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Pharmacists' Perceptions and Knowledge of the Legalization of Medical Marijuana in Mississippi

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By

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ABSTRACT

The legalization of medical cannabis in Mississippi was a debated topic among all citizens. This thesis specifically explored pharmacists' perceptions and knowledge as medical professionals who will be involved with patients certified to use medical cannabis. Information was gathered using a voluntary online survey on the Qualtrics platform to produce a cross-sectional, descriptive study.

From the information gathered, it was apparent that pharmacists in Mississippi have varying opinions regarding medical marijuana. Some are in favor of using these products, and some are not. However, as cannabis has been officially accepted and put into patient's medical plans both current and future pharmacists have the professional duty to be educated on all aspects of this emerging drug so as to serve patients with the best care possible.

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BACKGROUND

History of Medical Cannabis

Medical marijuana has been a subject of much discussion and debate for many years in the United States. It made its first appearance medically in the 1850s and was used in patented medicine and supported by the *United States Pharmacopoeia*, a convention of a variety of medical professionals, until the early 20th century (Bridgeman & Abazia, 2017). In the 1930s, many Mexicans immigrated to the United States and brought with them the tradition of smoking marijuana recreationally. This led to a scrutinizing of cannabis use in the United States, which ultimately brought about the first federal restriction of cannabis use and sale in 1937 in the Marihuana Tax Act (LibGuides: Survey of Marijuana Law in the United States: History of Marijuana Regulation in the United States, 2016).

There were many pieces of legislation that followed this act, including the 1951 Boggs Act, the 1956 Narcotics Control Act, and the 1970 Controlled Substances Act. These laws first increased the penalties for possession in the 1950s, leading to a complete prohibition of the use of cannabis in 1970 (Bridgeman & Abazia, 2017). Under the Controlled Substances Act (CSA), marijuana remains classified as a Schedule I substance. The substances that fall under the Schedule I classification have a high potential for abuse, no currently accepted medical use for treatment in the United States, and a lack of accepted safety for use under medical supervision (Drug Scheduling, 2018). This is the current condition of federal laws pertaining to cannabis.

However, there are many states that have differed from these laws. California was the first among many when in 1996 they legalized the use of cannabis for medicinal purposes. Just as it has always been, there are many different opinions about cannabis, and states have different ideas about how or even if it should be used. Eighteen states have allowed the use of cannabis for both medical and adult recreational purposes. Nineteen states only permit marijuana to be used medicinally. Eleven states authorize low amounts of tetrahydrocannabinol (THC) or cannabidiol (CBD) oil to be used, but anything beyond the authorized limit is prohibited. There are now only two states, Idaho and Nebraska, where marijuana is completely illegal (National Conference of State Legislatures: State Medical Cannabis Laws, 2022).

It seems as though these states should not have the authority to override the federal government's policy; however, at the beginning of our nation, the Founding Fathers knew that too strong of a central government would not benefit the country. Citizens of our newly formed nation did not want another kingship. Government was designed to be stronger the more localized it was, thus investing greater power in cities and states and less power in the federal government. Other legislation has reflected this pattern in regard to marijuana laws. In 2009, the Obama administration submitted a memo to the United States Department of Justice (USDOJ) encouraging them not to prosecute individuals who sold cannabis for medical purposes in states that allowed the use of medical marijuana. Then in 2013, the USDOJ announced that they would not enforce the federal law in states that had legalized the use of the plant. Eight prioritization areas were laid out in which the USDOJ would prosecute:

1. Distribution to minors

2. Revenue to criminal enterprise-gangs, cartels, etc.
3. Sale over state lines
4. Drug trafficking
5. Violence, firearms related to cultivation and sale of marijuana
6. Drugged driving or other actions with public health consequences
7. Growing of marijuana on public lands
8. Possession or use on federal property (Cole, 2013)

Then, in 2014, an amendment that had been introduced repeatedly since 2001 was passed: the Rohrabacher-Farr Amendment. This amendment prohibited the Justice Department from spending funds to interfere with the implementation of state medical cannabis laws. However, the amendment does not change the legal status of cannabis and must be renewed each fiscal year in order to remain in effect.

