Perceived Effectiveness of Medical Cannabis Among Adults with Chronic Pain: Findings from Interview Data in a Three-Month Pilot Study

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ABSTRACT

Objectives: Patient-reported outcomes are critical to evaluate the effectiveness of medical cannabis as an alternative treatment for chronic pain. This study examined the perceived effectiveness of medical cannabis for chronic pain management among middle-aged and older adults newly initiating medical cannabis. **Methods**: Interview data from participants in a three-month pilot study were analyzed to assess the perceived effectiveness of medical cannabis on chronic pain and related outcomes. The interview was conducted after approximately one month of usage and responses were analyzed using the RADaR (Rigorous and Accelerated Data Reduction) technique. **Results**: 51 adults initiating medical cannabis for chronic pain were interviewed (24 women, 27 men, mean age 54.4, SD = 12.0), with the majority (n=41) identifying as Non-Hispanic White followed by Non-Hispanic Black (n=7), Multi-racial (2), Hispanic White (1). Most study participants (62.7%) reported MC being overall effective. Common benefits included reduced pain intensity, anxiety, and dependency on pain and psychiatric medications. Improvements in physical functioning, sleep quality, and mood were reported. Common challenges included difficulty finding a suitable product or dose, experiencing side effects such as *'undesired high', 'stomach issues',* and a limited *'threshold of pain'* treatable by the product. **Discussion**: Findings suggest most participants perceived medical cannabis to be overall effective for chronic pain management. Participants reported improved physical and mental functioning and reduced use of pain and psychiatric medications. Future research systematically assessing side effects, dosage and mode of consumption is needed to further evaluate the outcomes among adults initiating medical cannabis.

Key words: = medical cannabis; chronic pain; qualitative interviews; symptom management

Chronic pain is a challenging and common condition burdening millions of United States (U.S.) adults. In 2019, an estimated 50.2 million U.S. adults (20.5%) reported chronic pain symptoms most or every day (Yong et al., 2022). Not only is chronic pain a difficult condition to treat; it is costly, linked to increased healthcare expenses, and reduced productivity (Berger et al., 2004; Gewandter et al., 2015; Knight et al., 2013). Seeking alternative treatments for pain management is a beneficial step to improve the quality of healthcare delivery and expand treatment options for chronic pain patients in the U.S.

Medical cannabis has been sought after more frequently as an alternative treatment for chronic pain (Boehnke et al., 2019; Mahabir et al., 2020). The expansion of legalized medical cannabis throughout the U.S. contributes to the increased accessibility and prevalence of this practice. As of

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April 2023, 38 states and four territories have legalized cannabis for medical usage (Legislatures, 2023). With the spread of medical cannabis throughout the U.S., the number of patients seeking medical cannabis as an alternative treatment option has grown exponentially, and chronic pain is cited as the most frequent reason patients obtain medical cannabis (Boehnke et al., 2019; Hill, 2015).

Given the substantial increase of medical cannabis use among patients with chronic pain, studying its potential benefits and risks is essential as there remains inconsistency in research findings on the effectiveness of medical cannabis as a treatment for chronic pain management (Wang et al., 2021). Some recent meta-analyses suggest that cannabinoids may help mitigate pain among chronic pain patients (Whiting et al., 2015; Wong et al., 2020; Yanes et al., 2019) while others reported minimal to no effect in pain reduction with cannabinoid usage (Aviram & Samuelly-Leichtag, 2017; Stockings et al., 2018). Along with the inconsistent findings on medical cannabis's effectiveness for chronic pain management, there is limited guidance for physicians to discuss this treatment (e.g., dose, modes of consumption) and associated side effects with patients (Cooke et al., 2019). Recent studies have consistently shown deficits in provider knowledge on clinical applications of cannabis (Ananth et al., 2018; Kansagara et al., 2020; Mendoza & McPherson, 2018; Rice et al., 2022). A nationally representative survey assessing pain physicians' concerns for recommending medical cannabis reported only 25% of physicians scored 65 or higher on a 101-point overall scale (Narouze et al., 2020). The lack of guidance and self-reported knowledge by providers illustrates the need for additional research to address the gap between clinical knowledge and the implementation of this rapidly growing medication.

