

## Medical Cannabis Users' Comparisons between Medical Cannabis and Mainstream Medicine

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### ABSTRACT

An evidence-based approach is needed to shape policies and practices regarding medical cannabis, thereby reducing harm and maximizing benefits to individuals and society. This project assesses attitudes towards and utilization of medical cannabis and the mainstream healthcare system among medical cannabis users. The research team administered brief hard copy surveys to 450 adults attending an annual public event advocating for cannabis law reform. Among usable responses ( $N = 392$ ), the majority (78%) reported using cannabis to help treat a medical or health condition. Medical cannabis users reported a greater degree of use of medical cannabis and a greater degree of trust in medical cannabis compared to mainstream healthcare. In comparison to pharmaceutical drugs, medical cannabis users rated cannabis better on effectiveness, side effects, safety, addictiveness, availability, and cost. Due to the medical use of cannabis, 42% stopped taking a pharmaceutical drug and 38% used less of a pharmaceutical drug. A substantial proportion (30%) reported that their mainstream healthcare provider did not know that they used medical cannabis. Other issues identified included lack of access to mainstream healthcare, self-initiated treatment of health issues, little knowledge of psychoactive content, and heavy cannabis use.

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Cannabis has been used medicinally by humans for over 5,000 years (Lucas 2012). Cannabis-based remedies were recommended by physicians and were popular for treatment of a wide variety of ailments in the United States (U.S.) from the early nineteenth century through the early twentieth Century (Grinspoon and Bakalar 1997). The use of these remedies declined with the invention of vaccines, introduction of the hypodermic syringe, and the increasing use of synthetic and derivative pharmaceuticals such as aspirin and barbiturates (Grinspoon and Bakalar 1997). Against the advice of the American Medical Association, cannabis was criminalized in the U.S. by the Marijuana Tax Act of 1937 (Grinspoon and Bakalar 1997). The U.S. government classified cannabis (colloquially “marijuana”) as a Schedule I drug under the Federal Controlled Substances Act (FCSA) in 1970, stating that it had “no accepted medical use” and a high potential for abuse and physical and/or emotional dependence.

Widespread recreational use of cannabis in the 1960s led to the gradual rediscovery of the therapeutic benefits of cannabis in the U.S., though outside of the

traditional healthcare system (Reinarman et al. 2011). In recent years, the U.S. state-level legal framework for cannabis has shifted from prohibition to legalization, especially for medical use (Eyler et al. 2016). As of January 2018, over 21% of Americans lived where recreational cannabis is legal at the state level, about 77% lived where some form of medical cannabis is legal at the state level, and less than 2% of the population lived in states with full prohibition of cannabis (National Conference of State Legislatures 2017).

Individuals use cannabis medicinally to treat a wide range of health conditions, including chronic pain, muscle spasms, depression, anxiety, post-traumatic stress disorder, headaches, menstrual cramps, sleep issues, narcotic addiction, and appetite issues, in addition to treating HIV-AIDS, cancer, and the adverse effects of cancer chemotherapy (Abrams et al. 2003; Beaulieu and Ware 2007; Bonn-Miller et al. 2014; Doblin and Kleiman 1991; Hazekamp et al. 2013; Nunberg et al. 2011; Ogborne et al. 2000; Reinarman et al. 2011; Woolridge et al. 2005). Medical cannabis users perceive cannabis to be beneficial for a wide range of conditions, some of which are not recognized as

eligible for state-level medical cannabis access (Bonn-Miller et al. 2014).

Many medical users consume cannabis as a substitute for prescription drugs (Reiman 2007, 2009; Reinerman et al. 2011). Recreational users of opiates have also shifted to cannabis when cannabis becomes more available and also when opiates become less available on the black market (Australian Institute of Health and Welfare 2002; Lucas 2012). In a small sample of individuals who had used both prescription anti-emetics and cannabis to treat AIDS symptoms, most preferred cannabis, though many had not discussed their medicinal cannabis use with their physician (Wesner 1996). Clinical trials demonstrate that cannabis and cannabis derivatives perform well in comparison to traditional pharmaceuticals such as codeine and opiates (see Lucas 2012).

As the prevalence of medicinal cannabis use increases, a host of related issues will have increasing impact on users and society. An evidence-based approach is needed to shape policies and practices regarding medical cannabis to reduce harm and maximize benefits to individuals and society (see Erickson et al. 2015). The medicinal use of cannabis is rarely covered in medical or public health curricula or addressed in public health policy. There is a large gap between science and de facto practice in the medical use of cannabis. Given the state of the science of medicinal cannabis, even basic information about users' attitudes and behaviors would be helpful. The purpose of the current study was to investigate issues related to the use of cannabis to treat health and/or medical conditions, the perceptions of cannabis in comparison to mainstream healthcare and pharmaceutical drugs, and the impact of medical cannabis use on the use of pharmaceutical drugs.

