


Practice Patterns and Training Needs Among Physicians Certifying Patients for Medical Marijuana in Florida

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Abstract

Background: Little is known about the clinical training or practice experiences among physicians who certify patients for medical marijuana. The objective of this study was to determine information sources, factors influencing recommendations, clinical practices in patient assessment, communications, and recommendations, and priority areas for additional training among physicians who certify patients for medical marijuana. **Methods:** A cross-sectional state-wide anonymous survey of registered medical marijuana physicians in Florida between June and October 2020 was administered. Numerical responses were quantified using counts and percentages. The frequencies for “often” and “always” responses were aggregated when appropriate. **Results:** Among 116 respondents, the mean (standard deviation) age was 57 (12) years old, and 70% were male. The most frequently used information sources were research articles ($n=102$, 95%), followed by online sources ($n=99$, 93%), and discussions with other providers and dispensary staff ($n=84$, 90%). Safety concerns were most influential in patient recommendations ($n=39$, 39%), followed by specific conditions ($n=30$, 30%) and patient preferences ($n=26$, 30%). Ninety-three physicians (92%) reported they “often” or “always” perform a patient physical exam. Eighty-four (77%) physicians provided specific administration route recommendations. Half ($n=56$) “often” or “always” provided specific recommendations for Δ -9-tetrahydrocannabinol: cannabidiol ratios, while 69 (62%) “often” or “always” provided specific dose recommendations. Online learning/training modules were the most preferred future training mode, with 88 (84%) physicians “likely” or “very likely” to participate. The top 3 desired topics for future training were marijuana-drug interactions ($n=84$, 72%), management of specific medical conditions or symptoms ($n=83$, 72%), and strategies to reduce opioids or other drugs use ($n=78$, 67%). **Conclusions:** This survey of over 100 medical marijuana physicians indicates that their clinical practices rely on a blend of research and anecdotal information sources. While physicians report clinical factors as influential during patient recommendation, patient assessment practices and treatment regimen recommendations vary substantially and rely on experimental approaches. More research is needed to inform evidence-based practice and training, especially considering details on drug interactions, risk-benefit of treatment for specific clinical conditions, and strategies to reduce opioid use.

Keywords

medical marijuana, cannabis, physician training, clinical practice, guidelines

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Introduction

As of January 2021, nearly three-fourths of US states have publicly available Medical Marijuana (MMJ) programs.¹ Florida is growing into one of the biggest MMJ markets in the country.^{2,3} By April 2021, over 2446 physicians were

authorized to certify and order MMJ, and 533 755 qualifying patients were registered in Florida’s program.⁴ However, the rapid expansion of MMJ programs has not been matched with similarly rapid expansion in clinical training or the evidence base supporting the safety and effectiveness of MMJ that could guide clinical decision-making.^{5,6}



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To become a qualified MMJ physician in Florida, physicians must hold an active, unrestricted license as an allopathic physician or as an osteopathic physician and attend a 2-h state-mandated training course and pass a subsequent examination offered by the Florida Medical Association or the Florida Osteopathic Medical Association.⁷ The training course is focused on the legal aspects of recommending MMJ, such as familiarizing physicians with MMJ-related state rules and regulations, and identifying eligible patients while considering legal consequences under federal law and other legal restrictions.⁸ However, the course does not provide physicians with needed clinical guidelines related to recommending MMJ, such as considering patient's parameters, comorbidities, potential drug-drug interactions, and managing side effects. Furthermore, it does not provide any specific guidelines for recommending dosages or appropriate routes of administration (RoA). Instead, physicians balance the risks of treating the patient with CBD-dominant or THC-dominant marijuana with the potential benefit to the patient based on their individual judgment. After completing the course, followed by passing a test, a physician receives their license within 24 to 48 hours and is ready to recommend and manage MMJ.⁹

Moreover, physicians-in-training do not receive formal medical training related to recommending MMJ or managing its use.¹⁰⁻¹² A survey of medical residents and fellows found that 84.9% of medical schools or residency programs provided no education on the topic and a majority (76.8%) reported not at all or slightly being able to answer patient questions about marijuana.¹² While the absence of such training is noticeable among physicians in general,¹³ it is far more important within physicians specifically engaged in MMJ practice. The absence of clinical guidelines and the limited evidence on the risk-benefit and treatment modalities of MMJ is a cause for concern for both physicians and patients.^{10,11,14,15} There have also been concerns surrounding the lack of communication between MMJ physicians and primary care physicians (PCPs), which can expose patients to potential marijuana-drug interactions and other safety risks.¹⁶

