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Reasons for Use and Perceived Effects of Medical Cannabis: A Cross-Sectional Statewide Survey

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Keywords
Medical cannabis · Medical marijuana · Marijuana as a therapeutic · Cannabis use behaviors

Abstract

Introduction: Medical cannabis (MC) is available upon certification for one of several qualifying conditions in Florida, USA. Previous studies suggested that some people seek cannabis for medical conditions/symptoms beyond those legally permitted. However, data remain limited on patient motives for seeking MC and their experiences around its impact on their health. We aimed to compare reported qualifying conditions for MC certification with the most frequently self-reported reasons for using MC while assessing the alignment between the two and understanding the perceived impacts of MC on self-reported conditions and symptoms. ***Methods:*** We conducted a cross-sectional study using survey data from the Medical Marijuana and Me (M^3) Data Bank of individuals receiving MC in Florida, USA, in 2022. Participants were recruited via convenience sampling from nine MC clinics/clinic networks across Florida and were asked to fill out an online survey. The study measures included sociodemographic variables, self-reported health conditions, self-reported main reasons for using MC, self-reported qualifying conditions for MC certification, and self-reported perceived impact of MC on health conditions. We cross-tabulated reported qualifying conditions and reasons for MC use and reported the perceived impact per condition. ***Results:*** A total of 632 participants completed the survey, of whom 396 (62.66%) were female and 471 (74.53%) were non-Hispanic white. The median (IQR) age was 45 (35, 58). The most frequently reported qualifying conditions were post-traumatic stress disorder (PTSD) (n = 187, 29.59%), a condition not on the qualifying conditions list (n = 175, 27.69%), medical conditions of the same kind/comparable to those listed (n = 140, 22.15%), and chronic nonmalignant pain (n = 62, 25.63%). The top ten most frequently reported reasons for using MC were anxiety (n = 383, 60.60%), chronic pain (n = 278, 43.99%), depression (n = 252, 39.87%), PTSD (n = 220, 34.81%), headaches/migraine (n = 134, 21.20%), fibromyalgia (n = 67, 10.60%), attention-deficit hyperactivity disorder (ADHD) (n = 59, 9.34%), bipolar disorder (n = 53,

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8.39%), high blood pressure (n = 41, 6.49%), and cancer (n = 18,2.85%). Of respondents, 70–90% with each qualifying condition reported it as one of the main reasons for using MC. Most respondents reported improvement of anxiety (n = 430/451, 95.34%), depression (n = 381/392, 97.20%), chronic pain (n = 305/310, 98.39%), insomnia/sleeping problems (n = 225/295, 86.44%), PTSD (n = 247/270, 91.48%), headaches/migraine (n = 172/218, 78.90%), ADHD (n = 82/123, 66.67%), bipolar disorder (n = 79/89, 88.76%), and fibromyalgia (n = 77/82, 93.90%). Most respondents were unsure/reported no change in blood pressure (n = 93/162, 57.41%). A small percentage reported perceived worsening impacts on their conditions. ***Conclusion:*** Qualifying conditions and self-reported reasons for using MC aligned for most respondents. Yet, a notable proportion of respondents sought MC for broader treatment effects beyond those delineated by the officially recognized qualifying conditions in Florida, USA. Most patients perceived positive effects, including those with limited available evidence on efficacy.

Plain Language Summary

In Florida, USA, medical cannabis (MC) is accessible for certified individuals with specific health conditions. Previous research found that many people seek MC for conditions beyond the officially approved ones. We aimed to understand the alignment between qualifying conditions per statute, the reasons patients reported for using MC, and the perceived impacts on health conditions and symptoms. In a 2022 survey of 632 MC users, the top reported qualifying conditions were post-traumatic stress disorder (PTSD), medical condition comparable to listed conditions, and chronic nonmalignant pain. The top ten self-reported reasons for using MC were anxiety, chronic pain, depression, PTSD, headaches/migraine, fibromyalgia, attention-deficit hyperactivity disorder (ADHD), bipolar disorder, high blood pressure, and cancer. Many patients reported multiple reasons for MC use, including typically one reason that matched their reported qualifying condition. Most respondents noted improvements in anxiety, depression, chronic pain, insomnia, PTSD, headaches/migraine, ADHD, bipolar disorder, and fibromyalgia. These findings suggest that in addition to the officially recognized qualifying conditions, people often use MC for a broader range of conditions and symptoms, some of which are not included in the current statute and/or without evidence of efficacy.

Introduction

Although cannabis remains a Schedule I substance on the federal level [1], the landscape of medical cannabis (MC) use continues to rapidly evolve, driven by changes in state-level legislation that have made MC accessible to individuals with qualifying medical conditions in many states, including Florida [2, 3]. Florida's qualifying medical conditions are cancer, epilepsy, glaucoma, human immunodeficiency virus/acquired immunodeficiency syndrome, post-traumatic stress disorder (PTSD), amyotrophic lateral sclerosis, Crohn's disease, Parkinson's disease, multiple sclerosis, chronic nonmalignant pain, other debilitating medical conditions of the same kind or class as or comparable to those listed, and terminal conditions diagnosed by a physician other than the qualified physician issuing the physician certification [4].

