their generalizability in defining patient populations that may benefit from medical cannabis use. Understanding patient characteristics will be useful in informing the design of future clinical research initiatives and identifying the needs of patients using medical cannabis.

**Keywords:** Medical cannabis, patient characteristics, survey

### Introduction

The plant species *Cannabis sativa* has long been a part of human history and medicine; for example, it has been used in China due to its range of psychoactive and physiological effects for at least 5000 years (1). Cannabis contains a complex combination of active compounds with varying pharmacodynamics and pharmacologic properties (2–

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4). The most well-known of these compounds is delta-9-tetrahydrocannabinol (THC), which is also the major psychoactive component in cannabis (5). THC belongs to a group of compounds known as cannabinoids, of which over 100 distinct structural types have been identified (3). These compounds are structurally similar to endogenous cannabinoids such as the euphoriant neurotransmitter anandamide, which are a part of the mammalian endocannabinoid system (6). In humans, cannabinoids have been found to activate CB-1 and CB-2 receptors of this system. These receptors are found in neurons of the central and peripheral nervous systems, and their activation leads to a wide range of effects including modulation of pain, appetite, mood, and memory (4,7,8).

Cannabis can be used for a variety of therapeutic applications. A systematic meta-analysis conducted by Amar (1) reviewed the findings of 72 controlled studies examining the effects of medical cannabis across 10 different pathologies or symptoms (1). These included nausea and vomiting associated with chemotherapy, loss of appetite, pain, multiple sclerosis, spinal cord injuries, Tourette's syndrome, epilepsy, glaucoma, Parkinson's disease, and dystonia. Nine of the 14 studies assessing acute and chronic pain found a significant reduction in dose of opioids or other pain medications following cannabis use. The most recent of these studies was conducted by Berman et al. which investigated 48 patients with neuropathic pain and found a statistically significant reduction in pain and improvement in sleep after the administration of THC (9). This suggests that medical cannabis may be a safer and more effective alternative to opioid analgesics without the risk of addiction-associated with opioid use.

Medical cannabis has emerged as a potential alternative or concomitant treatment option for a variety of indications. The growing number of medical cannabis patients has drawn attention to the need to better understand the physiological mechanisms behind its effects, and the characteristics of populations that may benefit from its use. However, there is a lack of data assessing the demographic and medical characteristics of medical cannabis users. The purpose of the present study was to assess the characteristics of medical cannabis patients with the intention of understanding their medical needs and how cannabis may be used to

alleviate their underlying medical conditions and associated symptoms. This knowledge will inform the design of future clinical research initiatives and contribute to the incorporation of medical cannabis into standard clinical practice.

## Methods

Between January 2015 and October 2016, patients who were prescribed medical cannabis in Canada from a single licensed medical cannabis provider were invited to complete an online survey approximately 15-25 minutes in length that assessed baseline demographics. Patients who completed the baseline survey were subsequently invited to complete follow-up (FU) surveys at 4 months and 10-months after completion of the initial survey.

### *Survey design*

The survey was designed based on scientific literature with direction from scientists and healthcare professionals with experience prescribing medical cannabis for patient care. Pain was assessed on a scale of 1-10, which was derived from the numerical rating scale, a common validated method of reporting chronic pain (10–12). Assessment of overall quality of life (QOL) was based on the commonly used and validated Quality of Life Scale (13, 14).

The dynamic survey contained a bank of over 100 questions, from which a customized selection was given to patients based on their responses to previous survey questions. For example, patients who responded “no” to “have you ever smoked cigarettes?” were not asked to answer “how many cigarettes did you smoke?.” Patients were given the option to skip questions they did not want to answer. In certain questions, patients were also given the option to select “prefer not to answer,” or “other” and input a specific response. As each patient completed a customized survey that assessed only relevant attributes in detail, each question received a different number of responses.

### Baseline

The baseline survey assessed patient demographics and medical information. Demographic information collected included age, sex, ethnicity, smoking status, previous experience with cannabis, and employment status. Patients were asked to select any diagnosed conditions from a list of 46 conditions, and were prompted with FU questions regarding specific aspects of their condition. Patients were also asked to select present symptoms from a list of 39 symptoms and rate the severity of each symptom as “mild,” “moderate,” or “severe.” Patients were asked to score severity of pain on a scale of 1-10, where 1 represented dull pain and 10 represented severe pain. Patients were asked to rate their ability to perform activities of daily living (ADL) from very capable, somewhat capable, somewhat incapable, very incapable, or don’t know. Moreover, patients were asked about their experiences of sleep, appetite, concentration, bowel activity, and sexual function by selecting from severe difficulty, moderate difficulty, no difficulty, good, or very good. Patients were also asked about any difficulties with mobility, and ability to dress and shower independently through selecting from severe, moderate, minimal, or no difficulty.

