Medical Cannabis for Chronic Pain: Patient Demographics, Perceptions, and Use Patterns in Florida

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ABSTRACT

Objective: Medical cannabis (MC) use has expanded rapidly, with chronic pain (CP) as a main reason for use. However, evidence on benefits and risks of MC use is conflicting due to factors like individual differences and product variability. This study compared the demographics of MC users with CP to those with other conditions, assessed perceived therapeutic benefit and risks of MC (effectiveness, changes in prescription opioid use, side effects), and examined product use patterns (methods of use, CBD:THC ratio, strain, dose). **Method:** Data were from the Medical Marijuana & Me (M^3) cross-sectional survey of adults (≥ 18 years) certified for MC in Florida. Individuals reporting CP as a main reason for MC use comprised the CP group; all others comprised the non-CP group. In total, 632 individuals were included (278 CP, 354 non-CP). Analyses included descriptive analyses, chi-square/Fisher's exact tests, and logistic regression models to assess group differences. **Results:** MC users with CP were older, used MC primarily for medical reasons, and were more likely to have health insurance compared to those without CP. Most individuals with CP experienced pain relief (94%), especially with flower, vape, and edibles. Among individuals using prescription opioids, most reported a reduction or discontinuation of opioids. Side effects were generally mild. Product use patterns were mostly similar between groups, though certain edible products were more common in the CP group. **Conclusions:** This study identifies condition-specific patient demographics, perceptions, and patterns of MC use for CP, with most reporting pain improvement and manageable side effects. Findings highlight the need for longitudinal research to guide dosing and optimize patient care.

Key words: medical cannabis; medical marijuana; chronic pain

Medical cannabis (MC) use in Florida, which involves patients being certified by a qualifying physician to obtain MC from dispensaries, has grown in the past five years from around 250,000 users in 2019 to over 920,000 users as of July 2025 (Office of Medical Marijuana Use [OMMU], 2019; OMMU, 2025). Early adopters of the MC program in Florida reported chronic pain (CP) as one of the most common reasons for MC use (Costales et al., 2021; Rosenthal & Pipitone, 2021), aligning with existing research highlighting the potential of MC for symptom improvements among those with CP (Pomey et al., 2024). MC is becoming increasingly accepted as an alternative treatment for pain, with many using MC to avoid side effects and risks associated with traditional pain medications (Dassieu et al., 2023). Despite this increase in MC use for CP, the International Association for the Study of Pain (IASP) does not endorse the use of cannabis for treating pain due to the lack of evidence (IASP, 2021). The ongoing uncertainty underscores the need for a more thorough understanding of the benefits and risks associated with MC use for CP.

Studies suggest that individuals with CP conditions find benefits related to MC use for managing symptoms and improving quality of life (Luque et al., 2021; Pomey et al., 2024; Pritchett

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et al., 2022; Zeng et al., 2021). In some cases, MC use may have the potential to decrease the use of other prescription pain medications, including opioids (Bradford & Bradford, 2016; Costales et al., 2021; Flexon et al., 2024; Powell et al., 2018). However, these findings are not consistent, with some studies finding no association (Davidson et al., 2024) or even increased opioid use (Bicket et al., 2024). Moreover, MC users report side effects such as weight loss, anxiety, dry eyes, cough, and increased appetite, though many report experiencing reductions in side effects they would have experienced using prescription pain medications (Luque et al., 2021). These findings are similar to studies investigating MC users in Florida (Pritchett et al., 2022) and highlight the importance of contextualizing the experiences of individuals using MC for CP within the broader population of MC users.

To fully understand the experiences of individuals with CP who are using MC, it is essential to examine demographic characteristics and product use patterns. In Florida, almost 60% of registered MC users between 2016 and 2017 were over the age of 50 (Brown et al., 2020). Veteran status may intersect with age, as many veterans are older and seeking alternative treatments for opioid use (Zaman et al., 2024). Prior studies suggest that the majority of MC users were non-Hispanic White and female (Davidson et al., 2024; Rosenthal & Pipitone, 2021). Additionally, employment status may be impacted by MC use due to fears of failing drug tests when applying to jobs (Lankenau et al., 2018). This is a potential issue for Florida MC users, as most reported not currently working either due to disability, retirement, unemployment, or being a student (Rosenthal & Pipitone, 2021).