Due to the lack of formal clinical guidelines, minimal training required, and the lack of a robust evidence base to guide MMJ practice, there is limited information available on how physicians form their decisions when certifying and counseling MMJ patients, conduct assessments, communicate with patients, or make specific treatment

recommendations. Moreover, previous MMJ-related surveys have been conducted on physicians and other health providers in general, but none has explicitly focused on qualified MMJ physicians. Understanding MMJ physicians' clinical decision-making approaches in the absence of sufficient evidence and their priorities for enhanced training is crucial to guide clinical research and training.

In this study, we surveyed MMJ physicians in Florida to determine: (1) the sources of information they used to learn about MMJ, (2) factors influencing their MMJ recommendations, (3) their clinical practices in patient assessment, communication, and MMJ recommendations, and (4) priorities for additional training, and preferred training modes.

Methods

We conducted a state-wide anonymous survey of qualified MMJ physicians in Florida from June 1st to October 6th, 2020. The survey was developed and disseminated by the Consortium for Medical Marijuana Clinical Outcomes Research, a state-of-Florida-funded Consortium of nine universities charged with the conduct and dissemination of MMJ clinical outcomes research.¹⁷ The study procedures were approved by the Institutional Review Board at the University of Florida (IRB202000207) and conducted per the Strengthening the Reporting of Observational Studies in Epidemiology guidelines (See Supplemental File 1).¹⁸

Study Population and Survey Distribution

We sought to survey only physicians who issued patient certification for MMJ in Florida within the previous 12 months. There were 2663 qualified physicians registered at the Florida Office of Medical Marijuana Use on March 1st, 2020,¹⁹ of whom 1634 issued patient certification in Florida within the previous 12 months.^{19,20} We provided a list containing the 1634 identified physicians' state license numbers, full names, professions, cities, and county names to DMD Marketing Corp. (a physician information database vendor)²¹ who linked the list to the American Medical Association Masterfile Physicians database²² and retrieved contact information. The vendor distributed the survey to the identified physicians by email on June 1st, 2020, and by regular mail on June 5th, 2020, and sent invitation reminders on June 8th, 2020. All MMJ physicians who participated received a \$40 Amazon gift card as compensation.

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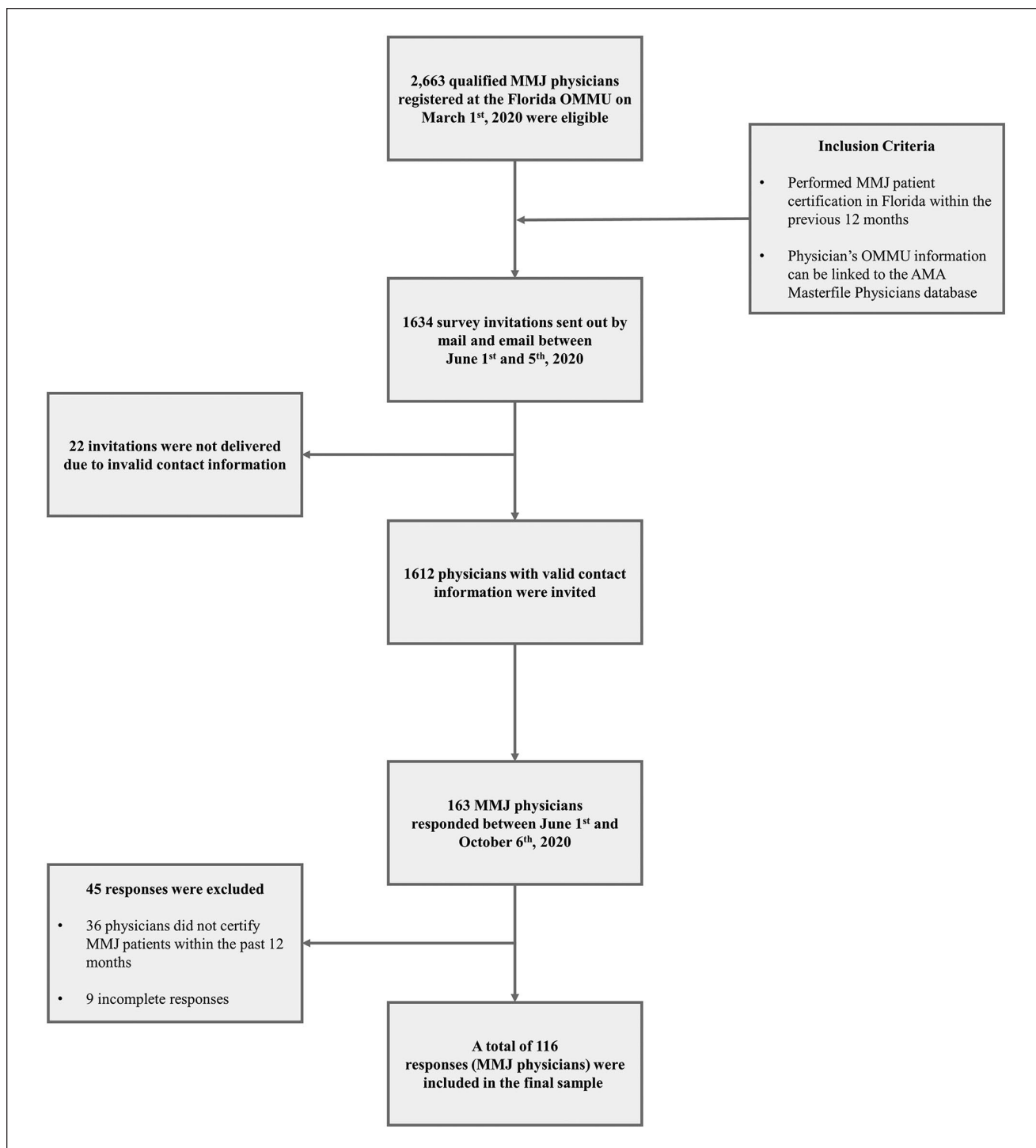