### Data analysis

Patients who selected “other” as an answer to any question were asked to specify, and their responses were categorized into existing options where appropriate. Data was summarized with statistical parameters of median, mean, range, standard deviation (SD), and percentage of total when appropriate.

## Results

A total of 2,753 patients identified their age and sex (see Table 1). Patient ages ranged from 2-91 years old, with the average age being 43.0 years old (SD = 13.7 years). A larger percentage (68.4%, n = 1,882) of the surveyed population was male.

Table 2 summarizes the lifestyle demographics of the surveyed patients. Of 2,314 patients who

responded to the question “Do you smoke tobacco cigarettes?,” 25.1% (n = 580) responded “yes.” FU questions showed that individuals smoked anywhere from one cigarette/day to over 60 cigarettes/day, with a median of 12 cigarettes/day. The duration of tobacco cigarette smoking ranged from one year to 30 years, with the median number of years ranging between 20-30.

Of the 2,319 patients who provided information about previous experience with cannabis, most responders reported that they had previous experience (76.8%, n = 1,782), while 15.8% (n = 366) had not used cannabis before (Table 2). The remaining patients preferred not to answer this question (7.4%, n = 171).

Of the 2,293 patients who specified their employment status, 34.5% (n = 791) were employed full-time, while 18.7% were retired (n = 428), 10.9% were not employed and not looking for work (n = 236), 9.7% were self-employed (n = 222), and 3.9% (n = 89) were students.

A total of 2,602 patients indicated their ethnicity, with the majority of patients identifying as “Caucasian” (80.3%, n = 2089), followed by “Native Canadian” (4.8%, n = 126), “Asian” (3.5%, n = 90), “Black/African American/African” (1.7%, n = 43), and “Spanish/Hispanic/Latino” (0.9%, n = 23) (see Table 3). A single individual identified as being “Pacific Islander” (0.04%). As several individuals indicated more than one race, these responses were collectively grouped under “Mixed race,” which made up 1.5% of all responses (n = 38).

## Patient conditions

Patients were asked to specify their diagnosed condition(s) from a list of 46 conditions, or to indicate any additional conditions that had not been specified. Responses were obtained from 2307 patients, with the twenty most commonly diagnosed conditions listed in Table 4. The most highly reported conditions were anxiety disorder (31.7%, n = 732), followed closely by depression (31.6%, n = 729) and pain (29.5%, n = 681). Additional common conditions included sleep disorder (25.5%, n = 589) and PTSD (21.8%, n = 502).

**Table 1. Patient age distribution by sex**

Age (Years)	Male	Female
	n (%)	n (%)
0-19	20 (0.7%)	11 (0.4%)
20-29	303 (11%)	96 (3.5%)
30-39	543 (19.7%)	196 (7.1%)
40-49	405 (14.7%)	184 (6.7%)
50-59	380 (13.8%)	244 (8.9%)
60-69	182 (6.6%)	105 (3.8%)
70-79	41 (1.5%)	22 (0.8%)
80-89	7 (0.3%)	13 (0.5%)
90-99	1 (0.04%)	0 (0%)
Total	1882 (68.4%)	871 (31.6%)
<b>Overall Total</b>	<b>2753</b>	
<b>Average (SD)</b>	<b>43.0 (13.7)</b>	
<b>Median (Range)</b>	<b>45 (1, 92)</b>	

SD: Standard deviation.

**Table 2. Patient lifestyle demographics**

	n (%)
<b>Smoking status</b>	
Smoker	580 (25.1%)
Non-smoker	1734 (74.9%)
Total responses	2314
<b>Experience with Cannabis</b>	
Yes	1782 (76.8%)
No	366 (15.8%)
Prefer not to answer	171 (7.4%)
Total responses	2319
<b>Employment status</b>	
Employed Full-Time	791 (34.5%)
Employed Part-Time	120 (5.2%)
Self-Employed	222 (9.7%)
Not employed, but looking for work	129 (5.6%)
Not employed, and not looking for work	236 (10.3%)
Homemaker	88 (3.8%)
Retired	428 (18.7%)
Student	89 (3.9%)
Prefer Not to Answer	190 (8.3%)
Total Responses	2293