With the wide range of MC products available, it is important to understand which products are preferred by those with CP. This is especially important given that evidence suggests certain dosages and modes of administration may be preferable for pain; however, treatment guidelines and research on specific conditions are limited (Jugl et al., 2021; Montagner et al., 2024). Research indicates that THC-dominant products may be preferred for pain symptoms over CBD-dominant ones, though demographic characteristics such as age and gender may impact preferences (Kalaba & Ware, 2022). For instance, older individuals may favor balanced CBD:THC ratios while younger individuals may prefer CBD or THC-dominant products (Kalaba & Ware, 2022). Aligning information about sociodemographic characteristics with product preferences may elucidate trends in the use of different MC products among individuals with CP.

The purpose of this study was to evaluate current MC users in the state of Florida with a focus on individuals using MC for CP, using those with other conditions as a reference group. The aims of this study were to (1) determine whether demographic characteristics of MC users with CP differ compared to users with other conditions, (2) assess the perceived therapeutic benefit and risks of MC for treating CP, including product effectiveness, changes in prescription opioid use, and side effects, and (3) analyze product use patterns, including methods of use, CBD:THC ratio, dose, and preferred strains among individuals using MC for CP conditions compared with those using for other conditions.

METHODS

Data from the Medical Marijuana & Me (M^3) cross-sectional survey were used for analysis. The data were obtained through the M^3 databank as approved by the M^3 Scientific Oversight Committee. To become an MC user in Florida, patients must visit an MC clinic and be certified by a qualified physician to be diagnosed with one of the qualifying conditions outlined by Florida law. The physician will then enter them into the MC use registry; the patient will need to apply for an ID card and pay the associated fee (OMMU, n.d.). Survey respondents were recruited through ten MC clinics or clinic networks covering most counties in the state of Florida, USA, between May 2022 and September 2022, using convenience sampling. Study materials (e.g., flyers, posters, information sheets) were placed in all ten locations. Clinic staff introduced the study to patients during their visits as well as included study invitations in appointment reminders sent via email or text message. Research staff were also sent to some of the clinics to do in-person recruitment depending on the preference of the clinics. More details can be found elsewhere (Sajdeya et al., 2023). Study measures were collected using self-reported online surveys.

Participants were current MC users in Florida aged 18 years or older. A total of 632 individuals were included in the cross-sectional data. More information on survey measures and data availability is outlined in the published M[3] protocol (Sajdeya et al., 2023).

Responses to survey questions regarding diagnosed conditions and conditions which served as a main reason for using MC were utilized to differentiate participants using MC for CP versus those using MC for other conditions. First, participants were asked, "Have you ever been diagnosed by a health professional to have any of these conditions?". Health conditions include anxiety, depression, post-traumatic stress disorder, attention-deficit/hyperactive disorder, bipolar disorder, schizophrenia, insomnia/sleeping problems, headaches/migraines, fibromyalgia, CP, cancer, amyotrophic lateral sclerosis, asthma, chronic lung disease, high blood pressure, heart disease, diabetes, kidney disease/dialysis, Crohn's disease/ulcerative colitis, stroke, multiple sclerosis, Parkinson's disease, epilepsy/seizures, Alzheimer's disease/dementia, glaucoma, HIV/AIDS, and other. If the participant selected a diagnosed condition, they were further asked, "Are any of these conditions one of the main reasons you are using medical marijuana?". If a participant selected CP as a main reason for MC use, they were assigned to the CP group. Otherwise, participants were assigned to the non-CP group. This resulted in a final sample of 278 individuals in the CP group and 354 individuals in the non-CP group. All data analyses were conducted in SAS OnDemand for Academics.

Demographic Characteristics

Current age, age when first used MC, sex, race/ethnicity, education level, employment status, veteran status, insurance status, annual household income, and marijuana use motive were analyzed. Categories with low response rates were combined into broader categories for analysis. Descriptive analyses were conducted for the CP group, non-CP group, and total sample. Univariate logistic regression models were run for all demographic characteristics to identify which factors were related to the primary outcome of indicating CP as a main reason for MC use or other conditions. All demographic characteristics were included in a multivariate logistic regression model, except Medicare coverage and veteran status due to concerns about multicollinearity. Individuals who did not answer questions regarding age when first used MC, current age, employment status, annual household income, and marijuana use motive were excluded from logistic regression analyses but were included in descriptive analyses on demographic questions completed.