Mississippi Medical Cannabis

Mississippi has had a fascinating history with regard to medical marijuana. Harper Grace's Law (House Bill 1231) was the first cannabis-related law passed by the Mississippi Legislature in 2014. With the passing of this bill, CBD oil was able to be prescribed for those with specific debilitating epileptic conditions. The bill laid out some guidelines for safety. It mandated that CBD oil must be tested by the National Center for Natural Products Research at the University of Mississippi and be dispensed by the Department of Pharmacy Services at the University of Mississippi Medical Center. Under the bill, CBD oil was limited to containing no more than 0.5% THC, “the primary psychoactive cannabinoid extracted from the cannabis (marijuana) plant.” (Terence Ng;

Vikas Gupta., 2022). Then, in 2017, the legislature passed Senate Bill 2610, which revised the 2014 law and allowed CBD oil to be dispensed by different pharmacies or laboratories as long as they are "under appropriate federal and state regulatory approvals and registrations." (Harkins et al., 2017)

Many other bills about medical marijuana were proposed by legislators in Mississippi, but they were usually quietly sent to a committee, never to see time on the floor. To break this cycle another approach was taken by legislators. An initiative was proposed to change the state of Mississippi's constitution. Initiatives require a certain number of signatures of citizens to show that there is enough interest to make a change. When enough signatures are collected, the initiative is proposed and voted on by all the citizens in the state. The legislature can propose its own alternative to the original, and this was exactly what happened in Mississippi. On the ballot presented to people across the state were Initiative 65, sponsored by Ms. Ashley Ann Durval and the Legislature's Alternative 65A. There were slight differences between the two, with the legislature's alternative being more restrictive (Initiative 65 & 65A, 2022).

Mississippians across the state voted on whether or not to allow medical marijuana and then if they did want it which initiative to enact. Sixty-nine percent of Mississippi voters cast their ballots in favor of enacting a medical cannabis program. On that same ballot, 74% voted for Initiative 65 while rejecting Initiative 65A. When this passed in November, many thought this was the end of the debate; medical cannabis was now part of Mississippi law. However, this was not the case. In October, before the vote, the mayor of the city of Madison had filed a lawsuit against Initiative 65 in the Mississippi Supreme Court (Ballotpedia, 2022). The City of Madison pointed to a part of

the state constitution that had to do with the ballot initiative process. The constitution says, "The signatures of the qualified electors from any congressional district shall not exceed one-fifth (1/5) of the total number of signatures required to qualify an initiative petition for placement upon the ballot." (State of Mississippi Constitution). In 2003, because the population did not grow as much as other states, Mississippi's congressional districts were reduced from five to four (Harrison, 2021), and this section has not been updated to reflect that fact. The city argued that it was mathematically impossible to meet the requirements laid out in the constitution. The Mississippi Supreme Court agreed and ruled in favor of the City of Madison. This not only rendered Initiative 65 null and void but all ballot initiatives since Mississippi dropped to four congressional districts.

Many people were upset that the initiative was struck down on such a technicality when it seemed as though most citizens were in favor of marijuana legalization for medicinal purposes (Ballotpedia, 2022). This setback gave more time and room for discussion. The Mississippi legislature proposed a new bill that expands the conditions under which people are able to be certified for medical marijuana use; it also allows cities and counties that did not want anything to do with this industry to opt out. There are many changes from Initiative 65 in this new legislation, some expansive and some restrictive. This new legislation, Senate Bill 2095, was passed quite easily through the House and the Senate with votes 46-6 and 104-13, respectively. It was signed into law by the governor on February 2, 2022.

Latest Federal Initiatives

As different states have been debating and enacting new legislation concerning cannabis, other debates and new legislation have occurred at the federal level. On April 1, 2022, the Marijuana Opportunity Reinvestment and Expungement Act, or the MORE Act, was passed by the U.S. House of Representatives and sent to the Senate. This legislation removes marijuana from the list of scheduled substances under the Controlled Substances Act and eliminates criminal penalties for any individual who manufactures, distributes, or possesses marijuana. It would make provision for the reviewing of cases for those currently in prison for violation of federal laws concerning marijuana. The sponsor of the bill is Representative Jerrold Nadler, a Democrat from New York. It is neither his first time introducing this bill nor the first time it has passed the House, but it has thus far failed in the Senate and this time was no exception (Congress.gov, 2023).