## Methods

The University of Michigan's Institutional Review Board for Health Sciences and Behavioral Sciences reviewed this project prior to data collection. Individuals who agreed to participate in the study viewed the informed consent document and took the hardcopy survey on a clipboard. The study received a waiver for informed consent documentation, as the survey was anonymous and consent documentation would have provided identifying information.

## Participants

Researchers conducted central intercept interviews at a public cannabis decriminalization advocacy event on

the University of Michigan campus, in a state where medical cannabis use became legal in 2008. The research team set up a table at a central location and verbally invited persons in the immediate area to complete the survey. Eligibility requirements included being 18 years of age or older and identifying as a current cannabis user. Researchers distributed 450 surveys; of those, 392 (87%) were completed. The remaining 58 surveys were not used in analysis because they were incomplete ( $n = 31$ ), refusals ( $n = 5$ ), individuals who never used cannabis ( $n = 9$ ), or were lost or not returned ( $n = 13$ ).

## Measures

A two-page paper questionnaire, available on request, collected information on participants' use of cannabis and comparative perceptions of medical cannabis and pharmaceutical drugs. Participants selected the forms of cannabis used, how much of their cannabis came from a dispensary or from caregivers who grow it, and onset of cannabis use. The survey used colloquial terminology for cannabis; e.g., "Do you use marijuana to help treat a medical or health condition?" Those who used cannabis to help treat a medical or health condition were asked what conditions they were treating, whether there were specific strains or cultivars used (including %THC and %CBD if known), and to report pharmaceutical medications that they stopped taking or used less of because of their use of medical cannabis.

Participants rated the extent to which they used and trusted mainstream healthcare and medical cannabis on a five-option scale (Not at All, Somewhat, Moderately, Very Much, Completely). Mainstream healthcare was defined as using a medical doctor or hospital. Participants were asked "How does medical marijuana compare to pharmaceutical medications you have taken for your health condition(s)..." and rated Effectiveness, Side Effects, Addictiveness, Safety, Cost, and Availability on a five-option scale (Much Worse, Worse, The Same, Better, Much Better).

Participants reported whether their mainstream healthcare provider knew that they used cannabis medicinally, how old they were when they first used cannabis medicinally, and whether they had a medical cannabis card. The survey also included demographic questions and a brief screening scale for Cannabis Use Disorder (CUDIT-SF; Bonn-Miller et al. 2016).

## Procedure

Data were recoded to facilitate analyses with two-tailed tests. Educational categories were recoded into years of education. One sample *t*-tests examined comparisons of

medical cannabis to pharmaceutical drugs using the scale midpoint (3, “The same”) as the critical value. Within-subjects *t*-tests compared ratings for use of and trust in mainstream healthcare and medical cannabis. Responses for conditions treated with cannabis by participants were classified into general conditions (e.g., Anxiety or panic attacks; see Table 1). Responses for substances used were classified into general categories (e.g., Adderall as Amphetamines; see Table 2). We used the HC-Holm procedure to limit the Error Rate Family Wise (ERFW; i.e.,  $\alpha$ ) to .05 (see Toothaker 1993).

## Results

### Participant characteristics

Analyses included only the 392 completed surveys; 58% completed by men, 40% by women, and 2% where gender was missing or given as “Other” gender. Ages ranged from 18 to 71 years, with a mean of 29 ( $SD = 12$ ). Participants had 13 years of education on average ( $SD = 2$ ), ranging from 10–22 years, and 35% were currently students. Participants were predominantly in-state residents (92%). Race/ethnicity was not assessed in the survey.

Nearly one-fifth of participants reported not having any kind of healthcare coverage (18%) and 4% did not know whether they had any kind of healthcare coverage. A similar proportion (26%) needed to see a doctor but could not because of the cost in the past 12 months; 4% did not know if this had happened. Participants reported initiating cannabis at 16 years of age on average ( $SD = 5$ , range 8–50) and consuming cannabis through smoking bud/flower (95%); smoking concentrates or extracts (hash, wax, oil, etc.; 57%); using a vaporizer with bud/flower (38%); using a vaporizer with concentrates or extracts (e.g., hash, wax, oil; 37%); ingesting cannabis edibles (65%); smoking dabs (51%); using a topical lotion, cream, or oil (19%); and other methods (4%). Participants reported that 47% of their cannabis was obtained directly from a dispensary and 40% was obtained directly from people who grew cannabis (potentially legally for those with medical cannabis cards in the state).