Product Effectiveness

All participants were asked, "How has medical marijuana affected each of your conditions or symptoms?", with the following response options: worse, no change, better, or NA/unsure. Additionally, all participants were asked, "For each of these conditions, have you found a specific method of using medical marijuana and/or a product type or strain that is most effective?". If CP was selected, participants were asked, "What method of using medical marijuana is most effective for this condition?". Descriptive analyses were conducted for the CP group.

Change in Prescription Opioid Use

All participants were asked, "Please indicate if you used any of the following substances/medications in the past 5 years.". Participants who indicated opioid use in the past 5 years with a prescription were asked, "How has the overall amount that you use changed since starting medical marijuana?", with the following response options: increased, no change, decreased, completely stopped, or NA/unsure. Descriptive analyses were conducted for the total sample of individuals who used prescription opioids in the past 5 years.

Side Effects

All participants were asked, "During the past 2 weeks, have you been bothered by any of the following?", followed by a list of side effects (e.g., dry mouth, nausea, etc.). Descriptive analyses were conducted for the CP group, non-CP group, and total sample. Chi-square analysis or Fisher's Exact Test were utilized to assess differences in side effects between individuals in the CP and non-CP groups.

Methods of MC Use

Participants were first asked, "Which of the following types of products have you tried from the MMJ program in Florida?". For each product selected, participants were asked, "Have you used [product type] in the past 30 days?". For products used in the last 30 days, participants were asked, "How often have you used the following methods to consume [product type] in the past 30 days?", with the following response options: never, less than weekly, 1-3 times a week, 4-6 times per week, every day, or several times a day. Responses were collapsed into a binary variable representing whether the product type was used for analysis. Descriptive analyses were conducted for the CP group, non-CP group, and total sample. Chi-square analyses were conducted to compare methods of MC use for the CP group versus the non-CP group.

CBD:THC Ratios

Participants who used each product within the past 30 days were asked, "What is the type of [product type] you use the most?", with the following response options: CBD only, primarily CBD, 1:1 CBD:THC ratio, primarily THC, THC only, or unsure. Chi-square analysis or Fisher's Exact Test were utilized to assess differences in CBD:THC ratio between individuals in the CP and non-CP groups. Smokeable concentrates were excluded from this analysis due to a lack of survey questions assessing CBD:THC ratio.

Strain

Participants who used each product within the past 30 days were asked, "Which types of [product type] do you use the most?", with the following response options: indica, sativa, hybrid, or unsure. Descriptive analyses were conducted for the CP group, non-CP group, and total sample. Chi-square analyses were conducted to compare strains used for the CP group versus the non-CP group.

Dose

Participants were asked, "On a typical or average day that you [use each product type], how many times a day do you use it?". Additionally, participants were asked various questions regarding the average THC concentration or mg consumed and CBD mg consumed each time, depending on each product. For inhaled products, participants were asked, "On average, how many hits, tokes, or puffs do you take per session?" and "When you smoke or vape [product type], how long do you inhale with each hit, toke, or puff?" in seconds. Descriptive analyses of the modal response were conducted on the three most effective MC products reported by participants in our sample.

RESULTS

Demographic characteristics of the study sample are outlined in Table 1. In univariate analyses, current age, employment status, insurance coverage (Medicare, VA, or none), and marijuana use motive were associated with indicating CP as the main reason for MC use ($p < .05$). On average, individuals in the CP group were older than those in the non-CP group, with 54.32% aged 50 years or older in the CP group versus 30.51% in the non-CP group.

Table 1. *Demographic Characteristics Associated With Reporting CP as a Main Reason for MC Use Among Participants Who Reported Either CP or Other Conditions as a Main Reason for MC Use (n = 632)*

	CP as main reason (*n* = 278)	Non-CP as main reason (*n* = 354)	Total (*n* = 632)	OR (95% CI)
Age When First Used MC				1.01 (0.99, 1.02)
Mean (SD)	20 (11)	20 (11)	20 (11)	
Current Age				**2.76 (1.99, 3.84)**
Below 50 years of age	124 (44.60%)	245 (69.21%)	369 (58.39%)	
50 years of age or older	151 (54.32%)	108 (30.51%)	259 (40.98%)	
Did not answer	3 (1.08%)	1 (0.28%)	4 (0.63%)	
Sex				