However, the alignment between the officially sanctioned qualifying conditions and self-reported motives for MC use remains a focal point of exploration. Patients certified to use MC for specific conditions might opt for this therapeutic avenue for reasons beyond the confines of the legally predefined list. For instance, many individuals turn to MC for conditions and symptoms not traditionally recognized as qualifying medical conditions, such as anxiety, depression, and sleep disturbances [5]. For qualifying conditions such as cancer, patients may articulate varied motivations for seeking cannabis as a remedy, including symptom relief of chemotherapy-associated nausea and vomiting, improving appetite, pain management, and others [6–9]. Gaining insights into the specific conditions and symptoms MC is employed to address informs the potential therapeutic scope of MC, can inform decisions on expanding qualifying conditions for MC, and define the research agenda to evaluate MC efficacy and safety. This study aimed to (1) assess the alignment of the reported qualifying conditions for MC certification and the self-reported reasons for using MC and (2) describe the perceived impacts of MC on self-reported symptoms and medical conditions.

Methods

Study Design and Population

We conducted a cross-sectional study of individuals receiving MC in Florida, USA, in 2022 using survey data from the Medical Marijuana and Me (M^3) study [10]. The detailed methods involved in the M^3 study design, survey development, data collection, and study measures have been previously published [11]. Here, we provide a brief description of the study methods.

Table 1. Characteristics of 632 survey respondents who used medical cannabis in Florida in 2022

Variable	Results
Age in years, median (IQR) (missing = 4)	45 (35, 58)
Sex at birth, *N* (%)	
Female	396 (62.66)
Male	236 (37.34)
Race/ethnicity, *N* (%)	
Non-Hispanic white	471 (74.53)
Non-Hispanic black	35 (5.54)
Hispanic	93 (14.72)
Other (American Indian or Alaska Native, Native Hawaiian or Pacific Islander, Asian, other)	33 (5.22)
Education level, *N* (%)	
Graduate degree (e.g., MS, PhD) or professional degree after graduating college	116 (18.35)
Some college or college graduate	408 (64.56)
High school or GED	103 (16.3)
Middle school	5 (0.79)
Elementary school or below	0 (0)
Employment status, *N* (%)	
Currently working full-time (including self-employment)	293 (46.36)
Currently working part-time (including self-employment)	76 (12.03)
Unemployed – looking for work	20 (3.16)
Unemployed – disabled/unable to work	101 (15.98)
Student	15 (2.37)
Retired	102 (16.14)
Other	20 (3.16)
Missing	5 (0.79)
Veteran status (yes), *N* (%)	61 (9.56)
Health insurance, *N* (%)	
Private health insurance	330 (52.22)
Medicaid	88 (13.92)
Medicare	160 (25.32)
VA coverage	32 (5.06)
No health insurance	70 (11.08)
Other	47 (7.44)
Annual household income in USD, *N* (%)	
<USD 20,000	84 (13.29)
USD 20,000–USD 39,999	130 (20.57)
USD 40,000–USD 59,999	108 (17.09)
USD 60,000–USD 79,999	98 (15.51)
USD 80,000–USD 99,999	51 (8.07)
≥USD 100,000	130 (20.57)
Do not know/do not want to answer	25 (3.96)
Missing	6 (0.95)
Cannabis use frequency in past 6 months, *N* (%)	
4 or more times a week	548 (86.71)
2–3 times a week	51 (8.07)
2–4 times a month	21 (3.32)
Monthly or less	9 (1.42)
Never	3 (0.47)
Years of daily cannabis use, *N* (%)	
No history of daily cannabis use	57 (9.02)
<1 year	63 (9.97)
1–2 years	118 (18.67)
3–4 years	105 (16.61)
5–10 years	103 (16.30)
11–20 years	84 (13.29)
>20 years	102 (16.13)

GED, General Educational Development Test; *N*, number; USD, US dollars; VA, veteran administration.

Survey participants represented a convenience sample recruited from nine major MC clinics across Florida between May 1 and December 31, 2022, who were using MC at the time of enrollment. The study utilized a comprehensive set of self-reported surveys covering sociodemographic information, history of cannabis use, health history, reasons for using MC, perceived impacts of MC on health conditions, changes in substance use and concurrent medications, changes in general health status, MC products and use patterns, side effects, and expectations and beliefs about MC. Data were collected via an online survey directly filled out by the participants. This study was approved by the University of Florida Institutional Review Board (IRB202002925). The survey respondents provided consent before completing the survey and received a USD 20 gift card compensation after completion. We followed the Strengthening the Reporting of Observational Studies in Epidemiology guidelines for cross-sectional studies (online suppl. 1; for all online suppl. material, see https://doi.org/10.1159/000540593).

Respondent Characteristics

Demographic variables included age, sex at birth, race/ethnicity, the highest level of education, employment status, veteran status, type of health insurance coverage, and combined annual family income. Age was further categorized into age groups (18–24 years old, 25–34 years old, 35–44 years old, 45–54 years old, 55–64 years old, and 65 years or older) to compare reasons for using MC across different age groups. We assessed the frequency of using cannabis, including that from outside dispensaries, in the past 6 months, in addition to the lifetime daily cannabis use history.

Descriptive Outcome Measures

Self-Reported Qualifying Conditions

From a list of qualifying conditions for MC certification in Florida, USA, we asked the participants to specify the medical condition for which they were certified by an MC physician. In addition to the formal list, we added an option for "A condition not on this list" in case the participants could not identify any listed conditions for their certification.