**Table 3. Patient ethnicities**

Ethnicity	n (%)	Census Canada 2011 (%)
White/Caucasian	2089 (80.3%)	67.6%
Native Canadian	126 (4.8%)	4.3%
Spanish/Hispanic/Latino	23 (0.9%)	1.2%

Ethnicity	n (%)	Census Canada 2011 (%)
Black/African American/African	43 (1.7%)	2.9%
Asian/Middle Eastern/South Asian	90 (3.5%)	14.2%
Pacific Islander	1 (0.04%)	N/A
Mixed race	38 (1.5%)	0.5%
Prefer Not to Answer	164 (6.3%)	N/A
Other	28 (1.1%)	N/A
Total Responses	2602	

**Table 4. Patient medical conditions**

Medical Condition	n (%)
Anxiety Disorder	732 (31.7%)
Depression	729 (31.6%)
Pain	681 (29.5%)
Sleep disorder	589 (25.5%)
PTSD	502 (21.8%)
Migraines	336 (14.6%)
Degenerative Disc Disease	278 (12.1%)
Irritable bowel syndrome	247 (10.7%)
Fibromyalgia	214 (9.3%)
Spinal Disk Herniation	194 (8.4%)
ADHD	169 (7.3%)
Cancer	142 (6.2%)
Restless Leg Syndrome	137 (5.9%)
Asthma	128 (5.5%)
GERD	120 (5.2%)
Hypertension	116 (5.0%)
Diabetes	96 (4.2%)
Obsessive Compulsive Disorder	74 (3.2%)
Bipolar	71 (3.1%)
Diverticulitis	50 (2.2%)
Total Responses	2307

PTSD: Post-traumatic stress disorder.

ADHD: Attention deficit hyperactivity disorder.

GERD: Gastroesophageal reflux disease.

## Patient symptoms

Patients were presented with a list of 39 symptoms and asked to indicate which of these they currently experience. They were also asked to rate the severity of their symptoms as mild, moderate, or severe. Table 5 shows the twenty most commonly reported symptoms from 2753 patients. Pain was the most highly reported symptom (73.0%, n = 2,011), followed by anxiety (72.6%, n = 1,988), sleep problems (69.8%, n = 1,922), depression (59.3%, n =

1,632), insomnia (55.5%, n = 1,529), and exhaustion (50.3%, n = 1,368).

The distributions of symptom severities varied widely. The most frequently experienced symptoms of current cannabis patients were also most commonly reported as being severe rather than moderate or mild. For example, pain was the most frequently reported symptom, and out of the 2,011 patients who reported pain, 49.9% experienced severe pain (n = 1,004). Sleep problems also commonly manifested as being severe, with 33.8% of the 1,922 patients with sleep problems reporting severe sleep problems (n = 650).

**Table 5. Patient symptoms and distribution of symptom severities**

Symptom	Total n (%)	Mild n (%)	Moderate n (%)	Severe n (%)
Pain	2011 (73%)	192 (9.5%)	815 (40.5%)	1004 (49.9%)
Anxiety	1998 (72.6%)	531 (26.6%)	993 (49.7%)	474 (23.7%)
Sleep problems	1922 (69.8%)	382 (19.9%)	890 (46.3%)	650 (33.8%)
Depression	1632 (59.3%)	536 (32.8%)	739 (45.3%)	357 (21.9%)
Insomnia	1529 (55.5%)	339 (22.2%)	698 (45.7%)	492 (32.2%)
Exhaustion	1386 (50.3%)	371 (26.8%)	662 (47.8%)	353 (25.5%)
Headache	1322 (48%)	508 (38.4%)	522 (39.5%)	292 (22.1%)
Digestion problems	1085 (39.4%)	406 (37.4%)	500 (46.1%)	179 (16.5%)
Limited mobility	1082 (39.3%)	339 (31.3%)	495 (45.7%)	248 (22.9%)
Constipation	978 (35.5%)	483 (49.4%)	356 (36.4%)	139 (14.2%)
Dry mouth	969 (35.2%)	457 (47.2%)	377 (38.9%)	135 (13.9%)
Weakness	956 (34.7%)	408 (42.7%)	424 (44.4%)	124 (13%)
Numbness	924 (33.6%)	380 (41.1%)	377 (40.8%)	167 (18.1%)
Drowsiness	893 (32.4%)	408 (45.7%)	386 (43.2%)	99 (11.1%)
Nausea	870 (31.6%)	441 (50.7%)	317 (36.4%)	112 (12.9%)
Dizziness	829 (30.1%)	510 (61.5%)	272 (32.8%)	47 (5.7%)
Burning sensation	823 (29.9%)	304 (36.9%)	331 (40.2%)	188 (22.8%)
Diarrhea	818 (29.7%)	408 (49.9%)	282 (34.5%)	128 (15.6%)
Spasms	809 (29.4%)	304 (37.6%)	363 (44.9%)	142 (17.6%)
Cognitive impairment	798 (29%)	387 (48.5%)	326 (40.9%)	85 (10.7%)
Total responses	2753			