In addition to the need for greater evidence-based research and randomized control trials to address this growing alternative treatment for chronic pain, there is a general lack of qualitative findings on medical cannabis and chronic pain management. There is a corresponding deficit in research focused on patient experiences, perspectives, and perceived symptom relief with medical cannabis usage (Mercurio et al., 2019). Recent studies have suggested a potential overemphasis on pain scores to define medical cannabis efficacy which may contribute to the inconclusive and limited findings in this field (Bhaskar et al., 2021). As pain research can be challenging to quantify, qualitative findings offer insight into patient experiences that are inaccessible to other research approaches (Osborn & Rodham, 2010). To address the lack of qualitative, patient-oriented feedback on medical cannabis, utilizing open-ended interviews is crucial as they offer insight from the patient perspective on perceived effectiveness of medical cannabis treatment which could help customize and improve this practice around patient needs.

The main goal of this study is to use an open-ended interview questionnaire to obtain qualitative data on the overall perceived effectiveness of medical cannabis for chronic pain management and explore patient perspectives regarding potential benefits and risks. Utilizing open-ended interview questions provides a more in-depth understanding of individual experiences as well as barriers. This direct feedback from patients using medical cannabis offers important insights into this growing medical practice which could contribute to an improved understanding of individual differences and identifying factors warranting further investigation.

METHODS

Participants

Participants were recruited as a part of a 3-month pilot study investigating the short- and longer-term effects of medical cannabis among adults newly initiating medical cannabis for chronic pain as detailed by Wang et al. (2021). Study participants were recruited from four medical cannabis clinics in North-Central Florida prior to applying for their medical cannabis card. Inclusion criteria included: 18 years of age or older, smartphone owners, seeking to start medical cannabis soon but had not yet initiated, and reported chronic pain as the primary reason for seeking treatment. Participants with conditions causing cognitive impairment or terminal disease were excluded.

Procedure

Clinic staff or physicians at each collaborating medical cannabis clinic first introduced the study to new patients when they came in for their appointment to obtain medical cannabis

certification/card. Participants who were interested could either talk with the research staff at the clinic to learn more about the study and complete the screening for eligibility or provide their contact information with an authorization to contact form so that the research staff could follow up. Once enrolled, participants were asked to complete 1) a baseline survey, 2) 3-4 weeks of ecological momentary assessments (EMA), 3) open-ended phone interview questions at the end of the EMA period, and 4) a 3-month follow-up survey. In Florida, patients can obtain medical cannabis products at any dispensary after they receive their medical cannabis card. The time window between their appointment to obtain the card and their actual purchase of medical cannabis products allowed us to obtain baseline data. The study procedures are detailed by Wang et al. (2021). Prior to study initiation, written consent was obtained by participants and the study protocol was approved by the University of Florida Institutional Review Board.

An open-ended survey was administered to enrolled participants after approximately one month of usage when participants had an opportunity to experiment and try to find the optimal treatment protocol that could include doses, specific modes of consumption, etc. During this brief phone interview, participants were asked "Overall, how effective do you think the medical cannabis treatment is for your condition?". Through the open-ended survey, participants could share any insight into the overall effectiveness of the product, including any observed benefits and side effects, but were not provided with follow-up prompts to address these topics. The interviews were transcribed verbatim, identifying information was removed and responses were edited to be reviewed in first-person.

Data Analysis

Two coders individually coded the interview data using the RaDaR (Rigorous and Accelerated Data Reduction) technique, a well-established and standardized procedure by qualitative experts in prior published literature (Watkins, 2017b). This technique utilizes tables to assign appropriate codes to qualitative responses and then identifies overarching themes in the data. Using this technique, two coders independently coded the data and met weekly to reach a consensus regarding the codes and their definitions. During these meetings, coders identified broader themes based on established codes and consulted the study team to discuss any variances in established codes. After two rounds of coding, a consensus code was created factoring in perceived pain relief, health benefits and reported side effects.