Self-Reported Health Conditions and Reasons for MC Use

Initially, the survey provided a list of 27 medical conditions, including qualifying conditions in Florida and those reported as frequent reasons for MC use in previous studies, and an option to specify other health conditions [5, 12–14]. The participants were asked to indicate all conditions they had been diagnosed with via a healthcare professional [11]. From the list of medical conditions, we then asked the participants to identify which health conditions they considered to be among their main reasons for using MC. We compared the top five main reasons for using MC by sex and age groups and cross-tabulated the main reasons against the reported qualifying conditions.

Perceived Health Impacts

We asked all survey participants, for each health condition, to indicate their perceived impact of MC on this health condition as worse, no change, better, or unsure.

Statistical Analysis

We conducted a descriptive statistical analysis to describe categorical and continuous measures using SAS version 9.4 (Cary, NC, USA). For items with missing data, the valid percentage is reported (excluding missing cases), and missing data are reported accordingly. For health conditions, including qualifying conditions, with cell sizes of less than ten respondents, the results were not displayed in the tables or figures for data privacy considerations. We assessed the alignment between self-reported qualifying conditions and self-reported main reasons for using MC by calculating agreement percentages of reporting a qualifying condition as a main reason for using MC. Finally, we assessed the frequencies of self-reported perceived impact of MC on the top ten most frequently self-reported medical conditions in our sample. Given that reported health conditions and reasons for using MC were not mutually exclusive, we analyzed each condition and reason separately and reported percentages relative to the appropriate denominator for each descriptive outcome.

Results

A total of 632 participants completed the survey. The median (IQR) age was 45 (35, 58) years. In the total sample, 396 (62.7%) were female, and 471 (74.5%) were non-Hispanic white (Table 1). Most respondents had higher education; specifically, 408 (64.6%) respondents had some college or were college graduates, and 116 (18.4%) had a graduate degree (e.g., MS, PhD). Most participants were employed (293 [46.4%] worked full-time and 76 [12.0%] worked part-time), and 330 (52.2%) had private health insurance. In the past 6 months, 548 (86.7%) participants used cannabis (including that obtained outside dispensaries) four or more times a week. Most survey respondents (>90%) reported daily cannabis use for at least 1 year (1–2 years: 118 [18.67%]; 3–4 years: 105 [16.61%]; 5–10 years: 103 [16.30%]; 11–20 years: 84 [13.29%]; >20 years: 102 [16.13]), as shown in Table 1.

The top ten most frequently self-reported medical conditions among the survey respondents were anxiety (n = 451, 71.4%), depression (n = 392, 62.0%), chronic pain (n = 310, 49.1%), insomnia/sleeping problems (n = 295, 46.7%), PTSD (n = 270, 42.7%), headaches/migraines (n = 218, 34.5%), high blood pressure (n = 162, 25.6%), attention-deficit hyperactivity disorder (ADHD; n = 123, 19.5%), bipolar disorder (n = 89, 14.1%), and fibromyalgia (n = 82, 13.0%), respectively. Of all reported health conditions, the top ten most frequently reported as main reasons for using MC in the total sample were anxiety (n = 383, 60.6%), chronic pain (n = 278, 44.0%), depression (n = 252, 39.9%), PTSD (n = 220, 34.8%), headaches/migraine (n = 134, 21.2%), fibromyalgia (n = 67, 10.6%), ADHD (n = 59, 9.3%), bipolar disorder (n = 53, 8.4%), high blood pressure (n = 41, 6.5%), and cancer (n = 18, 2.9%), respectively (Fig. 1).

The top five most prevalent reasons for using MC were consistent between females and males with anxiety being the most frequently reported main reason for MC use among both (67.7% and 48.7%, respectively), as shown in Figure 2. Anxiety was the most frequently reported main reason for using MC (70.0%, 78.3%, 64.4%, and 64.4%) among younger age groups (18–24, 25–34, 35–44, and 45–54 years old, respectively), while chronic pain was the most frequently reported main reason (62.1% and 47.5%) among older age groups (55–64 years old and 65 years or older, respectively) as shown in Figure 3. Still, anxiety was the second most frequently reported main reason (50.8% and 35.0%) among those in the 55–64 years old and 65 years or older age groups, respectively. Depression was