Male	106 (38%)	130 (37%)	236 (37%)	1
Female	172 (62%)	224 (63%)	396 (63%)	0.94 (0.68, 1.30)
Race/Ethnicity				
Non-Hispanic White	210 (76%)	261 (74%)	471 (75%)	1
Non-Hispanic Black	16 (5.8%)	19 (5.4%)	35 (5.5%)	1.05 (0.53, 2.09)
Hispanic	36 (13%)	57 (16%)	93 (15%)	0.79 (0.50, 1.24)
Other	16 (5.8%)	17 (4.8%)	33 (5.2%)	1.17 (0.58, 2.37)
Education Level				
Graduate or professional degree	44 (16%)	72 (20%)	116 (18%)	1
High School/GED or below	44 (16%)	64 (18%)	108 (17%)	1.13 (0.66, 1.92)
Some college or college graduate	190 (68%)	218 (62%)	408 (65%)	1.43 (0.94, 2.18)
Employment Status				
Currently working	135 (49%)	234 (66%)	369 (58%)	1
Unemployed	139 (50%)	119 (34%)	258 (41%)	**2.03 (1.47, 2.80)**
Did not answer	4 (1.4%)	1 (0.3%)	5 (0.8%)	-
Veteran Status				
No	245 (88%)	326 (92%)	571 (90%)	1
Yes	33 (12%)	28 (7.9%)	61 (9.7%)	1.57 (0.92, 2.67)
Insurance Status*				
Private	134 (48%)	196 (55%)	330 (52%)	0.75 (0.55, 1.03)
Medicaid	41 (15%)	47 (13%)	88 (14%)	1.13 (0.72, 1.78)
Medicare	100 (36%)	60 (17%)	160 (25%)	**2.75 (1.90, 3.99)**
Veteran's Affairs	20 (7.2%)	12 (3.4%)	32 (5.1%)	**2.21 (1.06, 4.60)**
Not insured	21 (7.6%)	49 (14%)	70 (11%)	**0.51 (0.30, 0.87)**
Other	21 (7.6%)	26 (7.3%)	47 (7.4%)	1.03 (0.57, 1.87)
Annual Household Income				
$60,000 and above	115 (41%)	164 (46%)	279 (44%)	1
Under $60,000	146 (53%)	176 (50%)	322 (51%)	1.18 (0.86, 1.64)
Don't know/did not answer	17 (6.1%)	14 (4.0%)	31 (4.9%)	-
Marijuana Use Motive				
Partially or completely recreational	54 (19%)	137 (39%)	191 (30%)	1
Mostly or completely medical	223 (80%)	216 (61%)	439 (69%)	**2.62 (1.82, 3.78)**
Did not answer	1 (0.4%)	1 (0.3%)	2 (0.3%)	-

Note. *Question allowed participants to select multiple responses. Percentages will not equal 100%.

Table 2. *Multivariate Logistic Regression of Demographic Characteristics Associated With Indicating CP as a Main Reason for MC Use Among Individuals Who Indicated CP as a Main Reason for MC Use and Those Who Indicated Other Conditions as a Main Reason for MC Use* (n *= 632)*