In the analysis of the overall effectiveness of treatment methods for chronic pain, various aspects of physical and mental functionality were observed and evaluated using The Initiative on Methods, Measurement, and Pain Assessment in Clinical Trials (IMMPACT) recommendation. Using this model, the following outcome domains were evaluated: pain, physical and emotional functionality, participant's perceived satisfaction and improvement with treatment method, reported symptoms, side effects and treatment regimen (Turk et al., 2003).

Sample Characteristics

The sample included 51 adults initiating medical cannabis or chronic pain (24 women, 27 men, mean age 54.4, SD = 12.0), with the majority (80.4%) identifying as Non-Hispanic White followed by Non-Hispanic Black (13.7%), Multi-racial (3.9%), Hispanic White (2.0%). Complete demographic information is summarized in Table 1. The sample characteristics were consistent with the demographics of medical cannabis patients in Florida with the majority of participants identifying as non-Hispanic white (Brown et al., 2020). Most participants reported having some college education or higher and were married or living with a long-term partner. More than half of the sample were not employed (either disabled or retired). There were variations in past cannabis usage, with 46.8% of study participants not using cannabis in the past 12 months, 17.0% reported using within the past 12 months, and 36.2% reporting cannabis use within the past 30 days.

RESULTS

A total of 51 medical cannabis users answered the open-ended survey assessing overall perceived effectiveness of medical cannabis for their condition. Based on participant feedback on the overall effects of medical cannabis as a treatment for chronic pain, the following themes were identified: overall perceived effectiveness of medical cannabis, health benefits, side effects, and

Table 1. *Sample Characteristics of the Study Population (N = 51)*

Variable	Value
Age in years	
Mean ± SD	54.4 ±11.9
Hispanic	
Yes	3 (5.9%)
No	48 (94.1%)
Race	
White	42 (82.4%)
Black/African American	7 (13.7%)
Multi-racial	2 (3.9%)
Gender	
Male	27 (52.9%)
Female	24 (47.1%)
Education	
High school graduate or GED	10 (19.6%)
Some college or technical/trade school	18 (35.3%)
College or higher	23 (45.1%)
Marital status	
Married/living with a long-term partner	33 (64.7%)
Divorced/separated	12 (23.5%)
Widowed	2 (3.9%)
Never married and not living with a long-term partner	4 (7.8%)
Employment status	
Yes, employed for wages	17 (33.3%)
Yes, self-employed	6 (11.8%)
No	28 (54.9%)
Cannabis use prior to starting medical cannabis	
Used in past 30 days	17 (36.2%)
Not used in past 30 days, but within 12 months	8 (17.0%)
Not used for more than 12 months	22 (46.8%)

treatment methods.

Overall Perceived Effectiveness

Based on participant feedback on the overall perceived effectiveness of medical cannabis as a treatment for chronic pain, more than half of the participants, both males and females, reported medical cannabis effectively reduced their chronic pain symptoms.

"It's [medical cannabis] very effective. There was only one day out of two weeks where I felt uncomfortable due to the pain, but it went away within an hour." [58 years, male]

"Very effective. On a 1-100% scale it was 90% effective." [26 years, female]

Two participants suggested limits in level the pain it can treat.

"Jury is still out some products help reduce my back pain when I am working but once a certain threshold of pain comes around no medical cannabis treatment has helped. Useful in reducing