Figure 1. Study sample flow chart.

Abbreviations: AMA, American Medical Association; MMJ, Medical Marijuana; OMMU, Office of Medical Marijuana Use.

Twenty-two invitations were not delivered due to invalid contact information. A total of 163 physicians responded to the survey (10.1% response rate, with valid contact information as the denominator ($n=1612$) between June 1st, 2020 to October 6th, 2020. Of those, 36 physicians

indicated not certifying patients within the past 12 months and 9 provided incomplete responses and were excluded from the analysis. A total of 116 responses (7.2%) from the contacted MMJ physicians were included in the final sample (Figure 1).

Survey Measures

A team of investigators from the University of Florida and Florida Gulf Coast University developed and updated the survey questionnaire using input from a pilot study's results previously conducted on 26 certifying MMJ physicians and 20 other individuals, including MMJ dispensary employees, patients, and researchers at the American Medical Marijuana Physicians Association Conference in October 2019. Finding the optimal dose, choosing the appropriate products, understanding MMJ and other drug interactions, and receiving more clinical training related to the risks and benefits of MMJ use were major concerns among respondents,²³ and questions related to them were included in the current survey. Based on the results of this pilot study, 29 items were included and then revised based on input and pilot testing from 5 other qualified Florida MMJ physicians. In this study, we included responses to 15 questions related to characteristics of the MMJ physicians and their practice setting, MMJ-related education and training needs, and practices related to their MMJ recommendations, patient assessment, and communications. The full survey is provided in Supplemental File 2. Specific survey questions that were used to assess the study measures and the response options are included in the results' tables.

Study Measures

Physician characteristics. Surveyed characteristics of physicians and their practices included sociodemographic information, medical specialty, type of medical practice, and details on the MMJ-related practice.

Information sources used to learn about MMJ. Physicians were provided with a list of possible information sources and were asked to indicate the utilization and perceived usefulness of each source.

Factors influencing MMJ recommendations. Physicians were asked to rate the influence of a list of prespecified patient factors on specific MMJ recommendations for their patients on a 4-point Likert scale.

Clinical practices in patient assessment, communications, and MMJ recommendations. Physicians were asked to rate the frequency of specific practices, including the performance of physical exam, communication with patients' PCP or referring doctor, inquiry about specific products patients received from MMJ dispensaries, counseling on possible drug interactions, review of outside medical records, and screening for cannabis use disorder (CUD). Physicians were then asked to report how often they provide their patients with information about specific MMJ products, educational information about the endocannabinoid system,

a list of recommended websites about MMJ, specific Δ -9-tetrahydrocannabinol (THC) to cannabidiol (CBD) ratio recommendations, specific THC and CBD dosing recommendations or RoAs, and specific MMJ Treatment Clinics or dispensaries recommendations.