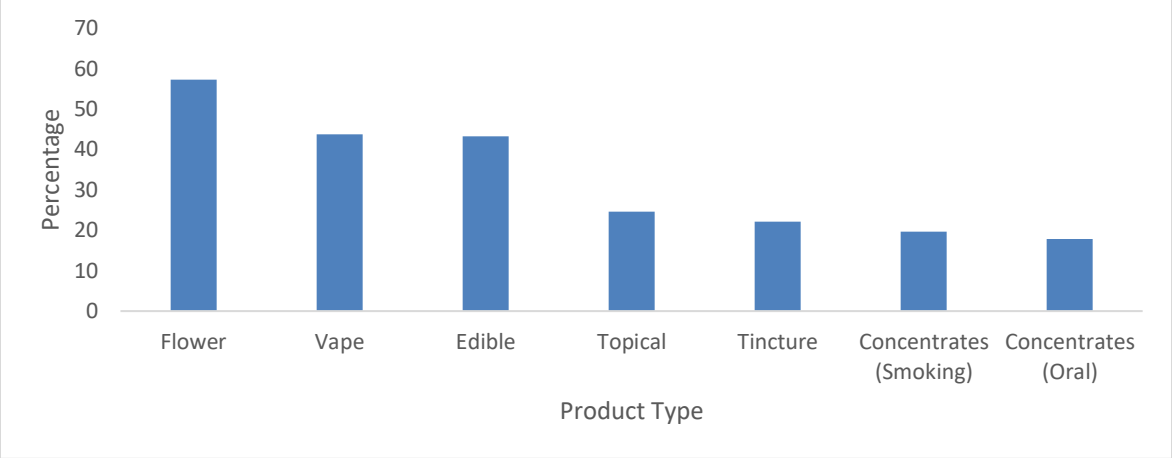
	aOR	95% CI	p-value
Age When First Used MC	0.99	0.97, 1.01	0.23
Current Age (ref: below 50 years of age)	**2.32**	**1.57, 3.43**	**< .0001**
Female (ref: male)	1.03	0.71, 1.49	0.88
Race/Ethnicity (ref: Non-Hispanic White)			
Non-Hispanic Black	1.22	0.57, 2.61	0.80
Hispanic	1.00	0.60, 1.67	0.57
Other	1.35	0.62, 2.94	0.57
Education Level (ref: graduate or professional degree)			
High School/GED or below	1.20	0.63, 2.26	0.86
Some college or college graduate	1.30	0.81, 2.09	0.37
Unemployed (ref: currently working)	1.21	0.80, 1.82	0.37
Insurance Status			
Private (ref: no)	0.66	0.38, 1.13	0.13
Medicaid (ref: no)	0.73	0.39, 1.37	0.33
Veteran's Affairs (ref: no)	1.57	0.65, 3.78	0.31
Not insured (ref: no)	**0.41**	**0.19, 0.86**	**0.02**
Other (ref: no)	0.61	0.28, 1.30	0.20
Annual Income Under $60,000 (ref: $60,000 and above)	1.12	0.75, 1.66	0.59
Use Motive Mostly or Completely Medical (ref: recreational)	**2.70**	**1.80, 4.04**	**< .0001**

Note: Bolded values are significant.

Results for the multivariate logistic regression model are presented in Table 2. Adjusted odds ratios (aOR) can be interpreted as the effect holding others constant. Individuals aged 50 years or older had 2.32 times the odds of indicating CP as a main reason for MC use compared to those below 50 years of age (95% CI [1.57, 3.43], $p < .0001$). Individuals who were not insured had approximately 59% lower odds of indicating CP as a main reason for MC use compared to those who had insurance coverage (aOR = 0.41, 95% CI [0.19, 0.86], $p = .02$). Individuals who indicated mostly or completely medical use had 2.70 times the odds of indicating CP as a main reason for MC use compared to those who indicated partially or completely recreational use (95% CI [1.80, 4.04], $p < .0001$). No significant differences were found for any other demographic characteristics.

Among those in the CP group, 260 (94%) individuals found that their pain was better when using MC versus 0.4% of individuals who found their pain to be worse when using MC. Among the 260 individuals who reported that their CP was better following MC treatment, 208 indicated that they found a method or product that was most effective for treating their pain. Figure 1 shows the percentage of those 208 individuals who indicated each MC product type as most effective for treating CP. The three most effective MC products reported for pain were flower (57%), vape (44%), and edibles (43%).

Figure 1. *Self-Reported Most Effective MC Products for Treating CP Among Those Who Indicated CP as a Main Reason for Use* (n *= 208)*



A total of 231 participants across the entire sample reported opioid use in the past 5 years with a prescription. Among these individuals, 209 reported a change in their use of prescription opioids since starting MC. Most reported either a decrease (38%) or having completely stopped (43%) their use of opioids.

Reported side effects within the past 2 weeks related to MC are outlined in Table 3. The most common side effects reported among all participants were dry mouth (26%), fatigue/low energy (24%), and insomnia (22%). Among these, significant differences between individuals in the CP and non-CP groups were observed for dry mouth ($p = .01$) and fatigue/low energy ($p = .01$), but not insomnia ($p = .06$). Additionally, significant differences were observed between the two groups for shortness of breath ($p = .03$), nausea ($p = .01$), constipation ($p = .02$), diarrhea ($p = .04$), trouble with balance/walking ($p = .001$), headache ($p = .02$), numbness or tingling ($p < .0001$), hot or cold sensations ($p = .02$), excessive sweating ($p = .048$), and other side effects ($p = .03$). Excessive sweating was more common among individuals in the non-CP group, while all other significant side effects were more common among individuals in the CP group.