Table 2. *Qualitative Themes, Codes and Definitions from Open-ended Interview*

Themes	Codes	Definitions
Perceived Effectiveness of Medical Cannabis	Medical cannabis was effective.	Participant reported that medical cannabis was effective for chronic pain management.
	Medical cannabis had limited effect in pain reduction.	Participant reported limits in the level or quantity of pain treatable by medical cannabis product.
	Unsure of overall effectiveness of medical cannabis.	Participant was undecided on the overall effectiveness of medical cannabis treatment.
	Medical cannabis overall no effect.	No clear effects were observed from medical cannabis treatment.
Health Benefits	Medical cannabis improved sleep quality.	Participant experienced improvements in sleep quality after starting medical cannabis product.
	Medical cannabis helpful for reducing other medications.	Participant reported reduction in previous pain medication and opioid usage.
	Medical cannabis improved physical health and functionality.	Participant experienced improvements in physical health, functionality, and mobility with medical cannabis.
	Mental Health Benefits	Participants reported benefits with mental health including improved focus, mood, and stress levels after beginning treatment.
Side Effects	Undesired 'high'	Participant reported undesirable high because of medical cannabis product.
	Stomach discomfort experienced	Participant reported experiencing stomach discomfort after initiating medical cannabis treatment.
	Choking on 'vape'	Participant reported experiencing 'choking' when consuming medical cannabis through vape.
Medical Cannabis Treatment Regimen	Product Components	Participant stated preferences with product ingredients and THC to CBD ratio.
	Mode of Consumption	Participant was uncertain about most effective mode of consumption.
	Determining Proper Dosage	Participant reported difficulties determining optimal dosage and *'sweet spot'* with medical cannabis usage.

pain in moderate levels but not high levels like opioids." [69 years, male]

"I think it [medical cannabis] helped a lot until I hurt my back. I seemed to have to smoke more after that. But for the everyday normal pain it was awesome." [45 years, female]

A few participants reported not noticing any reduction of pain or being undecided on overall effectiveness of medical cannabis treatment.

"…I don't believe it is that effective for me, I need to experiment more with products. I looked online at products and did not find much to help me." [30 years, female]

"I have not noticed much of a difference if I will be honest with you." [52 years, female].

Overall, most study participants reported medical cannabis effectively reduced their chronic pain, but several study participants mentioned not observing changes in pain intensity and limits in the pain treatable by medical cannabis products.

Health Benefits

Participants reported various health improvements attributed to medical cannabis in addition to perceived effectiveness for chronic pain relief.

Improvements in Sleep Quality

Several participants reported improvement in their sleep quality as an additional benefit of medical cannabis use.

"Before I was very restless at night, I didn't get any sleep at all and now I do. I don't have the twitchy leg or the pain that would make me moan and groan at night. My husband is really happy about that!" [60 years, female]

"Overall, medical cannabis treatment was helpful …I have been able to sleep through storms for the first time in months." [61 years, female]

Reduced Need for Medications

Participants also reported that medical cannabis reduced their need for other medications and effectively substituted prescription medications including Xanax, Meloxicam, Tramadol, and Oxycontin while leading to fewer side effects.

"It's [medical cannabis] great. I've never used medical cannabis before. With pain, I haven't had to take any medication and I've been taking medication for years. All those narcotics and other meds. I was surprised, I didn't know it was going to help me like that. It really works." [43 years, female]

"I'd give it a B+. I still need Celebrex, something to help inflammation. I've gotten off some medications, but still take Celebrex daily…I'm not on Hydrocodone, I didn't like the way it made me feel. I'm off the other opioids and Meloxicam. Life is good." [62 years, male]

"At this point the CBD oil, there's a dramatic change in my body. Usually, I get up and I'm achy/sore but now I can get up and not have to take a pain pill. Pain in thumb from arthritis is almost gone. I would put cream on it every day, now it would be every other day or 3 days. I cut back on 3 or 4 pills (pain meds). I take less valium when I go to sleep because I take medical marijuana." [67 years, male]

One participant mentioned preferring medical cannabis over the side effects of tramadol.

"Overall medical cannabis is helpful. It makes it much easier to control pain and not take pills. The side effects are way better than tramadol medication. On medical cannabis you can live life, work and do stuff, but on tramadol, you can't live pain-free and do stuff…all you can do is sit on the couch and watch TV while drooling" [47 years, female]

Improvements in Physical Health Functioning

Participants reported improvements in physical health and functionality including increased mobility, delay of surgery. One participant believed their medical cannabis treatment improved diabetes management.