### Medical use of cannabis

The majority ( $n = 305$ , 78%) of participants reported using cannabis to help treat a health or medical condition. Over half (60%) of these medical users had a medical cannabis card. Participants with a medical cannabis card obtained a significantly greater

proportion of cannabis directly from a dispensary (62%) than those who did not have a card (34%),  $t(370) = 17.96$ ,  $p < .001$ ,  $d = 0.75$ . There was no difference in the amount of cannabis obtained from growers by medical cannabis card status,  $t(366) = 0.58$ ,  $p = .566$ ,  $d = 0.06$ . Participants reported initiating medical use of cannabis at 22 years of age on average ( $SD = 9$ , range 9–60). Most participants (78%) reported initiating recreational cannabis use before medical cannabis use, averaging six years between onsets of recreational cannabis use and medical cannabis use.

The most common conditions participants reported treating with cannabis were pain, back problems, anxiety or panic attacks, and depression or bipolar disorder (see Table 1). Of medical cannabis users, 34% reported using specific strains or cultivars of cannabis for medical purposes, and 26% were able to name specific strains or cultivars. We included those who mentioned broad categories (e.g., “Any sativa,” “High CBD”) as well as specific cultivars (e.g., “big fan of Jack Herer,” “Skunkwreck Widows”). Few participants were able to report the THC content (4%) or CBD content (1%) of these strains. Of medical cannabis users, 30% reported that their mainstream healthcare provider did not know that they used medical cannabis (an additional 14% were unsure if their mainstream healthcare provider knew), and 47% screened positive for Cannabis Use Disorder on the CUDIT-SF.

Medical cannabis users reported a greater degree of use of medical cannabis than of mainstream healthcare,  $t(288) = 17.96$ ,  $p < .001$ ,  $d = 1.06$ , and a greater degree of trust in medical cannabis than in mainstream healthcare,  $t(286) = 26.12$ ,  $p < .001$ ,  $d = 1.54$ . Compared to pharmaceutical drugs, medical cannabis users rated cannabis better on: effectiveness,  $t(299) = 40.83$ ,  $p < .001$ ,  $d = 2.35$ ; side effects,  $t(296) = 39.51$ ,  $p < .001$ ,  $d = 2.29$ ; safety,  $t(292) = 36.12$ ,  $p < .001$ ,

**Table 1.** Conditions treated with cannabis by participants.

| Condition                      | %    | 95% CI |
|--------------------------------|------|--------|
| Pain                           | 28.2 | 23–33  |
| Back problems                  | 13.8 | 10–18  |
| Anxiety or panic attacks       | 13.4 | 10–17  |
| Depression or bipolar disorder | 9.2  | 6–12   |
| Headache or migraines          | 6.6  | 4–9    |
| Sleep issues                   | 5.2  | 3–8    |
| PTSD                           | 3.3  | 1–5    |
| Injury                         | 2.6  | 1–4    |
| Arthritis                      | 2.3  | 1–4    |
| Nausea                         | 2.3  | 1–4    |

*Note.* Values represent proportions of participants who indicated using cannabis to treat a medical condition ( $n = 305$ ). Less than 2% indicated appetite or anorexia, seizures or epilepsy, cancer, fibromyalgia, premenstrual syndrome (PMS) or cramps, attention-deficit disorder (ADD) or attention-deficit hyperactivity disorder (ADHD), diabetes, polycystic ovary syndrome (PCOS), stress, digestion, endometriosis, asthma, ulcers, anger, and obsessive-compulsive disorder (OCD).

**Table 2.** Pharmaceuticals discontinued because of medical use of cannabis.

| Type                                                      | %    | 95% CI |
|-----------------------------------------------------------|------|--------|
| Narcotics/opioids                                         | 25.5 | 17–34  |
| Non-opioid analgesics (painkiller)                        | 26.4 | 18–35  |
| Anxiolytics/benzodiazepines (anti-anxiety)                | 18.9 | 11–26  |
| Antidepressants                                           | 19.8 | 12–28  |
| Amphetamines                                              | 6.6  | 2–11   |
| Sedatives                                                 | 4.7  | 1–9    |
| NSAID—Nonsteroidal anti-inflammatory                      | 5.7  | 1–10   |
| Anticonvulsants (antiepileptic drugs, anti-seizure drugs) | 3.8  | 0–7    |
| Antipsychotics                                            | 2.8  | 0–6    |
| Muscle relaxants                                          | 2.8  | 0–6    |
| Antihistamine                                             | 1.9  | –1– 5  |
| Other stimulants                                          | 0.9  | –1– 3  |
| Other drugs                                               | 8.5  | 3–14   |

Note. Values represent proportions of participants who indicated discontinuing use of pharmaceuticals because of medical use of cannabis ( $n = 113$ ).