Those in favor of using marijuana for medicinal purposes have raised the suggestion of moving marijuana from a Schedule I to a Schedule II substance. The United States Drug Enforcement Administration defines Schedule II to be “drugs with a high potential for abuse, with use potentially leading to severe psychological or physical dependence” (DEA, 2018). Some examples of substances that are in Schedule II are morphine, opium, codeine, and hydrocodone all of which are used in a medical setting. An advantage of moving marijuana from Schedule I to Schedule II would be to allow medical research to be performed while still being careful of its distribution. Because of its current federal standing as a Schedule I substance, little clinical research has been done on marijuana (Cooper et al., 2021). Therefore, this substance should not be rashly released to the public, but instead, just as with any other drug, careful testing should be

conducted to ascertain effective dosing, potential drug interactions, safety, dependence, and a host of other factors. When Connecticut made marijuana legal for medical use, this is the measure they used, i.e., switching it from a Schedule I substance to a Schedule II substance (Connecticut HB 5389, 2012). This measure would meet with less resistance and allow for marijuana to be explored for useful medical applications.

Pharmacist Involvement in Medical Cannabis

Interestingly, the Mississippi medical cannabis legislation makes no mention of pharmacists and the role they will play in the dispensing of medical cannabis. In the first law made regarding CBD oil, it was expressly mandated that the oil was only to be dispensed by the Department of Pharmacy Services at the University of Mississippi Medical Center. Later, when this law was revised, CBD oil could be dispensed by additional pharmacies or laboratories as long as they are "under appropriate federal and state regulatory approvals and registrations" (MS Code § 41-29-136, 2017).

Other states have had pharmacists in different roles as they are exploring the use of medical cannabis. Connecticut, Minnesota, and Arkansas, for example, have placed pharmacists in or near dispensaries. Pharmacists are best suited for this role because they specialize in what effect medicines have on the body and on each other (e.g., drug interactions, etc.).

Every state handles how, or if, pharmacists are involved differently. Connecticut was the first state to require that pharmacists be involved in the dispensing of medical cannabis. Their pharmacists have been shaping the treatment pathways for patients, maintaining quality, managing dosage, requiring better, clearer, and more consistent labeling from

producers, and are impacting many other aspects of the process. Minnesota, like Connecticut, has its pharmacists very involved in the dispensing process. In fact, only pharmacists can dispense cannabis. The pharmacists control the amount of THC and CBD in the cannabis given to patients and create treatment plans with patients. Arkansas, on the other hand, only requires that every dispensary must have a pharmacist as a consultant. The pharmacist is required to develop training for other dispensary agents once yearly involving patient information, how to identify substance abuse, and how to refuse to dispense cannabis to a patient on the grounds of suspected substance abuse.

Other countries have varied approaches to medical cannabis. Canada has had a medical marijuana law in place since 2001. To obtain medical marijuana, patients must get authorization from a doctor or nurse practitioner and send the authorization to a licensed dispenser. The dispenser then mails the marijuana directly to the patient. The government does not regulate the amounts of THC and CBD in cannabis (Grootendorst, Paul, and Rajivi Ranjithan pg. 10, 2018). Also, prescribers are not required to authorize a certain level of either of these substances for their patients, so it is up to the patient to decide. The Canadian Pharmacists Association (CPhA) has been lobbying for the inclusion of pharmacists in the distribution of medical marijuana. Many patients who use medical cannabis do so in the presence of other drugs. Thus, having a pharmacist to advise regarding drug interactions would be beneficial to these patients. It has also been observed in Canada that most medical marijuana users choose to use marijuana with high levels of THC, the compound connected with a euphoric experience. Regular use of cannabis rich in THC can lead to psychosis, hyperemesis or severe nausea and vomiting, and dependence. Pharmacist-initiated interventions to reduce cannabis harm could be

invaluable. Given the recent legalization of medical marijuana in Mississippi, the objective of this study is to determine pharmacists' perspectives on and knowledge of the legalization of medical marijuana in Mississippi.