Table 3. *Self-Reported Side Effects Among Individuals Who Indicated CP as a Main Reason for MC Use and Those Who Indicated Other Conditions as a Main Reason for MC Use* (N = *632)*

	CP as main reason (n = 278)	Non-CP as main reason (n = 354)	Total (n = 632)	x^2(df)	p
Side Effects Related to MC					
Palpitations	22 (7.9%)	22 (6.2%)	44 (7.0%)	0.69(1)	0.40
Shortness of Breath	22 (7.9%)	14 (4.0%)	36 (5.7%)	**4.54(1)**	**0.03**
Cough	33 (12%)	44 (12%)	77 (12%)	0.05(1)	0.83
Dry Mouth	86 (31%)	79 (22%)	165 (26%)	**6.00(1)**	**0.01**
Decreased Appetite	30 (11%)	30 (8.5%)	60 (9.5%)	0.97(1)	0.32
Increased Appetite	41 (15%)	46 (13%)	87 (14%)	0.40(1)	0.53
Nausea	40 (14%)	29 (8.2%)	69 (11%)	**6.15(1)**	**0.01**
Vomiting	10 (3.6%)	9 (2.5%)	19 (3.0%)	0.59(1)	0.44
Constipation	24 (8.6%)	15 (4.2%)	39 (6.2%)	**5.20(1)**	**0.02**
Diarrhea	24 (8.6%)	16 (4.5%)	40 (6.3%)	**4.44(1)**	**0.04**
Sexual Problems	9 (3.2%)	14 (4.0%)	23 (3.6%)	0.23(1)	0.63
Insomnia	71 (26%)	68 (19%)	139 (22%)	3.64(1)	0.06
Memory Problems	28 (10%)	35 (10%)	63 (10%)	0.01(1)	0.94
Paranoid	7 (2.5%)	8 (2.3%)	15 (2.4%)	0.04(1)	0.83
Speech Difficulties	8 (2.9%)	5 (1.4%)	13 (2.1%)	1.66(1)	0.20
Dizziness or Lightheadedness	21 (7.6%)	22 (6.2%)	43 (6.8%)	0.44(1)	0.51
Trouble with balance/walking	30 (11%)	14 (4.0%)	44 (7.0%)	**11.24(1)**	**0.001**
Sleepiness	32 (12%)	31 (8.8%)	63 (10%)	1.32(1)	0.25
Fatigue/Low Energy	80 (29%)	69 (19%)	149 (24%)	**7.45(1)**	**0.01**
Problems Driving	2 (0.7%)	1 (0.3%)	3 (0.5%)	-	0.59*
Blurred Vision	6 (2.2%)	2 (0.6%)	8 (1.3%)	-	0.15*
Headache	46 (17%)	37 (10%)	83 (13%)	**5.07(1)**	**0.02**
Numbness or Tingling	42 (15%)	18 (5.1%)	60 (9.5%)	**18.21(1)**	**< .0001**
Hot or Cold Sensations	16 (5.8%)	8 (2.3%)	24 (3.8%)	**5.21(1)**	**0.02**
Edema	8 (2.9%)	4 (1.1%)	12 (1.9%)	2.55(1)	0.11
Itchy Skin or Rash	10 (3.6%)	17 (4.8%)	27 (4.3%)	0.55(1)	0.46
Excessive Sweating	20 (7.2%)	13 (3.7%)	33 (5.2%)	**3.90(1)**	**0.048**
Other	8 (2.9%)	2 (0.6%)	10 (1.6%)	-	**0.03***

Note. Highlighted side effects are most commonly reported. Bolded values are significant. *Fisher's Exact Test used due to low expected cell counts.

Different MC product use methods for each product type used within the past 30 days are presented. Of the 477 individuals who reported using flower in the past 30 days, both the CP and non-CP groups used bowl/pipe/one-hitter the most (83% and 81%, respectively). Those in the non-CP group also used joint/pre-roll the most (81%). A total of 545 individuals reported using vape products in the past 30 days; 78% reported use in the CP group and 81% reported use in the non-CP group. Of the 188 individuals who reported using smokeable concentrates in the past 30 days, both the CP and non-CP groups used RSO/distillate syringe the most (73% and 67%, respectively). Of the 156 individuals who reported using topicals in the past 30 days, both the CP and non-CP groups used creams or lotions the most (75% and 67%, respectively). A total of 332 individuals reported using oral tinctures in the past 30 days; 48% reported use in the CP group and 42% reported use in the non-CP group. Of the 160 individuals who reported using oral concentrates in the past