Priorities for additional training and preferred training modes. Two questions were used to assess physician perceived priorities about additional training related to MMJ. Physicians were asked to indicate the likelihood of participating in a selection of educational outlets. They were then asked to select the MMJ-related topics they would be most interested in to receive additional training on, including advantages and disadvantages of specific dosage forms, comparison of products available in different dispensaries, drug interactions with MMJ, the endocannabinoid system, management of specific medical conditions or symptoms, identification and management of CUD, THC, and CBD doses and ratios for patients, phytocannabinoids and terpenes, strategies to help patients reduce their use of opioids or other drugs, updates on research findings, and safety of MMJ use.

Statistical Analysis

Emailed surveys were entered by respondents directly into REDCap, while mailed surveys were entered into REDCap by 2 independent research assistants (double-data entry). We used descriptive statistics to report the proportion of respondents choosing specific responses. Data management and analysis were performed using SAS version 9.4 (SAS Institute Inc, Cary, NC). The frequencies of the responses "often" and "always" were aggregated and reported in the text, and the total number of physicians who responded to each question is provided in the results tables.

Results

A total of 116 responses of MMJ physicians from 29 Florida counties were included in the analysis. The mean and standard deviation (SD) age of respondents was 57 (12) years, 70% (n=81) were males, and the majority (n=92, 81%) had practiced both MMJ and traditional medicine in the last 12 months (Table 1).

Information Sources Used to Learn About MMJ

Research articles were the most frequently used source (n=102, 95%) to learn about MMJ, followed by online sources (n=99, 93%), discussions with other MMJ providers (n=84, 90%), and dispensary staff (n=84, 90%). Notably, 66 (62%) and 39 (38%) physicians learned from magazines or personal experience with MMJ, respectively

Table 1. Baseline Characteristics of Survey Respondents (n = 116).

Baseline characteristic of survey respondents	N (%)
Age, mean (SD)	57 (12)
Gender, male	81 (70)
Type of medical practice in the last 12 months	
Medical marijuana only	21 (19)
Both medical marijuana and traditional medical practice	92 (81)
Type of medical marijuana practice type	
Owner or co-owner of the practice	58 (51)
Salaried employee or independent contractor	52 (46)
Other	4 (3)
Number of years in certifying medical marijuana in Florida	
< 1 year	19 (17)
1-2 years	52 (45)
3-4 years	43 (38)
Number of hours per week dedicated to marijuana certifications and counseling	
<5 h	41 (36)
5-9 h	27 (24)
10-19 h	23 (20)
20-29 h	17 (15)
30-40 h	4 (4)
>40 h	2 (2)
Number of patients seen per week for marijuana certification	
< 10 patients	58 (51)
10-34 patients	37 (32)
35-59 patients	10 (9)
60-85 patients	6 (5)
>85 patients	3 (3)
Medical specialty*	
Family practice	41 (35)
Internal medicine	19 (16)
Pain specialist	12 (10)
Emergency medicine	10 (9)
Anesthesiology	7 (6)
Obstetrics and gynecology	6 (5)
Neurology	5 (4)
Pediatrics	5 (4)
Oncology	3 (3)
Psychiatry	3 (3)
General surgery	2 (2)
Preventive medicine	2 (2)
Integrative medicine	2 (2)
Other†	13 (11)

Abbreviations: N, number; SD, standard deviation.

Percent values represent column percent and are approximated to the nearest integer.

*Medical specialties are not mutually exclusive; hence the numbers do not add to 100%.

†Other specialties included: addiction medicine, allergy and clinical immunology, general practice, hospital medicine, ophthalmology, orthopedics, otolaryngology, physical medicine and rehabilitation, plastic surgery, radiology, regenerative medicine, sports medicine, urology.

(Table 2). Overall, all learning sources were mostly ranked as “useful” or “very useful” by those who used them.

Factors Influencing MMJ Recommendations

Of the factors influencing patient recommendations, safety concerns were chosen by most physicians as being most influential (n=39, 39%), followed by specific conditions (n=30, 31%) and patient preferences (n=26, 30%) (Table 3). However, all factors had an “influence” for the majority of responding physicians (46%-63%), though a small proportion at varying rates also reported that the suggested factors, including age, the specific conditions, a patient’s occupation or responsibility, or safety concerns did not influence their recommendations.