METHODS

Design

This study utilized a descriptive, cross-sectional survey produced in the electronic survey platform Qualtrics. The survey was distributed to pharmacists in Mississippi. Institutional Review Board (IRB) exemption was granted by the University of Mississippi before administering this survey.

Sample and Data Collection

Our initial data collection plan was to target around 650 members of the Mississippi Pharmacists Association (MPhA) through the MPhA emailing system to meet the study objectives. However, due to staffing changes at MPhA, data collection was not possible using this method. An IRB amendment was submitted to change data collection procedures to recruitment on Facebook and LinkedIn and through convenience and snowball sampling. On April 3, 2023, recruitment announcements for the survey were posted to a faculty-member account on Facebook and LinkedIn in an effort to recruit University of Mississippi pharmacist alumni who have access to the account. Additionally, the investigator reached out to personal contacts in an effort to increase the sample size through convenience and snowball sampling.

Measures

Validation items: Once data collection was shifted to social media and convenience/snowball sampling, validation items were added to the beginning of the survey and submitted on the IRB amendment to assure the veracity of responses. That being said, the veracity of responses was not entirely a concern due to a lack of incentives

being offered for taking the survey. Validation items included pharmacy school graduated from, year graduated from pharmacy school, and region of Mississippi (North, South, Center) where respondents practice.

Demographic variables: Demographic variables collected in this study included:

1. Age
2. Gender
3. Race
4. Years practicing pharmacy
5. Employment status
6. Highest level of pharmacy education
7. Practice setting
8. Rural/urban classification of practice setting

Measurement variables: Before presenting survey questions that were specific to study objectives (determining pharmacists' perspectives on, and knowledge of, legalization of medical marijuana in Mississippi), a definition of medical marijuana was presented ("What You Can Expect From Medical Marijuana").

Data Management

Data was exported from Qualtrics into an Excel spreadsheet for partial data analysis. Before conducting analysis, incomplete responses were removed from the dataset. For the remaining data analysis, data was imported into Statistical Package for the Social Sciences (SPSS).

Data Analysis

Frequencies, percentages, means, and standard deviations were conducted for categorical and continuous data in order that demographic variables and variables measured meet study objectives.

RESULTS

Response Rate

After utilizing the sampling methods described above, 19 complete responses were received from Mississippi Pharmacists.

Sample Description

The average age of the sample population was 43, with a minimum age of 26 and a maximum age of 76; the standard deviation for the sample age was 15.22. The population consisted of 9 (47.4%) males and 10 (52.6%) females. A total of 16 (84.2%) pharmacists listed themselves as white, whereas 3 (15.8%) listed themselves as non-white. Respondents had been practicing pharmacy from 1 year to 52 years, with a mean of 14.95 and a standard deviation of 15.43. There were 16 (84.2%) full-time pharmacists, 2 (10.5%) part-time or casual pharmacists, and 1 (5.3%) retired or currently unemployed pharmacists. When asked about their highest level of education, 4 (21.1%) said they had a Bachelor of Science degree, 14 (73.7%) said they had a Doctor of Pharmacy degree, and 1 (5.3%) said they had postgraduate training. Respondents came from various practice settings, including 2 (10.5%) from chain pharmacies, 2 (10.5%) from mass merchandiser pharmacies, 3 (15.8%) from independent community pharmacies, 6 (31.6%) from hospital inpatient pharmacies, 1 (5.3%) from hospital outpatient pharmacies, 1 (5.3%) from long-term care pharmacies, 1 (5.3%) from academia, and 3 (15.8%) from other practice settings, including specialty mail order, home infusion pharmacy, and the Mississippi State Department of Health. There were 5 (26.3%) respondents in rural settings, 6 (31.6%) respondents in suburban settings, and 8 (42.1%) respondents in urban settings. Table 1 below outlines sample demographics.