30 days, both the CP and non-CP groups used distillate syringes the most (79% and 82%, respectively). Of the 345 individuals who reported using capsules or edibles in the past 30 days, both the CP and non-CP groups used gels or gummies the most (90% and 87%, respectively). For capsules and edibles, a significant difference between the CP and non-CP group was observed for use of capsules/tablets within the past 30 days, with 48% of those in the CP group reporting use versus 36% in the non-CP group ($p = .02$). No significant difference was found between the CP group and the non-CP group for flower, vape, smokeable concentrates, topical, oral tincture, or oral concentrate methods.

The CBD:THC ratio for products used within the past 30 days is outlined in Table 1 of the Appendix. The majority of participants indicated using products primarily or only containing THC for flower (87%), vape (85%), tincture (58%), oral concentrates (79%), and edible products (73%). For topical products, similar numbers of participants used products containing a 1:1 ratio of CBD:THC (37%) and primarily or only THC (38%). No significant differences between individuals in the CP group and those in the non-CP group were found for any product.

For all product types, sativa strains were typically used less than indica and hybrid strains (see Table 1 of the Appendix). For flower, vape, and topical products, hybrid strains were used slightly more than indica strains. However, for smokeable concentrates and edible products, indica strains were used slightly more than hybrid strains. Compared to other products, which tended to be dominated by indica (57-71%) and hybrid (46-66%), topical products had a more balanced distribution across strains, with 30% using indica, 15% using sativa, and 37% using hybrid strains. Tincture and oral concentrate products had the greatest difference in the use of different strains. For tincture products, indica strains were used the most (61%), followed by hybrid strains (46%) and sativa strains (28%). For oral concentrate products, indica strains were used the most (70%), followed by hybrid strains (48%) and sativa strains (31%). For tinctures, a significant difference between the CP and non-CP group was observed for use of indica strains within the past 30 days, with 69% of those in the CP group reporting use versus 52% in the non-CP group ($p = .04$). No other significant differences were found for product strains between the CP group and the non-CP group.

Modes and frequencies for dose measures of the three most effective MC products (flower, vape, and edibles) are presented. Regardless of group, those using flower products mostly reported taking 3 hits, tokes, or puffs per session twice per day on average with 3-second inhales. Individuals in the CP group reported using THC concentrations between 15-20%, compared with the 20-25% THC concentration reported most by individuals in the non-CP group. Among individuals in the non-CP group, responses for hits, tokes, or puffs taken per session were highly variable, with the next most common category being 10 or more (15%). Regardless of group, those using vape products mostly reported taking 2 hits, tokes, or puffs per session with 3-second inhales. Individuals in the CP group most frequently reported using twice per day while individuals in the non-CP group reported using only once per day. Regardless of group, those using edible products mostly reported using once per day on average, with 10mg THC and less than 5mg CBD consumed each time.

DISCUSSION

Compared to U.S. Census Bureau [n.d.] data in Florida, individuals who identify as female and non-Hispanic White were overrepresented in our sample. However, the demographic profile of our sample aligns with previous research on MC users (Davidson et al., 2024; Rosenthal & Pipitone, 2021). Individuals in the CP group were older than individuals in the non-CP group, consistent with prior research on the Florida MC program (Brown et al., 2020; Costales et al., 2021; Rosenthal & Pipitone, 2021). When examining demographic characteristics of individuals in the CP group compared to the non-CP group, current age, no insurance coverage, and marijuana use motive emerged as significant distinguishing demographic factors, holding all other demographic characteristics constant. Marijuana use motive in those using mostly or completely for medical reasons was associated with higher odds of using MC for CP compared to those using for partially or completely recreational reasons. This supports existing research on the acceptability of MC as an alternative treatment for pain (Dassieu et al., 2023). No significant differences between

MC users with CP versus other conditions were found for any other demographic characteristics. These findings can inform providers looking to take a targeted approach when recommending MC treatment to patients.