Clinical Practices in Patient Assessment, Communications, and MMJ Recommendations

Ninety-three physicians (92%) reported that they “often” or “always” perform a physical exam for patients receiving MMJ, 87 (86%) “often” or “always” reviewed outside medical records, and 76 (76%) “often” or “always” informed their patients about drug interactions (Table 4). About two thirds of physicians (n=65, 64%) “often” or “always” screened for CUD. On the other hand, 36 (36%) of physicians “sometimes” communicated with a patient’s PCP or referring doctor, 24 (24%) “rarely” communicated, and 12 (12%) “never” communicated.

Recommendations of specific routes of administration were “often” or “always” provided by 84 (77 %) physicians, while 77 (70%) “often” or “always” provided information about the endocannabinoid system, and 74 (66%) provided information about specific MMJ products. Half (n=56, 50%) “often” or “always” provided specific recommendations for THC: CBD ratios, while 69 (62%) “often” or “always” provided specific dose recommendations. Recommendations of specific dispensaries were uncommon (27 (24%) of responses indicating “often” or “always”).

Priorities for Additional Training and Preferred Training Modes

Online learning/training modules were the most popular future training opportunities among responding physicians, with 88 (84%) reporting that they would be likely or very likely to participate, followed by single-day clinical education conferences (n=79, 75%) (Table 5). MMJ research conferences (63%) and multi-day clinical education conferences were less popular (45%). The top 3 topics of interest for additional training were (1) drug interactions with MMJ, with 84 (72%) respondents identifying this as the topic they would be most interested in, (2) evidence for the

Table 2. Physician-Reported Information Sources to Learn About Medical Marijuana and Their Usefulness (n = 116).

Source to learn about medical marijuana	How useful were the sources? N (%)			
	Yes, N (%) [*]	Not very useful, N (%) [†]	Useful, N (%) [†]	Very useful, N (%) [†]
Research articles	102 (95)	3 (3)	51 (50)	48 (47)
Online sources (websites, videos, etc.)	99 (93)	1 (1)	55 (56)	42 (43)
Discussions with other medical marijuana providers	90 (84)	4 (5)	47 (52)	39 (43)
Staff from dispensaries (sales representatives, etc.)	90 (84)	8 (9)	57 (64)	24 (27)
Conferences with marijuana-related content	78 (73)	3 (4)	36 (46)	39 (50)
Books	71 (67)	4 (6)	47 (66)	20 (28)
Magazines about marijuana	66 (62)	9 (14)	48 (74)	8 (12)
Personal experience with medical marijuana	39 (38)	2 (5)	20 (51)	17 (44)

All percent values are approximated to the nearest integer.

^{*}Percent values represent the proportion of physicians who used the learning sources with the total sample in the denominator.

[†]Percent values represent row percent, with the number of physicians using a certain information source in the denominator.

Table 3. Physician-Reported Factors Influencing Medical Marijuana Recommendations.

Question: How much does each of the following influence your specific medical marijuana recommendation (eg, type of product, dose, etc.) for your patients in general?

Factor	No influence, N (%)	Somewhat influence, N (%)	Influence, N (%)	Most influence, N (%)	Total N [*]
Safety concern	4 (4)	8 (8)	49 (49)	39 (39)	100
Specific condition	5 (5)	14 (14)	50 (51)	30 (31)	97
Patient's preference	1 (1)	15 (17)	45 (52)	26 (30)	87
Occupation/responsibilities	7 (7)	24 (24)	45 (46)	22 (23)	98
Comorbidities	2 (2)	15 (15)	61 (63)	19 (20)	97
Medication use	3 (3)	18 (18)	58 (58)	21 (21)	100
Age	6 (6)	25 (26)	55 (56)	12 (12)	98

All Row percent values are approximated to the nearest integer.

^{*}Total number of physicians who responded to each question.

management of specific medical conditions or symptoms (n = 83, 72%), and (3) strategies to help patients reduce their use of opioids or other drugs (n = 78, 67%) (Table 6). Identification and management of CUD was the least rated topic of interest (n = 58, 50%).

Discussion

We conducted a state-wide survey on physicians certifying MMJ in Florida to determine their information sources about MMJ, clinical practices involved in patient assessments, communications, and MMJ recommendations, and additional training preferences. Several previous surveys have been conducted among different types of providers^{12,13,16,24-26}; however, to our knowledge, this is the first survey that specifically targets physicians who certify patients for MMJ use in the US. Responses revealed several

key findings regarding current practices and priorities for additional evidence and training.