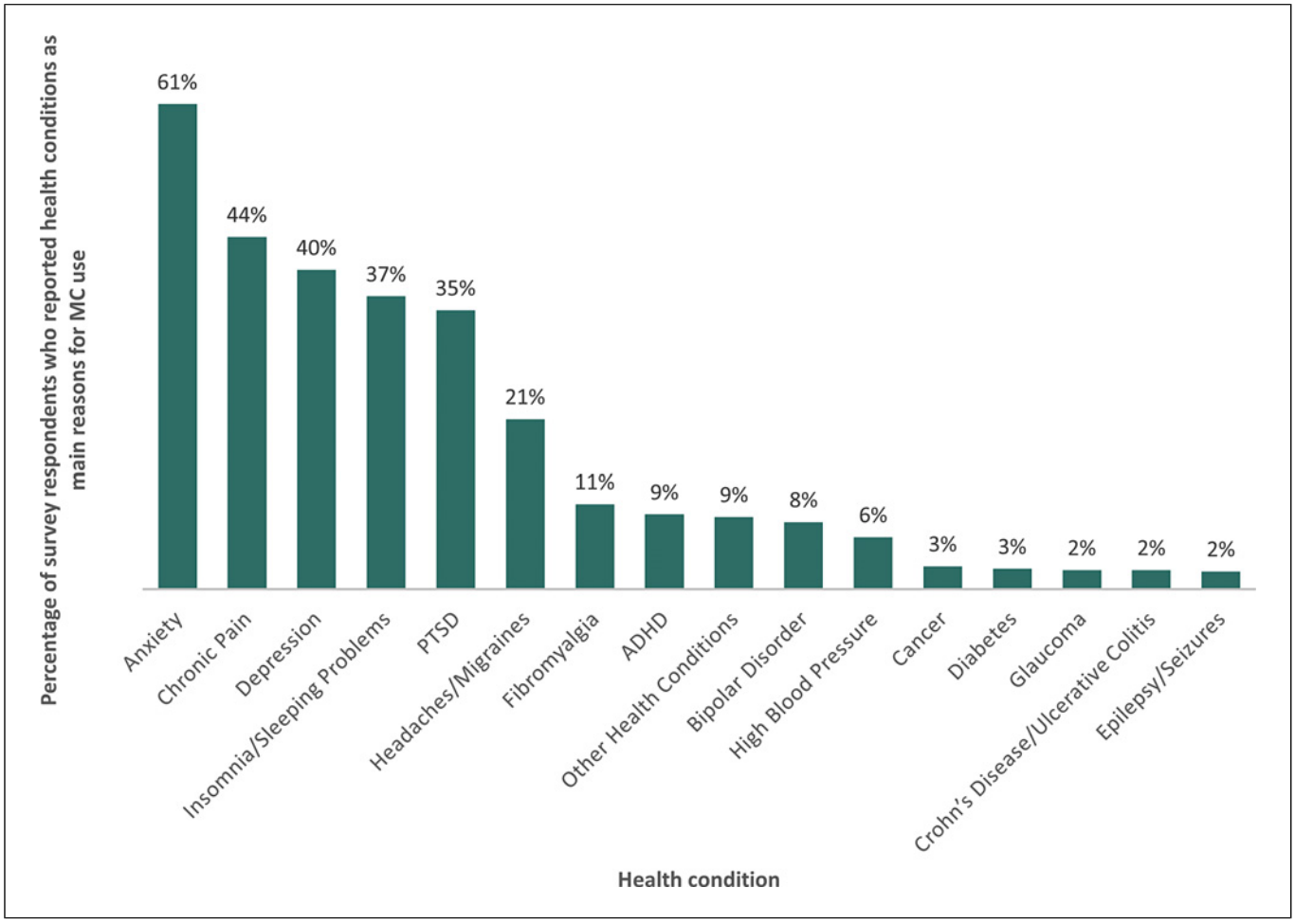

Fig. 1. Illustration of the frequency of self-reported main reasons for using MC among 632 respondents who used MC in Florida in 2022. Survey respondents were asked to identify all health conditions they have been diagnosed with by a healthcare professional from a list of 27 health conditions. For each health condition, only those with a diagnosis were asked if their health condition was the main reason for using MC. Percentages shown in the figure express the percentage of participants who self-reported each health condition as one of the main reasons for using MC denominated by the total sample. Percentages do not add to 100% as survey respondents were allowed to select all conditions that applied as a main reason for using MC (not mutually exclusive). Conditions with less than 10 responses are not shown in the figure. Other health conditions included 14 arthritis, 22 other musculoskeletal pain, 14 gastrointestinal disorders (e.g., irritable bowel syndrome, gastroparesis), 18 neurological disorders, 10 other psychiatric disorders (e.g., obsessive-compulsive disorder), and 21 miscellaneous (e.g., hypothyroidism, polycystic ovary disease). ADHD, attention-deficit hyperactivity disorder; HIV/AIDS, human immunodeficiency virus/acquired immunodeficiency syndrome; MC, medical cannabis; *N*, number; not applicable; PTSD, post-traumatic stress disorder.

the second most frequently reported main reason (46.7%, 54.2%, and 44.97%) among 18–24, 25–34, and 35–44 year olds, respectively. Furthermore, insomnia/sleeping problems were a top reason for using MC, with more than 30% using MC for insomnia across all age groups as shown in Figure 3.

Among those certified for PTSD, the most frequently reported main reasons for using MC was PTSD (n = 155/187, 82.9%), followed by anxiety (n = 134/187, 71.7%), depression (n = 96/187, 51.3%), insomnia/sleeping problems (n = 83/187, 44.4%), and chronic pain (n = 75/187, 40.1%), respectively. Among those who reported being certified for a condition other than those listed, the most frequently reported main reasons for using MC was anxiety (n = 107/175, 61.1%), followed by depression (n = 71/175, 40.6%), insomnia/sleeping problems (n = 59/175, 32.7%), and chronic pain (n = 52/175, 29.7%), respectively. Among those certified for medical