"For me it's [medical cannabis] very helpful. It helps me move. I would get home from work, I would take the vape, and it would help me move around even after a busy day. Normally, when I come home from work, I would be a lump on a log and couldn't move and now I can move around freely interacting with my family members." [48 years, male]

"I can get up and move around and not be miserable. The morning is when I notice the most." [67 years, male]

One participant discussed decreased dependency on walker attributed to physical benefits experienced with medical cannabis usage.

"Pretty damn effective [medical cannabis treatment]. I'm no longer using my walker. I only take my meds [opioid/pain medication] one time a day instead of three, and I haven't had a Xanax in 30 days." [51 years, female]

Another participant reported being able to delay surgical procedures and maintain an intense-paced lifestyle with medical cannabis usage.

"Without medical cannabis, I would have to get surgery immediately. Using drops and opioids I have been able to put off surgery and live life to the fullest even at the high intense pace I am at right now." [64 years, male]

One participant believed that medical cannabis helped with his diabetes management.

"It [medical cannabis] helps me with my joint pain and in bringing my sugar levels down. I have diabetes." [53 years, male]

Impact on Mental Health and Functioning

Many participants stated that medical cannabis use for pain reduction also helped improve aspects of their mental health including

focus, mood, stress levels, and engagement in daily life activities.

"I think it helped me out a lot especially with my mood. It helped with my pain and depending on what I smoke it allows me to be more focused as well. I did a lot of cleaning." [39 years, male]

"There is one [product] where it makes me more active if I don't sit down. It makes me focus and I do dishes and clean my house and stuff. I get so much done, … Anxiety wise, being on the CBD and using the vape, my anxiety has gone from a 10 to a 4." [45 years, female]

A participant suggested medical cannabis helped reduce suicidal ideation and made her feel 'human again'.

"Medical cannabis is very effective in helping my pain. When everyone had to go down on opioids [doses reduced] because of the high death rates, I felt suicidal. It [medical cannabis] takes the edge off plenty where I feel human again." [56 years, female]

One participant addressed cognitive functioning and reported a perceived increase in cognitive functioning with the medical cannabis product.

"Medical cannabis has been wonderful. It has been absolutely fantastic as I have found the perfect mix for the right time of day. Have absolutely no cognitive loss during the day has seen increase cognitive ability has been able to properly go to sleep at night instead of using medication to pass out." [56 years, female]

Although most participants who addressed mental health spoke of the benefits, one participant stated not experiencing mental health benefits or pain relief.

"[Medical cannabis] helps with insomnia. Not so much with pain or mental issues." [56 years, female]

Based on participant feedback of overall product effectiveness, many participants reported health benefits including improvements in sleep quality, reduced dependency on pain and psychiatric medications, and improved physical functioning and overall mental health.

Side Effects

Participants also offered insight into side effects experienced; specifically, stomach discomfort, an undesirable 'high feeling', and 'choking' on the vape.

Undesirable High

"[Medical cannabis is] not really effective with my job. I handle lots of heavy machinery. I don't have the capability to be high or incapacitated mentally. It feels good sometimes, but I don't like the side effects or being unable to work." [49 years, male]

"Hard to find a sweet spot when using vape since I am high on the first hit. I would like to not feel my neuropathy and not be high. Medical cannabis is effective but does not enjoy being high." [65 years, male]

Another participant reported experiencing stomach issues with medical cannabis usage.
"Overall, the medical cannabis treatment was effective, but I couldn't take the oil because it gave me stomach issues." [58 years, female]

One participant reported difficulty with 'choking' on vape during the initial week of usage.

"To be honest, I had trouble at the beginning with the vape. I would choke on it for the first week, but the past week I've been able to use it." [58 years, female]

One participant mentioned experiencing different side effects based on product type mentioning sleep impairment and an *'overdose'* on THC product.

"I don't know that it does anything. After I had the overdose, I stopped taking the Indica THC. The other one, CBD, turned out bad because I'd stay awake until 3-4 in the morning. I've used the cream on my shoulders, but I haven't seen any help from it either." [73 years, female]

Based on participant feedback, side effects experienced during medical cannabis treatment

varied from an undesired high, stomach issues, 'choking' during vape usage, sleep impairment and reported overdose on Indica THC product.