Information Sources Used to Learn About MMJ

In our sample, physicians ranked research articles as the most frequently considered source to inform their MMJ practice, followed by online sources. This finding is surprising, given that there are very few research articles providing information relevant to specific doses, delivery methods, or conditions, other than for the few federally approved products, like Epidiolex[®] and Marinol[®].^{5,6} However, both discussions with other MMJ providers and dispensary staff were also highly ranked, highlighting the importance of anecdotal evidence in MMJ practice, which seems in contrast to the widely adopted paradigm of evidence-based medicine. This finding highlights that available evidence

Table 4. Physician-Reported Frequency of Clinical Practices in Patient Assessment, Communications, and Medical Marijuana Recommendations.

	Never, N (%)	Rarely, N (%)	Sometimes, N (%)	Often, N (%)	Always, N (%)	Total N*
Question: In the past 12 months, how often did you provide/perform the following for patients receiving medical marijuana (for the first time as a new patient/as a returning patient)?						
Do a physical exam	1 (1)	3 (3)	4 (4)	20 (20)	73 (72)	101
Review outside medical records	1 (1)	3 (3)	10 (10)	29 (29)	58 (57)	101
Inform them of possible drug interactions	3 (3)	4 (4)	18 (18)	35 (35)	41 (41)	101
Screen for Cannabis use disorder	4 (4)	13 (13)	19 (19)	24 (24)	41 (40)	101
Find out the specific products that my patients received from dispensaries	3 (3)	11 (11)	15 (15)	40 (39)	32 (32)	101
Communicate with patient's primary care physician or referring doctor	12 (12)	24 (24)	36 (36)	11 (11)	18 (18)	101
Question: How often do you provide the following information or specific recommendations to your patients?						
I recommend specific routes of administration	4 (4)	3 (3)	19 (17)	38 (35)	46 (42)	110
Educational information about the endocannabinoid system	2 (2)	10 (9)	22 (20)	42 (38)	35 (32)	111
Information about specific medical marijuana products	5 (5)	7 (6)	25 (23)	37 (33)	37 (33)	111
I recommend specific CBD and THC dosages (mg)	6 (5)	11 (10)	25 (23)	37 (33)	32 (29)	111
I recommend a specific THC:CBD ratio	4 (4)	12 (11)	39 (35)	30 (27)	26 (23)	111
List of recommended websites about medical marijuana	7 (6)	20 (18)	34 (31)	21 (19)	29 (26)	111
I recommend specific dispensaries (MMTCs)	27 (25)	16 (15)	40 (36)	17 (15)	10 (9)	110

Abbreviations: CBD, cannabidiol; MMTC, medical marijuana treatment clinics; THC, Δ -9-tetrahydrocannabinol.

All row percent values are approximated to the nearest integer.

*Total number of physicians who responded to each question.

Table 5. Physician-Reported Preferences for Modes of Medical Marijuana Training.

	Very unlikely, N (%)	Unlikely, N (%)	Not sure, N (%)	Likely, N (%)	Very likely, N (%)	Total N*
Please indicate the likelihood that you would participate in the following learning opportunities about medical marijuana in the next 12 months.						
Learning opportunity						
Online learning/training modules	3 (3)	1 (1)	13 (12)	46 (44)	42 (40)	105
Clinical education conference (single day)	5 (5)	3 (3)	18 (17)	45 (43)	34 (32)	105
Medical marijuana research conference	7 (7)	10 (9)	22 (21)	41 (39)	25 (24)	105
Clinical education conference (multiple days)	12 (11)	14 (13)	31 (30)	27 (26)	20 (19)	104

All row percent values are approximated to the nearest integer.

*Total number of physicians who responded to each question.

related to MMJ efficacy and safety remains limited and may be insufficient to guide clinical decisions.²⁷ Online sources, such as websites, videos, and magazines, with varying degrees of objectivity and bias, were rated by most respondents as a useful or very useful information source. However, making recommendations to patients based on these sources is subject to the biased influence of marketing and pro-cannabis information, especially with the wide variability of available cannabis products, emphasizing the need for more scientifically based training infrastructure to facilitate evidence-based approaches in MMJ care. Interestingly, most physicians with personal MMJ experience found it to be a useful or very useful learning

source. This may be related to first-hand experiences of dosing MMJ to achieve a certain symptom relief level, experimenting with different MMJ products and RoAs, and body effects (both wanted and unwanted).