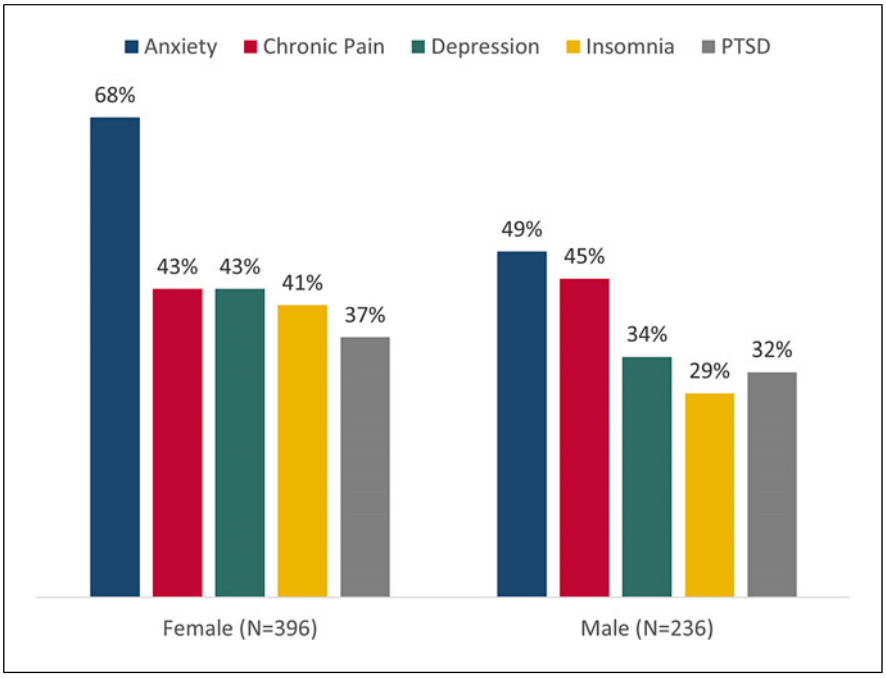

Fig. 2. The top five most frequently self-reported reasons for using MC by sex at birth among 632 survey respondents (396 females and 236 males) who used MC in Florida in 2022. Percentages were rounded to the first integer. MC, medical cannabis; *N*, count; PTSD, post-traumatic stress disorder.

conditions of the same kind or class as or comparable to the others listed, the most frequently reported main reason for using MC was anxiety (n = 100/140, 71.4%), followed by insomnia/sleeping problems (n = 67/140, 47.9%), depression (n = 66/140, 47.1%), and chronic pain (n = 61/140, 43.6%), respectively. Finally, among those certified for chronic nonmalignant pain, the most frequently reported main reason for using MC was chronic pain (n = 138/162, 85.2%), followed by anxiety (n = 82/162, 50.6%), insomnia/sleeping problems (n = 66/162, 40.7%), and depression and PTSD (for both, n = 46/162, 28.4%).

The most frequently reported qualifying conditions for MC certification in the total sample were PTSD (n = 187, 29.6%), a condition not listed on the qualifying conditions list (n = 175, 27.7%), a medical condition of the same kind or class as or comparable to the others listed (n = 140, 22.2%), and chronic nonmalignant pain (n = 62, 25.6%), respectively. No individuals reported being certified for amyotrophic lateral sclerosis in our sample.

Figure 4 depicts the alignment between the self-reported qualifying conditions for MC certification and self-reported main reasons for using MC and illustrates the full ranking of the main reasons for using MC within each qualifying condition category expressed in percentages. Figure 5 illustrates the perceived impacts of MC on self-reported health conditions. Among those who had the top ten most frequently reported medical conditions, most respondents reported improvement in chronic pain (n = 305/310, 98.4%), depression (n = 381/392, 97.2%), anxiety (n = 430/451, 95.3%), fibromyalgia (n = 77/82, 93.9%), PTSD (n = 247/270, 91.5%), bipolar disorder (n = 79/89, 88.8%), insomnia/sleeping problems (n = 225/295, 86.4%), headaches/migraine (n = 172/218, 78.9%), and ADHD (n = 82/123, 66.7%). For high blood pressure, our respondents most frequently reported improvement (n = 69/162, 42.6%); however, a high percentage of the respondents also reported experiencing no change (n = 57/162, 35.2%) or being unsure (n = 36/162, 22.2%) about MC's impact on their blood pressure. A small percentage reported a perceived worsening impact of MC on ADHD (n = 2/123, 1.6%), fibromyalgia (n = 1/28, 1.2%), anxiety (n = 4/451, 0.9%), depression (n = 3/392, 0.8%), insomnia/sleeping problems (n = 2/295, 0.7%), headaches/migraine (n = 3/218, 1.4%), bipolar disorder (n = 1/89, 1.1%), PTSD (n = 1/270, 0.4%), and chronic pain (n = 1/310, 0.3%).

Discussion

In this cross-sectional survey of MC patients in Florida, USA, the most frequently reported qualifying conditions were PTSD, a condition not on the qualifying conditions list, medical conditions of the same kind/comparable to those listed, and chronic nonmalignant