Table 1: Respondent Pharmacist Sample Demographics

Gender	**Number of Respondents (%)**
Male	9 (47.4)
Female	10 (52.6)
Race	**Number of Respondents (%)**
White	16 (84.2)
Non-White	3 (15.8)
Employment Status	**Number of Respondents (%)**
Full-Time	16 (84.2)
Part-Time or Casual	2 (10.5)
Retired or Currently Unemployed	1 (5.3)
Level of Education	**Number of Respondents (%)**
Bachelor of Science	4 (21.1)
Doctor of Pharmacy	14 (73.7)
Post-Graduate Training	1 (5.3)
Practice Setting	**Number of Respondents (%)**
Chain Pharmacy	2 (10.5)
Mass Merchandiser Pharmacy	2 (10.5)
Independent Community Pharmacy	3 (15.8)
Hospital Inpatient Pharmacy	6 (31.6)
Hospital Outpatient Pharmacy	1 (5.3)
Long-Term Care Pharmacy	1 (5.3)
Academia	1 (5.3)
Other	3 (15.8)
Rural/Urban Classification	**Number of Respondents (%)**
Rural	5 (26.3)
Suburban	6 (31.6)
Urban	8 (42.1)

Pharmacists' knowledge about medical cannabis

The knowledge of these pharmacists was tested through basic questions asking what the current schedule classification of marijuana was and what disease states are indicated for medical cannabis usage (Table 2.1). When it came to classification, most of the respondents were able to pick the correct answer; however, the question about indications showed that none of the pharmacists surveyed knew all the disease states that medical cannabis is thought to help with. The top three disease states picked were cancer-related pain, glaucoma, and ALS. All of these are correct but there was no disease state that every pharmacist picked as indicated for by medical cannabis use. This lack of knowledge about some of the basic information about cannabis is not unusual considering the fact that this substance has been illegal for most medical uses in the state of Mississippi until recently (Tables 2.1 and 2.2).

Table 2.1: Respondent Pharmacist Knowledge About Medical Cannabis

Medical cannabis classification		**Number of Respondents (%)**
Schedule I	(correct)	16 (84.2)
Schedule II		1 (5.3)
Schedule III		0
Schedule IV		0
Schedule V		2 (10.5)
Medical cannabis indication		**Number of Respondents (%)**
Agitation of dementia	(correct)	7 (36.8)
ALS	(correct)	12 (63.8)
Alzheimer's disease	(correct)	7 (36.8)
Autism	(correct)	8 (42.1)
Cancer-related pain	(correct)	17 (89.5)
Chronic pain	(correct)	11 (57.9)
Crohn's disease	(correct)	8 (42.1)
Diabetic/peripheral neuropathy	(correct)	6 (31.6)
Glaucoma	(correct)	16 (84.2)
Hepatitis C		3 (15.8)
HIV/AIDS	(correct)	9 (47.4)
Huntington's disease	(correct)	3 (15.8)
Hydrocephalus		0
Migraine		5 (26.3)
MS	(correct)	9 (47.4)
Muscular dystrophy	(correct)	10 (52.6)
Parkinson's disease	(correct)	9 (47.4)
PTSD	(correct)	8 (42.1)
Rheumatoid arthritis		2 (10.5)
Seizures/epilepsy	(correct)	10 (52.6)
Severe and persistent muscle spasms	(correct)	5 (26.3)
Sickle-cell anemia	(correct)	8 (42.1)
Spastic quadriplegia	(correct)	6 (31.6)
Spinal cord disease or severe injury	(correct)	6 (31.6)
Terminal illness with less than one year of life expectancy		8 (42.1)
Tourette syndrome		1 (5.3)
Ulcerative colitis	(correct)	6 (31.6)

Table 2.2: Respondent Pharmacist Knowledge About Medical Cannabis Indications in Mississippi