Factors Influencing MMJ Recommendations

Even though the level of evidence to inform MMJ-related clinical decisions may be suboptimal, most physicians considered the provided factors as highly or most influential on their MMJ recommendations. However, between a quarter and a fifth reported that age, comorbidities, medication use, occupation/responsibilities, safety, and specific conditions

Table 6. Physician-Reported Priorities for Additional Training (n = 116).

Question: If you did attend a conference or do online training modules, please check the topics below that you would be most interested in.

Topic	N (%) [*]
Drug-drug interactions with medical marijuana	84 (72)
Evidence for management of specific medical conditions or symptoms	83 (72)
Strategies to help patients reduce their use of opioids or other drugs	78 (67)
Updates on research findings	76 (66)
Advantages and disadvantages of specific modes of delivery (eg, vape, tincture)	76 (66)
Information about the effect of different phytocannabinoids and terpenes	77 (66)
Information about how to best recommend doses and ratios for patients	70 (60)
Educational information about the endocannabinoid system	66 (57)
Safety of medical marijuana use	59 (51)
Comparison of products available in different dispensaries	59 (51)
Identification and management of cannabis use disorder	58 (50)

All percent values are approximated to the nearest integer.

^{*}Number of physicians who voted for each topic.

had limited influence on clinical decisions when recommending MMJ, suggesting that certifications for MMJ are perhaps not always approached as a component of a more comprehensive treatment plan.

Clinical Practices in Patient Assessment, Communication, and MMJ Recommendations

Practices to gather information about such factors varied more distinctly across respondents. Only a minority (29%) of physicians reported to often or always communicate with PCPs or referring physicians, which mirrors previous findings showing a need for better familiarization of general physicians with MMJ programs and the MMJ use status of their patients.^{10,24} Similar concerns arise from inconsistencies related to the physicians' knowledge of specific products patients receive from dispensaries, communication with patients regarding possible drug interactions, review of outside medical records, and screening for CUD. The lack of communication with patients regarding potential adverse effects or drug interactions may result in exposing patients to serious preventable risks, including alterations in mental status, psychiatric side effects, being at risk of motor vehicle accidents,²⁸ bleeding, and reduced efficacy of medications.²⁹ Communication with patients and their PCPs is essential, especially in patients with concurrent underlying conditions who receive other medications.³⁰ Given that the current evidence is scarce, communicating potential risks to patients will likely remain a major challenge in the foreseeable future.³¹

Finally, while Florida law requires qualified physicians to perform a physical examination while being "physically present in the same room as the patient" and to conduct a full assessment of the patient's medical history before

issuing a certification,³² only 72% of responding physicians always performed a physical exam for their patients in the last 12 months, and 1% never performs an exam. This practice may be concerning, especially for patients with severe health conditions that could be detected during physical examination.^{33,34} It is noteworthy that we conducted the survey during the Coronavirus Disease 2019 (COVID-19) pandemic when qualified physicians were allowed to use telemedicine for recertifications of already-existing patients.³⁵ However, as assessing the pandemic's impact was not in the survey's scope, we do not know how much of the physicians' responses can be attributed to the pandemic and its subsequent regulatory changes.

The contrast between current MMJ and traditional medical practice was also evident when considering patients' recommendations. While an allopathic prescription will include precise yet adaptive recommendations with detail on specific doses, routes, and product types, approaches with MMJ seem more experimental. With MMJ, finding an effective dose for successful therapeutic intervention is challenging. As most MMJ is distributed in plant form (flower), the levels of active cannabinoids, mainly THC and CBD, can vary substantially, making adequate dose recommendations difficult.³⁶ Furthermore, MMJ with different THC: CBD ratios can subsequently enhance varying physiological and neurological effects,³⁷ adding another layer of complexity to MMJ dosing, which is reflected in our findings regarding physicians' practices. Moreover, our data showed that 84% of physicians indicated learning about MMJ from dispensary staff and sales representatives, which might have influenced their product and dose recommendations. These practical challenges, in addition to lacking research that evaluates the risk-benefit of specific doses and routes of standardized products, poses significant

challenges to both physicians and patients, as inconsistent therapeutic approaches using a variety of products can result in unpredictable adverse events.³⁸⁻⁴⁰ The complexity and wide variability of MMJ products has also extended to other healthcare providers; for example, a previous survey demonstrated that 53% and 38% of pharmacists reported they had no knowledge or very little knowledge, respectively, about the different types/forms of MMJ products.²⁵ However, involving pharmacists in MMJ prescriptions might help avoid potential drug interactions. In states like Arkansas, MMJ legislation requires all dispensaries to appoint a licensed pharmacist consultant, whose responsibilities include training dispensary staff, preparation of educational patient materials, and patient counseling.⁴¹