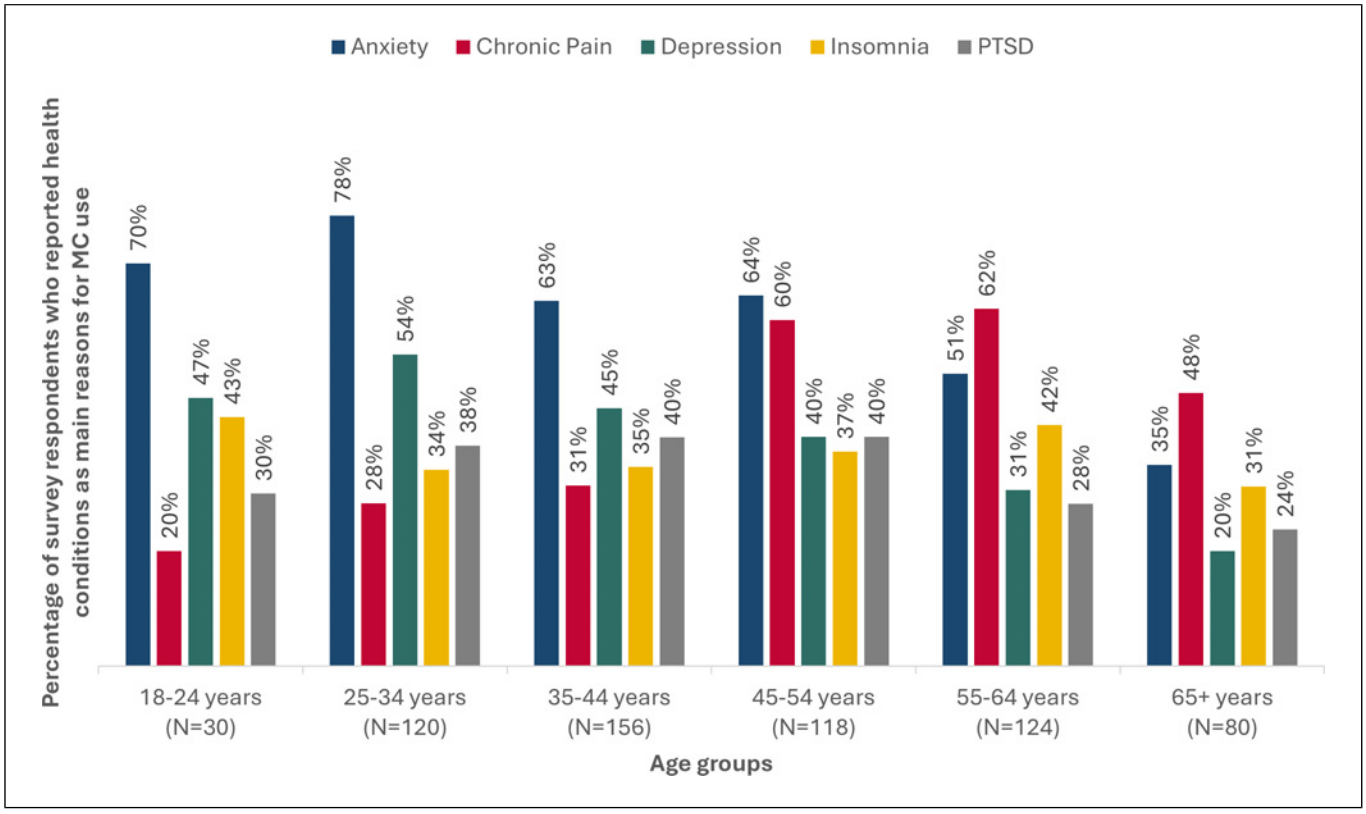

Fig. 3. The top five most frequently self-reported reasons for using MC by age groups among 632 survey respondents (396 females and 236 males) who used MC in Florida in 2022. Percentages were rounded to the first integer. Age was missing for four respondents, not included in this figure. MC, medical cannabis; *N*, count; PTSD, post-traumatic stress disorder.

pain. The top ten most frequently self-reported reasons for using MC were anxiety, chronic pain, depression, PTSD, headaches/migraine, fibromyalgia, ADHD, bipolar disorder, high blood pressure, and cancer. Of overall survey respondents, 70–90% with each qualifying condition reported it as one of the main reasons for using MC. Most respondents reported improvement in chronic pain, depression, anxiety, fibromyalgia, PTSD, bipolar, insomnia/sleeping problems, headaches/migraine, and ADHD. Most respondents were unsure/reported no change in blood pressure. A small percentage reported perceived worsening impacts on their conditions.

Consistent with data from the Physician Certification Pattern Review 2023 Annual Report [15], PTSD was the most frequently reported qualifying condition. Consistent with previous reports, anxiety, depression, chronic pain, and insomnia/sleeping problems emerged as the most prevalent self-reported reasons for using MC [14, 16, 17]. It is noteworthy that anxiety was the most frequently reported reason among younger groups, while chronic pain was the most frequent among older groups. Anxiety was most frequently reported as a main reason for using MC among females. These observations can be explained by the higher prevalence of anxiety among females and younger populations [18] and the higher prevalence of chronic pain in older populations [19].

Reported qualifying conditions and self-reported reasons for using MC aligned for most survey respondents, suggesting that certification data accurately reflect the spectrum of conditions that are treated with MC in Florida. However, more than a quarter of the survey respondents reported being certified for a condition they do not recognize from the list of qualifying conditions in the Florida MC program. Among those respondents, the most frequently self-reported reasons for using MC were anxiety, depression, and sleeping disturbances. While this finding deviates from the formally recognized list of qualifying conditions, these self-reported reasons are