Treatment Regimen

Participants reported experimentation with various product types and modes of consumption to find an optimal treatment routine. A common concern expressed by participants was difficulty finding the right dosage or the '*sweet spot*' with medical cannabis.

Product Components

Participants addressed their preferred medical cannabis product ingredients, including Sativa and Indica products, and preferences with the CBD to THC ratio.

"*I'd say it's [medical cannabis] pretty effective. If you're doing a Sativa product and your back is hurting you, the Sativa would give you energy to move. The Indica would help put me to bed if I'm not feeling sleepy and keep me knocked out.*" [38 years, male]

Few participants commented on customizing their CBD to THC ratio and the benefits experienced based on the different products. Two participants noted improved sleep with THC.

"*Overall medical cannabis treatment is good. CBD in combination with Vegan diet helps a lot. I haven't felt this good in 20 years. The THC is good on days that I do lawn work because it helps me sleep. The THC also gives me an increased appetite, but that's a good thing.*" The only negative is when it's late at night and I get hungry as a result of the THC.*" [63 years, male]

"*I'll be 100% honest with you. I think it works wonderful for my condition. It really helps to take the THC when I go to sleep. During the day it helps cut down my inflammation and to be able to customize it so that I'm not high is really nice.*" [40 years, male]

"*I can actually tell a difference. The first time I tried one strain and I didn't tell a difference then I went back and tried a different strain with higher THC and I was able to see a difference in my lower extremity (back problems). My pain was more tolerable.*" [67 years, male]

Modes of Consumption

Participants mentioned the role different modes of consumption such as vape/ inhalation, topical cream, oil, drops, sublingual tablets and capsules played on overall product effectiveness.

"*As far as delivery, the inhalation is better, the oil tastes disgusting. THC didn't work, taking the product was worse than not taking it. I still take the CBD.*" [65 years, male]

"*The only thing I get benefits from is the vape.*" [68 years, male]

"*Since I've only been on it [medical cannabis] for a short time. I started off smoking the marijuana and I didn't like it. I didn't like the way it made me high. I got the drops and the pills. The pills didn't do anything. The drops worked better, but I'm still trying to figure out what works for me.*" [61, male]

Determining Optimal Dosage

Participants reported experiencing difficulties in finding the optimal dosage and '*sweet spot*' for their condition and suggested this affected their perception of the overall effectiveness.

"*I'm using sublingual and capsules have not found my sweet spot. It is making a difference but not that much of one.*" [72 years, male]

"*I am still trying to figure out the right concoction, I need to go and try a couple of more types. There's this one [product] that knocks me out. It works because I don't feel any pain, but I fall asleep within 20 min. There is one [product] where it makes me more active... but then I'm hurting because I've overdone it and been moving all day. I need to learn to balance…It's effective in that it does what it says it would do. It reduces some of my pain. It is going to take a couple of months to figure out. I really like the CBD oil but that alone doesn't do it 100%.*" [45 years, female]

A participant reported difficulty balancing getting good sleep and waking up feeling tired due to the dosage used while vaping.

"It [vape pen] puts me to sleep really quick, within 30min, which is a big help because I wouldn't fall asleep until 1 or 2 am. I think it makes me more tired during the day so it's a work in progress. I need to tweak it, right now I'm taking it how my doctor told me to, but he said to adjust as needed. So, I need to play around with it a little." [58 years, female]

Overall, participants reported experimentation with different strains of medical cannabis and adjusting the CBD to THC product ratio to maximize treatment benefits. Additionally, some participants struggled to identify the most effective mode of consumption and *'sweet spot'* during their experimentation with medical cannabis.