## Discussion

When compared to the racial distribution of the Canadian population from the most national census, Census Canada 2011, the racial distribution of cannabis patients in this study showed that “White/Caucasian,” “Native Canadian,” and “Mixed” races were more highly represented (15) (see Table 3). “Spanish/Hispanic/Latino,” “Black/African American,” and “Asian” ethnicities were less represented in the medical cannabis patient population when compared to the general Canadian population.

The present study analyzing the baseline demographics of patients using medical cannabis is the largest study of this nature conducted to date in Canada. A smaller study conducted in Canada by Walsh et al. assessed 702 medical cannabis users recruited across the country, and 77 local medical cannabis users recruited from a cannabis dispensary in British Columbia (16). Similar to the present study, an adaptive online questionnaire was used to collect

information pertaining to patient demographics and relevant medical conditions or symptoms. In this study, Walsh et al. found the most commonly reported symptoms and conditions for which patients were using medical cannabis were sleep disorders (85%), pain (82%), anxiety (79%), and depression (67%) (see Table 4).

In the United States, Reinerman et al. studied a sample of 1,746 patients from medical evaluation clinics in California, and found that users were predominantly Caucasian and male (17). The most common conditions approved by physicians for cannabis use included pain (30.6%), sleep disorders (15.7%), and anxiety or depression (13.0%) (17). A study involving 347 patients recruited from four medical cannabis dispensaries in Arizona was conducted by Trout et al. (18). Although this study did not assess patient demographics, it reported existing patient conditions and symptoms (18). The authors showed that a large proportion of patients suffered from chronic pain (86.6%), anxiety (49.3%), stress (44.7%), and insomnia (39.5%) (18). In the

United Kingdom, a study by Ware et al. on 2,969 cannabis patients found that medical cannabis users were most commonly afflicted with chronic pain (25%), depression (22%), and multiple sclerosis (22%) (19). They also found that medical cannabis use was more common among younger males. The North American findings on commonly reported patient symptoms were similar to those reported in the present study, namely pain, anxiety, sleep problems, and depression. However, they slightly differed from that of the UK where multiple sclerosis was one of the common uses for medical cannabis. Since the prevalence of multiple sclerosis is similar in UK and Canada, it is unlikely that this represents a true demographic difference (20). This difference is likely due to regulations regarding the indications for which a physician can prescribe medical cannabis, highlighting the importance of policy on impacting patient access to treatment. Similar to the previously mentioned studies, a majority of patients in the present study were male.

The commonalities between medical cannabis users across a variety of populations from these studies, covering Canada, USA, and UK, suggest that individuals likely to benefit from medical cannabis have a shared set of symptoms and characteristics including anxiety, depression, stress, and pain. Therefore, these results are applicable to a broad patient population and may be able to predict if cannabis is a suitable treatment option for patients based on their symptoms.

One limitation to this study is that the survey was designed as a voluntary online survey in which results were self-reported, and patients were given the option to not answer certain questions. Therefore, not all patients answered the same questions and the received responses may be influenced by selection and recall bias.

## Conclusion

Demographic and medical characteristics of patients who were prescribed medical cannabis and participated in this study were consistent with previously published data in North America. The present Canadian study showed that cannabis patients suffered from a variety of conditions and symptoms,

the most common of which were anxiety, depression, and pain. Additionally, sleep disorders and PTSD were prevalent among the surveyed patient population. The demographic characteristics of cannabis users were diverse, but patients were predominantly Caucasian males, most of whom were employed. Understanding the demographic profile of patients using medical cannabis may assist physicians in identifying patients who are likely to benefit from medical cannabis. Additionally, understanding patient population demographics is essential for guiding future clinical research initiatives so that research is targeted towards patient populations who are suitable candidates for medical cannabis treatment.

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