Health condition reported as one of the main reasons for using MC	Qualifying condition for MC certification								
	Cancer (N=16)	Chronic nonmalignant pain (N=162)	Glaucoma (N=12)	PTSD (N=187)	Crohn's disease (N=10)	HIV/AIDS (N=10)	Medical conditions of the same kind or class as or comparable to the others listed (N=140)	A terminal condition diagnosed by other than the qualified physician (N=11)	A condition not on this list (N=175)
Cancer	81.25%	3.09%	8.33%	0.53%	0%	0%	0.00%	9.09%	2.29%
Chronic Pain	43.75%	85.19%	83.33%	40.11%	60%	50%	43.57%	72.73%	29.71%
Glaucoma	6.25%	3.70%	75.00%	1.07%	0%	0%	2.86%	0%	2.29%
PTSD	12.50%	28.40%	16.67%	82.89%	40%	30%	32.86%	9.09%	17.71%
Crohn's Disease/Ulcerative Colitis	0%	1.23%	0%	1.60%	90%	0%	1.43%	0%	2.86%
Anxiety	31.25%	50.62%	33.33%	71.66%	50%	60%	71.43%	45.45%	61.14%
Depression	18.75%	28.40%	16.67%	51.34%	40%	40%	47.14%	63.64%	40.57%
ADHD	0%	6.17%	0%	13.90%	20%	20%	12.14%	9.09%	9.71%
Bipolar Disorder	6.25%	6.79%	0%	12.83%	30%	10%	14.29%	9.09%	4.57%
Insomnia/Sleeping Problems	25%	40.74%	41.67%	44.39%	30%	20%	47.86%	54.55%	33.71%
Headaches/Migraines	6.25%	20.99%	16.67%	25.13%	30%	0%	27.86%	18.18%	22.29%
Fibromyalgia	12.50%	14.81%	16.67%	8.02%	0%	0%	13.57%	0%	10.86%
High Blood Pressure	0%	9.88%	16.67%	8.02%	10%	0%	7.86%	9.09%	4.00%
Diabetes	6.25%	4.94%	0%	2.14%	0%	0%	4.29%	0%	1.14%
Epilepsy/Seizures	0%	1.23%	0%	2.14%	10%	0%	2.14%	9.09%	1.71%
Other Health Conditions	0%	8.64%	0%	6.42%	10%	10%	13.57%	18.18%	12.57%

Fig. 4. Heatmap depicting distributions of self-reported reasons for MC use per reported qualifying condition among 632 respondents who used cannabis in 2022 in Florida. Total column percentages do not add to 100% as responses are not mutually exclusive. Qualifying conditions and health conditions reported as the main reasons for using MC with a cell count less than ten are not displayed. The heatmap brackets are set at 20%. ADHD, attention-deficit hyperactivity disorder; HIV/AIDS, human immunodeficiency virus/acquired immunodeficiency syndrome; MC, medical cannabis; *N*, number; PTSD, post-traumatic stress disorder.

comparable to those attributed to the "other" condition category that may be used for conditions with comparable symptoms. Moreover, the main reasons for use were multifaceted among most survey respondents, suggesting expectations for broader treatment effects than usually described for allopathic medications. For example, among those who reported being certified for chronic nonmalignant pain, a considerable proportion reported using MC for other conditions or symptoms, mainly anxiety (51%), sleeping disturbances (41%), and depression (28%). These findings support the notion that individuals often seek MC for broader symptom management rather than adhering strictly to state-authorized conditions [6], while simultaneously suggesting that MC appears to have more dimensions of treatment effects, an observation rarely seen with allopathic pharmacotherapy (e.g., opioid use for pain). The participants overwhelmingly reported positive impacts of MC on various health conditions, including anxiety, depression, chronic pain, insomnia, PTSD, and headaches, consistent with previous studies and surveys [5, 12–14, 20, 21]. However, it is crucial to acknowledge that our study lacked a control group to allow MC effectiveness assessment and its cross-sectional nature focusing on current users prevented from examining MC discontinuation (i.e., prevalent user bias) [22, 23]. Finally, a small percentage reported perceived worsening of their health conditions, emphasizing the need for individualized approaches and ongoing monitoring of potential MC adverse effects.

Our study population lacked representation of minority population groups, which is a shortcoming of the M^3 study and likely of Florida's MC program itself. Unfortunately, no data describing the demographic characteristics of Florida's MC population are available yet, but a previous survey with findings aligning with ours underscored an over-representativeness of non-Hispanic white populations compared to Florida's census data [14].