**Table 3.** Pharmaceutical intake reduced because of medical use of cannabis.

| Type                                               | %    | 95% CI |
|----------------------------------------------------|------|--------|
| Non-opioid analgesics (painkiller)                 | 35.8 | 23–49  |
| Narcotics/opioids                                  | 24.5 | 13–17  |
| Anxiolytics/benzodiazepines (anti-anxiety)         | 15.1 | 5–25   |
| Antidepressants                                    | 11.3 | 3–20   |
| Anticonvulsants (antiepileptic, antiseizure drugs) | 9.4  | 1–18   |
| Muscle relaxants                                   | 7.5  | 0–15   |
| Amphetamines                                       | 7.5  | 0–15   |
| Sedatives                                          | 5.7  | –1– 12 |
| Antipsychotics                                     | 1.9  | –2– 6  |
| NSAID—Nonsteroidal anti-inflammatory               | 1.9  | –2– 6  |
| Other drugs                                        | 7.5  | 0–15   |

Note. Values represent proportions of participants who indicated reduced use of pharmaceuticals because of medical use of cannabis ( $n = 55$ ).

$d = 2.11$ ; addictiveness,  $t(289) = 23.94$ ,  $p < .001$ ,  $d = 1.41$ ; availability,  $t(291) = 18.01$ ,  $p < .001$ ,  $d = 1.05$ ; and cost,  $t(292) = 6.33$ ,  $p < .001$ ,  $d = 0.37$ . Because of the medical use of cannabis, 35% stopped taking at least one pharmaceutical drug, primarily narcotics/opioids, non-opioid analgesics, anxiolytics/benzodiazepines, and antidepressants (see Table 2). Medical cannabis' perceived lower burden of side effects uniquely predicted discontinuing the use of a pharmaceutical drug,  $\beta = .183$ ,  $p = .002$ . In addition, 38% used less of at least one pharmaceutical drug because of the medical use of cannabis, primarily non-opioid analgesics, narcotics/opioids, anxiolytics/benzodiazepines, and antidepressants (see Table 3). Medical cannabis' better effectiveness uniquely predicted reducing the use of a pharmaceutical drug,  $\beta = .152$ ,  $p = .018$ . Of those participants whose physician may be unaware of their medical cannabis use, 24% stopped taking at least one pharmaceutical drug, and 22% (95% CI: 15–29%) used less of at least one pharmaceutical drug. The HC-Holm procedure verified that all reported effects are significant at an Error Rate Family Wise (ERFW; i.e.,  $\alpha$ ) of .05 (see Toothaker 1993).

## Discussion

In this study, most medical cannabis users had previously used cannabis recreationally, as has been reported in other studies (Hazekamp et al. 2013). Echoing the results of previous research (e.g., Bonn-Miller et al. 2014; Hazekamp et al. 2013), the current study found that people are using cannabis to treat a wide range of self-reported ailments. Four of the five most commonly treated issues or conditions (pain, back problems, depression or bipolar disorder, headache, or migraines) are not currently specified in Michigan's qualifying conditions for medical cannabis, though the state regulation also includes a clause that may be interpreted as including other health conditions where cannabis provides some benefit. Also replicating the results of previous work (e.g., Reinerman et al. 2011), many participants reported using cannabis as a supplement to or substitution for pharmaceutical drugs. It was not determined whether these practices were initiated upon the advice of healthcare providers; however, slightly less than half of respondents did not discuss their medical cannabis use with their mainstream healthcare provider and many of these respondents discontinued or reduced pharmaceutical drug use. About one-quarter of participants reported barriers to healthcare and may have substituted cannabis for pharmaceutical drugs for financial reasons.

We note the differential interpretations of using cannabis as a substitute or replacement for pharmaceutical drugs. In the current healthcare system, self-initiated reductions or discontinuations of prescribed medications are interpreted as non-compliance. Medical cannabis users are making these decisions based on the perceived superiority of attributes in comparison to traditional pharmaceutical drugs. Systematic and comprehensive comparisons (e.g., double-blind trials) will be needed to generate policy and practice recommendations regarding the relationships between conventional treatments, including traditional pharmaceutical drugs, and medical cannabis.