DISCUSSION

The current study was designed to evaluate data from an open-ended interview to assess the perceived effectiveness of medical cannabis as a potential treatment for chronic pain. With the rapid expansion of this practice, evidence-based research is essential to understand and properly implement this alternative treatment for chronic pain management. Based on the feedback interviews evaluating the perceived effectiveness of medical cannabis products for chronic pain, the following themes emerged: 1) overall perceived effectiveness, 2) health benefits, 3) side effects, and 4) treatment regimen. As chronic pain encompasses a wide array of health symptoms beyond perceived pain, we assessed a multitude of physical and mental health domains to accurately evaluate pain outcome measures. The themes observed in this study aligned well with the IMMPACT recommendation on core outcome measures for chronic pain treatment as various health domains in addition to perceived pain were assessed to best evaluate pain outcomes with medical cannabis treatment (Turk et al., 2003).

Based on qualitative findings from this study, more than half of adult female and male participants found medical cannabis to be effective for the management of their chronic pain. These findings align well with past meta-analyses suggestive of improved pain management with medical cannabis treatment (Whiting et al., 2015; Wong et al., 2020; Yanes et al., 2019). A small percentage of participants interviewed were undecided on the overall

effectiveness of medical cannabis, and only three participants reported no observed effect from the treatment. Additionally, two study participants suggested a 'threshold' of pain treatable by product. Further research may be beneficial to evaluate limits in pain treatable by medical cannabis products and variances observed in the perceived effectiveness of medical cannabis.

In addition to the alleviation of chronic pain symptoms, multiple other health benefits were reported with medical cannabis usage. A common benefit mentioned was improved sleep quality. Participants reported being able to 'sleep through storms', improvements with insomnia, and experiencing 'well and uninterrupted' sleep. This feedback aligns with previous findings suggestive of small improvements in sleep quality during medical cannabis treatment (AminiLari et al., 2022; Sarris et al., 2020). A couple of participants reported difficulty finding the balance between receiving adequate sleep and being tired throughout the day due to product dosage. A few participants also reported a 'knocking out' effect after the consumption of medical cannabis products. Additionally, two participants reported greater ease of falling asleep with higher THC products. Although this finding contributes to past research suggestive of the potential therapeutic effects of THC on decreasing sleep latency, there is also emerging evidence of potential impairments in long-term sleep quality with higher THC products (Babson et al., 2017). As the research is still limited and inconclusive on medical cannabis and sleep quality with some past reviews reporting insufficient evidence to support the clinical use of cannabinoids for sleep therapy (Corroon, 2021; Suraev et al., 2020), further research is needed to explore the varying effects and potential therapeutic uses of medical cannabis for sleep disturbances.

Additionally, participants reported reduced need and replacement of other medications while experiencing fewer side effects with medical cannabis treatment. Reduced intake of a variety of benzodiazepine and pain medications including Xanax, Meloxicam, Tramadol, and Oxycontin were stated. These findings enhance preliminary evidence of the potential to use medical cannabis in substitution for other substances (Lucas et al., 2019; Walsh et al., 2017). A couple of participants mentioned using medical cannabis in addition to low dosages of pain medication or substituting

pain medications completely with medical cannabis while experiencing fewer side effects. Although our findings suggest potential analgesic properties of medical cannabis, some meta-analyses have found low-quality evidence to back this potential alternative to common prescription medications (Noori et al., 2021). Further research is needed to clarify the substitutive and 'opioid-sparing' effects of medical cannabis treatment in addition to assessing proper dosing to achieve potential analgesic properties, but our findings contribute to a growing body of evidence suggestive of the potential to use medical cannabis as an alternative to common prescription medications.

Improvements in physical health and functionality were observed in the qualitative findings. Participants stated perceived benefits including increased ability to 'move freely', decreased dependency on walker, improvements in blood sugar management, and increased muscle relaxation with medical cannabis usage. Based on the participant feedback, it was suggested that improved physical mobility may be an additional benefit experienced attributed to the reduction in pain symptoms with medical cannabis usage. Although there is limited literature on medical cannabis and its effects on mobility, a review assessing medical cannabis in patients with Huntington's Disease found significant improvement in motor symptoms including tremors and rigidity after medical cannabis treatment (Akinyemi et al., 2020). Further research would be beneficial to determine the physical benefits and potential changes in motor functioning with medical cannabis.