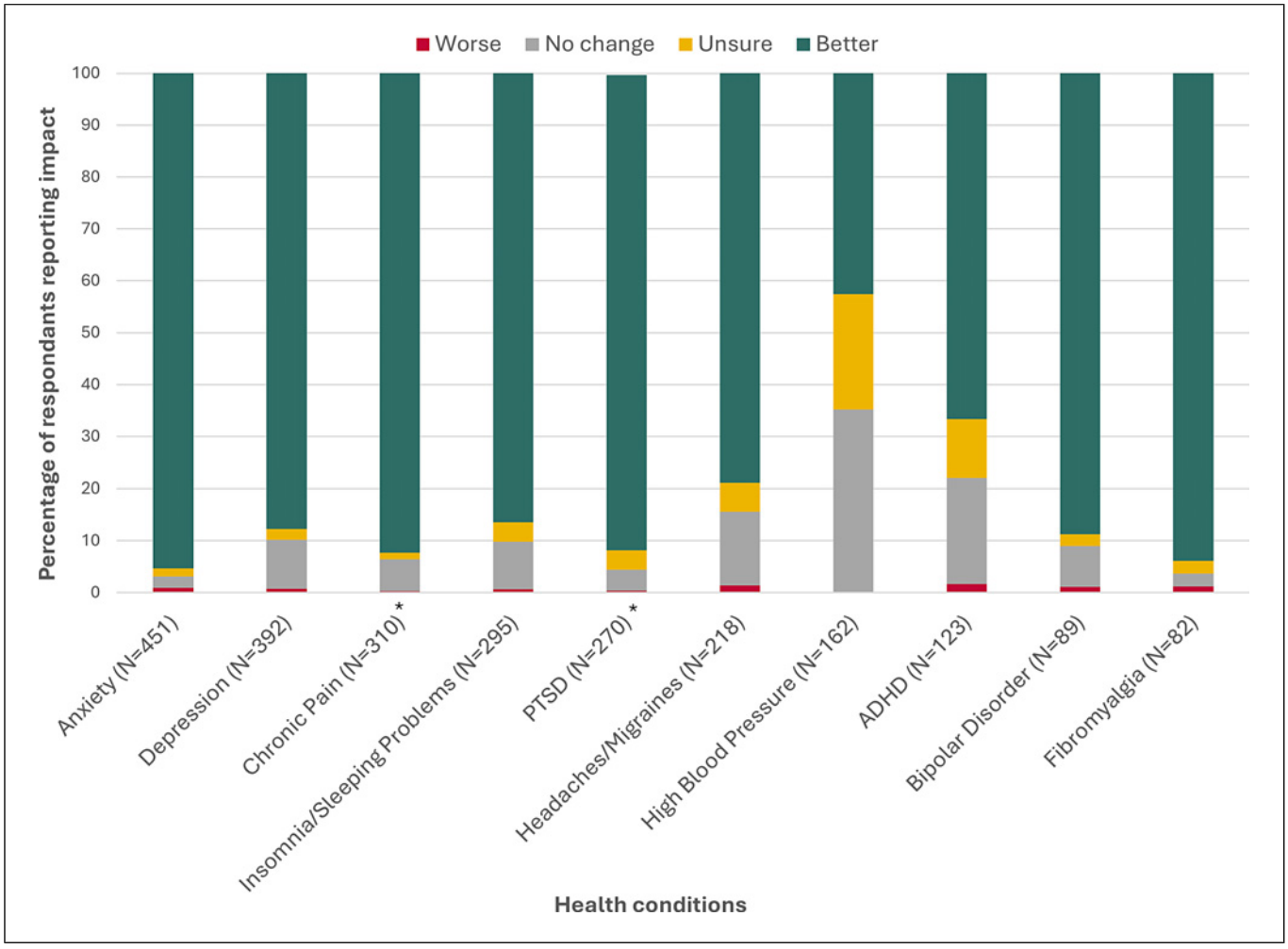

Fig. 5. Illustration of the perceived impact of MC on the top ten most frequently self-reported medical conditions among 632 survey respondents in Florida in 2022. For each condition, the denominator for percentages is the number of respondents who reported being diagnosed with that condition by a healthcare provider. Percentages are rounded to the first integer. *A qualifying condition for MC in Florida, USA. ADHD, attention-deficit hyperactivity disorder; MC, medical cannabis; *N*, number of respondents; PTSD, post-traumatic stress disorder.

Limitations

Our study had limitations. First, our study employed a cross-sectional design, capturing a snapshot of participants at a specific point in time. This design restricts our ability to establish causal relationships or track changes over time, particularly in assessing the long-term impacts of MC use on specific health conditions. Second, assessing perceived MC impacts on health conditions relied on self-reporting. Objective measures or additional clinical data would strengthen the robustness of our findings regarding the effectiveness of MC for specific health conditions. Specifically, given that our study used a convenience sample of individuals using MC, it is expected that these patients are more likely to have positive views on MC and, therefore, more likely to report positive impacts. In a study conducted in the state of Minnesota, USA, it was estimated that only half of individuals initially enrolled in the state's MC program renewed their enrollment [24]. As reasons for MC discontinuation are not yet fully characterized, such findings support the suggestion that people who persist in MC programs, akin to those included in our study, are more likely to experience and report positive impacts. To retain representativeness in our sample, we did not restrict the analysis to those who identified a health condition as a main reason for using MC. This approach may have increased the frequency of responses corresponding to uncertainty about MC impact. However, this approach also allowed us to capture a small percentage of

participants who reported negative impacts of MC on their other health conditions. Finally, the quantitative nature of our study restricts our ability to explore nuanced aspects of participants' experiences with MC. Qualitative data could provide a richer understanding of motivations, challenges, and perceptions related to MC use.

Conclusion

Reported qualifying conditions and self-reported reasons for using MC aligned for most patients, suggesting that certification data accurately reflect the spectrum of conditions that are treated with MC in Florida. However, about one-quarter of patients reported being certified for a condition that is currently not available in the Florida MC program. Main reasons for use were commonly multifaceted, suggesting expectations for broader treatment effects than usually described for allopathic medications. Most patients perceived positive effects, including those with limited available evidence on efficacy. Yet, a small percentage reported negative effects of MC on their health conditions. Controlled studies targeting specific, well-defined outcomes remain needed to evaluate MC's effectiveness and safety.

Statement of Ethics

This study was approved by the University of Florida Institutional Review Board (IRB202002925). All study participants provided written informed consent. Survey responses are saved as deidentified data on ResVault, a highly secure computing environment at the University of Florida for protecting restricted and confidential data.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

Ruba Sajdeya, Sebastian Jugl, Yan Wang, Amie J. Goodin, Almut G. Winterstein, and Robert L. Cook conceptualized the manuscript. Ruba Sajdeya conducted the data analysis and drafted the initial manuscript. Ruba Sajdeya, Sebastian G. Jugl, Sophie Maloney, Juan Perez, Yan Wang, Catalina Lopez-Quintero, Amy J. Goodin, Almut G. Winterstein, and Robert L. Cook revised, edited, and approved the final draft.

Data Availability Statement

Study surveys are available upon request from the authors. Data collected in the M^3 study are available for researchers interested in using it to answer MC-related specific research questions upon application and approval by the M^3 Data Bank. Further inquiries can be directed to the corresponding author.

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