The current study also provides novel insights on medical cannabis users' perceptions of how medical cannabis compares to mainstream healthcare and pharmaceuticals. Medical cannabis users reported both trusting and using medical cannabis considerably more than mainstream healthcare. As participants were recruited from a group advocating for the decriminalization of cannabis, the differences seen in these comparisons may be attenuated in a population-representative sample. Still, there is a considerable population of individuals who have acquired state-level certification for medical cannabis use, despite the risk of liability for federal-level law



enforcement. The fact that so many study participants did not discuss their medical cannabis use with their healthcare provider indicates the lack of integration between these types of treatment. A holistic and integrative approach would likely be most effective at maximizing benefits and minimizing risks, as there are several potential challenges when cannabis use is unknown. Healthcare providers may misattribute the effects of treatment; misinterpret physiological, psychological, and behavioral patterns resulting from cannabis use; or may unintentionally put patients at risk through harmful drug interactions.

Participants considered cannabis superior to pharmaceuticals across all aspects assessed. These perceptions should be verified with randomized controlled trials. However, the current Schedule I status of cannabis interferes with the conduct of controlled trials. Previous research suggests that cannabinoids can lead to a greater cumulative relief of chronic pain when used in conjunction with opiates (Lucas 2012), and concurrent use of cannabis may also result in a reduction in opiate use and opiate side effects (Cichewicz and McCarthy 2003). Cannabinoids may have an advantage over opiates in the absence of classic opioid side effects such as respiratory depression (Lucas 2012).

Although a significant difference, the perceived cost advantage over traditional pharmaceuticals, was considerably smaller than advantages in other attributes. As the balance of supply and demand plays a large role in determining price, restrictions on cannabis production may contribute to the cost disparity between cannabis and agricultural food crops that are legally available in grocery stores.

Traditional pharmaceuticals are prescribed to be administered in precise dosages on systematic schedules. A physician would lose her or his medical license for giving patients bags of assorted pharmaceutical drugs with unknown chemical properties and physiological effects, yet this resembles the current state of medical cannabis administration for many users. Participants demonstrated little knowledge of the psychoactive agent contents of their medical cannabis. Cannabis contains hundreds of known psychoactive compounds (Russo 2013), which have differential effects (e.g., Colizzi and Bhattacharyya 2017) and risks of abuse (e.g., Szabo, Siemes, and Wallmichrath 2002).

Considerable efforts are needed to bring a similar level of precision to medical cannabis administration. This includes systematic research on the effective dosage levels for the numerous cannabinoids; effectiveness ranges for the treatment of various health conditions; standardized testing, systematic assessment, and accurate and informative labeling of cannabis products; and consumer education on cannabinoid properties,

effective dosage levels, and administration schedules. In addition, systematic research is needed on risk assessment for developing policies and guidelines for levels of cannabis intoxication during behaviors such as driving automobiles and operating other machinery (Governors Highway Safety Association 2015).

Study limitations include the use of a convenience sample of cannabis users recruited during a cannabis decriminalization advocacy event, so that findings from this study may not be generalizable to other populations. This research was cross-sectional, thus causal relationships cannot be determined. We used a brief survey instrument due to practical limitations, thus providing very basic information on topics that could be elaborated. We used a brief screening scale for problematic cannabis use (CUDIT-SF; Bonn-Miller et al. 2016); however, this scale may not be a valid measure for assessing problematic use in medicinal users (e.g., Loflin, Earleywine, and Bonn-Miller 2017). Further, this research was conducted in a location where medical cannabis was legal, whereas recreational cannabis was not yet legal. Conditions vary widely across U.S. states with medical cannabis legalization or decriminalization, as well as internationally; thus, results may differ in other contexts. Medical cannabis is more integrated with health systems in some nations, including insurance coverage (Hazekamp et al. 2013), which may predict better integration of healthcare administration and therapy. In the current study, participants with legitimized medical access obtained a greater proportion of their cannabis from official dispensaries, where the potential for systematic regulation and knowledge of chemical content and psychoactive effects for cannabis products is higher than on the black market.

This study advances knowledge in the evidence-based approach to harm reduction and benefit promotion regarding medical cannabis. Given the growing use of cannabis for medical purposes and the widespread use for recreation purposes despite criminalization, the current public health framework focusing primarily on cannabis abstinence appears obsolete. Those working in public health and medicine have an obligation to reduce harm and maximize benefits to the health of individuals and society, and thus serious consideration and scientific investigation of medical cannabis are needed.

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