Changes related to mental functionality, including improvements in focus, mood, and stress levels were also observed. This supports previous findings of health benefits such as mood improvement, reduction in anxiety, and improved stress management with medicinal cannabis usage (Peterson et al., 2021). A common concern with medical cannabis is cognitive decline; although past findings have shown a correlation between long-term exposure and a reduction in cerebral blood flow, neuroimaging studies have shown no effect from cannabis in gross brain anatomy (Shrivastava et al., 2011). One study participant even suggested a potential perceived increase in cognitive function attributed to medical cannabis products. Although multiple

participants commented on the positive effects of the treatment on their mental health and overall functioning, a couple of participants did report impaired functioning due to undesired high and not experiencing benefits in their mental health. It is important to consider and further evaluate how medical cannabis affects various facets of cognitive functioning and mental health to properly implement and advise patients on this treatment.

Further, a comprehensive understanding of potential side effects is essential to properly understand and regulate medical cannabis usage. In addition to an undesired high, impaired work performance, stomach issues and 'choking on vape' were side effects mentioned by a few study participants. The observed side effects by study participants contribute to past findings suggestive of impaired performance and neurocognitive impairment with chronic usage (Bridgeman & Abazia, 2017). Future research and a thorough risk assessment would be beneficial to determine the long-term side effects of chronic cannabis usage and properly assess the risks associated with this practice.

Lastly, the treatment regimen was evaluated to better understand the effectiveness of medical cannabis in pain management. In the state of Florida, once a patient receives a medical cannabis recommendation, they can purchase their product of choice within the recommended THC to CBD ratio (Wang et al., 2021). The delivery methods for medical cannabis in the state of Florida include inhalation, sublingual, oral, topical, edibles, and suppository (Risola, 2020). Products mentioned by participants included vape, oil, drops, pills, patches, and cream. Based on the feedback from the open-ended survey, determining the proper mode of consumption and finding the 'desired sweet spot' were common concerns reported by participants. Participants mentioned struggling to find a regimen that allowed them to experience maximum product benefits while also minimizing potential side effects. Additionally, participants mentioned experimentation adjusting the CBD to THC ratio to customize product effects to best fit their lifestyle and pain management needs.

Limitations

Our sample size was relatively small and predominantly non-Hispanic white adults which

may limit applicability to larger, more diverse groups. Although the population interviewed is largely representative of the demographic seeking out medical cannabis treatment for chronic pain management in the U.S., greater diversity would strengthen and increase the generalizability of these findings. The smaller sample size could limit the observed themes of the qualitative data. Additionally, the RADaR coding technique may not be applicable to larger datasets as it requires manual sorting and reviewing of qualitative data (Watkins, 2017a). As the interviews were administered after a month of usage, the findings may not reflect more long-term effects observed from the usage of medical cannabis products. Another limitation of this study was the use of our own interview questions, which could be further validated for rigor and reproducibility. Finally, this study was an observational one, so our findings could not rule out the potential impact of factors such as the placebo effect. Assessing the potential 'placebo effect' associated with medical cannabis products may be another important consideration when evaluating perceived effectiveness.

Conclusions

This study provided preliminary findings that contribute to an improved understanding of individual experiences using medical cannabis for chronic pain management. The open-ended interview highlighted information from patient perspectives which may guide future investigations with the longer-term goal of optimizing patient care. Based on the preliminary findings, most of our sample of middle to older adults reported medical cannabis to be beneficial in managing their chronic pain and associated symptoms. Although improvements in pain management, sleep quality, physical and mental health were observed, identifying potential side effects, and determining optimal treatment regimens were reported as important. Randomized control trials and longer-term prospective studies would provide needed information regarding safety and dosing to promote public safety and to keep up with the increasing interest in medical cannabis as a medication for the treatment of chronic pain.

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Conflict of Interest Statement: This work has not been previously published nor is it under consideration for publication elsewhere. Past findings with study subjects (survey data) have been reported by Wang et al. (2021) and referenced in the manuscript. Study findings were presented as a poster at the 2022 AGS Annual Meeting and as an oral presentation at the Cannabis Clinical Outcomes Research Conference 2022. There are no conflicts of interest to disclose.