The development of trustworthy clinical guidelines typically takes several years, involves several stakeholders (eg, patients, clinicians, and methodologists), and aims to produce explicit recommendations for clinical decision-making based on the best available evidence.^{42,43} In order to identify high-quality evidence, a comprehensive literature search and review is conducted and critical appraisal for quality of evidence,⁴⁴ while available scientific evidence and expert testimonies are debated, and informal or formal consensus methods are used to draft recommendations that other stakeholders further review before the guideline is finalized and published.^{42,43} Nevertheless, in the absence of robust evidence regarding the effects of MMJ due to federal restrictions on its research, establishing similar guidelines for MMJ-related clinical practices and recommendations is far beyond being accomplished.²⁷

Priorities for Additional Training and Preferred Training Modes

As marijuana continues to be legalized, both medically and recreationally, we are entering a new era of modernized medicine where MMJ is being explored as a therapeutic agent for various medical conditions. Consistent with previous studies conducted on physicians in general,^{24,26,45} our findings show that even qualified MMJ physicians perceive a pronounced need for additional training. Our findings showed that most MMJ physicians are interested in participating in additional educational opportunities related to MMJ, especially easily accessible online learning and training modules that offer flexibility in scheduling within a busy clinical practice. Consistent with previous findings in surveyed PCPs and pharmacists,^{13,25} the most frequently selected topic for additional training was drug interactions with MMJ, followed by evidence to manage specific medical conditions or symptoms. However, other topics related to safety and strategies in managing patients were ranked highly as well. These findings reflect the need to implement clinically focused training programs and establish evidence-based clinical guidelines for physicians seeking to certify

and manage MMJ patients. It also emphasizes the need to incorporate MMJ education into general medical education curricula as the number of patients using MMJ increases.

Limitations

Although we conducted a state-wide survey, the response rate (7.2%) was relatively low. We conducted the survey between June and October 2020, during one of the COVID-19 pandemic peaks in Florida,⁴⁶ which might have affected the response in our survey, especially that our sample included physicians. It is possible, however, that other individual-level factors such as lack of time, especially for MMJ physicians whose time is split between working at MMJ practice and another practice, and the possibility that some physicians had different contact information than what is available in the American Medical Association database, especially those who have switched to primarily working in MMJ, may have also contributed to the low response rate. Yet, this is the largest number of surveyed MMJ physicians to date. However, we received responses from physicians covering 29 counties (from a total of 34 counties with qualified physicians), and 26 different medical specialties, that covered all those considered to be among the top 5 specialties with the highest number of certifications including specific qualifying conditions.²⁰ Moreover, the percentage of physicians seeing a certain number of patients per week (58 (51%) see <10 patients, 47 (41%) see 10-59 patients, and 9 (8%) see >60 patients) are consistent with the patterns revealed by the Physician Certification Pattern Review-2021 Annual Report where 50% to 59% of MMJ physicians certified 1 to 49 patients, 37% to 41% certified 50 to 999 patients, and 4% to 9% certified >1000 patients in the preceding year (2019-2020).²⁰ No data was available on the demographic characteristics of qualified physicians in Florida; thus, we could not make inferences on the representativeness of our sample by age, gender, or race/ethnicity of Florida's qualified physicians. Also, our study is subject to bias related to self-report (eg, social desirability, enthusiasm about MMJ), although the anonymous nature of the study was intended to minimize it. Nevertheless, this study yielded important information regarding perceived MMJ physicians' knowledge, practices, and training needs, not assessed in previous research.

Conclusion

Current practices of physicians certifying MMJ in Florida rely on a blend of information sources that supplement the insufficient available primary evidence on risk-benefit with anecdotal reports. While respondents report that clinical factors are influential, practices in patient assessment vary. Recommendations for MMJ use oftentimes rely on experimental approaches. As more research becomes

available, training based on scientific evidence is needed, especially regarding drug interactions, risk-benefit of treatment for specific clinical conditions, and specific treatment regimens.

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Availability of Data and Materials

The dataset used and analyzed during the current study is available from the corresponding author upon reasonable request.

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Supplemental Material

Supplemental material for this article is available online.

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