Among those who indicated CP as a main reason for their MC use, over 90% indicated an improvement in their pain, with flower, vape, and edible products being reported as most effective. While effectiveness was based on the participants' subjective perceptions, these findings are useful for identifying potential products that may be beneficial and reinforce previous research on the possibility of MC to help with managing symptoms associated with CP (Pomey et al., 2024). Among the 209 participants who reported a change in their use of prescription opioids since starting MC, most reported either decreasing or stopping their use of opioids. This aligns with evidence on the potential opioids-sparing effects of MC use (Bradford & Bradford, 2016; Costales et al., 2021; Flexon et al., 2024; Powell et al., 2018), which is especially useful given inconsistencies. Commonly reported side effects included dry mouth, fatigue/low energy, and insomnia. While shortness of breath, nausea, constipation, diarrhea, trouble with balance/walking, headache, numbness or tingling, hot or cold sensations, and other side effects were significantly more common in the CP group, they were generally mild symptoms reported in both groups. This supports prior qualitative research indicating that MC side effects tend to be more manageable for users with CP conditions compared to the side effects from prescription pain medications (Dassieu et al., 2023; Luque et al., 2021). These findings are useful for providers, researchers, and patients to move toward more standardized recommendations for MC use; however, more research is needed.

Product use patterns also differed between those using MC for CP versus other conditions. Individuals in the CP group were more likely to have used capsules/tablets in the last 30 days. THC-dominant products were more common for flower, vape, tincture, oral concentrates, and edible products, while THC-dominant and 1:1 CBD:THC ratio products were nearly equally common for topical products. For the CP group, this supports research that THC-dominant products may be preferred for managing pain symptoms (Kalaba & Ware, 2022). Additionally, the equal use of THC-dominant and 1:1 CBD:THC ratios for topical products and the higher use of these products among those in the CP group may reflect findings that older individuals tend to prefer more balanced products in terms of CBD and THC (Kalaba & Ware, 2022). However, no significant differences were observed between the CP and non-CP groups for CBD:THC ratios. Although indica and hybrid strains were more commonly used than sativa strains for all products, only those who used indica strains for tincture products were more likely to indicate CP as a main reason for use. However, these products were not reported as being very effective for CP. This aligns with existing literature on the preference of hybrid and indica strains when using MC for pain (Baron et al., 2018). Further study is needed to examine why strain preference may not align with symptom relief. Minimal differences were observed for dose measures; individuals with CP tended to use lower concentrations of THC when using flower but used vape products more times per day compared to individuals in the non-CP group. These findings suggest that pain relief may be achieved without high THC concentrations and highlight the need for more research on MC dosing and efficacy for CP treatment.

Several limitations may have impacted our findings. The study focused on a convenience sample of individuals in the Florida MC program and may not represent the experiences of MC users in other states. Not all products had dose and THC:CBD ratio data as survey measures varied, and product information was based on self-report, which may introduce recall bias. Selection bias is also a concern, as only individuals who remained in the Florida MC program completed the survey and may have more positive experiences compared to those who stopped using MC. The cross-sectional study design did not allow for examination of changes in product use patterns and CP over time. Future research should aim to collect detailed and objective product data, such as from dispensary records or product labels. Future studies should also utilize longitudinal data to allow for evaluation of changes in product use patterns and therapeutic benefits over time.

Conclusion

This study offers a comprehensive overview of MC use for CP among current users in Florida and suggests that most MC users perceive more benefits than risks. By using individuals with other conditions as a reference group, we were able to identify patterns specific to individuals using MC for CP.

Individuals using MC for CP tended to be older, used MC primarily for medical reasons, and were more likely to have health insurance. The majority of users with CP experienced improvement in their pain when using MC, with flower, vape, and edibles perceived as the most effective products. Among those using prescription opioids, most reported decreasing or discontinuing their opioid use when using MC, suggesting the potential for opioid reduction. Reported side effects were not severe, which supports existing data suggesting that MC may be more tolerable than conventional pain treatments.

Individuals with CP reported distinct product use preferences compared to individuals with other conditions. Those using MC for CP used more capsules/tablets compared to those without CP. While THC-dominant products were commonly used for most products, THC-dominant and 1:1 CBD:THC ratio products were nearly equally common for topical products. This underscores the need for research to guide dosing recommendations to tailor treatments based on condition-specific needs.

Future research should focus on collecting more detailed information on MC product types, dose, and use frequency. Longitudinal studies are necessary to understand how these patterns change over time for individuals seeking to manage CP using MC. These insights can guide clinical care, policy, and patient education related to the use of MC as a treatment for CP.

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