Correctly Selected	Not Indicated but Selected
Agitation of dementia ALS Alzheimer's disease Autism Cancer-related pain Chronic pain Crohn's disease Diabetic/peripheral neuropathy Glaucoma HIV/AIDS Huntington's disease MS Muscular dystrophy Parkinson's disease PTSD Seizures/epilepsy Severe and persistent muscle spasms Sickle-cell disease Spastic quadriplegia Spinal cord disease or severe injury Ulcerative colitis	Hepatitis C Migraine Rheumatoid arthritis Terminal illness with < 1 year of life expectancy Tourette syndrome

Pharmacists' opinions about medical cannabis

From the varied backgrounds of pharmacists questioned came equally varied perspectives on medical cannabis. Respondents were split on wanting the legalization of medical marijuana in the state, with a general trend in favor of legalization and others not in favor or unsure. Over half of the respondents indicated that medical marijuana would benefit their patients, while most of the other respondents were unsure if their patients would benefit from the use. Most (78.9%) of the pharmacists were concerned about medical marijuana use, and almost the same amount (73.7%) felt that they were not well-educated about medical marijuana. Those who were concerned about the Mississippi Medical Cannabis Program affecting their current practice were split very evenly. When asked, the majority of pharmacists agreed that only FDA-approved derivatives of cannabis should be in use, but the margin between those who agreed and did not agree was small. Respondents generally agreed that medical cannabis has not been researched enough by scientists (Table 3).

As part of the survey given to these pharmacists, they were asked if they had concerns about how the Mississippi Medical Cannabis Program would impact their current practices. If they answered yes to this question, then they were asked to explain their reason. These are the responses received from these healthcare professionals:

"I'm concerned about safety, especially regarding drug interactions."

"I've had no formal education on it."

"MSDH [Mississippi Department of Health] was given the task of overseeing the program with almost zero guidance, funding, or regulation. It has been a challenge for the

agency to create and maintain so far. I believe it will continue to be an issue in the future."

"Patients who will flood the pharmacy looking for recreational marij[u]ana."

"Pharmacy left out."

"Possible interactions with the medicines we fill."

"[Patients] entering the hospital on home prescriptions for medical cannabis. Ability to attain. Adverse reactions of patients who then need hospitalization."

"Since I am in the hospital setting, we have concerns on patient's use while in our facility. We are currently working on policies to address this. We have to figure out how to secure the patient's medical marijuana while also documenting use while in the facility."

As can be seen from the responses submitted, there is much concern from these healthcare professionals about knowledge, safety, and unforeseen interactions between cannabis and other commonly used drugs. These concerns will be difficult to address because research on medical cannabis has been limited by it being a Schedule I substance (National Academies Press, 2017). Pharmacists are also concerned about crafting new policies for their workplaces, as well as about the Mississippi Department of Health not having the tools needed to create and maintain this new medical cannabis program.

Table 4 outlines responses addressing respondents concerns about the use of medical cannabis, their competency in pharmacotherapy knowledge regarding medical cannabis, their confidence is explaining medical cannabis to patients, and preparedness for counseling patients who use medical cannabis. Somewhat contrary to results found in Table 3, respondents appeared marginally concerned about medical cannabis, and

displayed the least amount of concern for the amount of evidence for therapeutic use of cannabis. Based on responses, pharmacists did not feel knowledgeable in aspects of pharmacotherapy knowledge for medical cannabis. Confidence in explaining medical cannabis to patients varied from low confidence in drug interactions to higher confidence in side effects. Overall, respondents felt less confident in their ability to counsel medical marijuana users in general.

Table 3: Respondent Pharmacist Opinions About Medical Cannabis

In favor of the legalization of medical marijuana?	**Number of Respondents (%)**
Yes No Unsure	9 (47.4) 7 (36.8) 3 (15.8)
Patients would benefit from medical marijuana?	**Number of Respondents (%)**
Yes No Unsure	10 (52.6) 1 (5.3) 8 (42.1)
Concerns about medical marijuana use?	**Number of Respondents (%)**
Yes No	15 (78.9) 4 (21.1)
Are you well-educated about medical marijuana?	**Number of Respondents (%)**
Yes No	5 (26.3) 14 (73.7)
Are you concerned about how the MS Medical Cannabis Program will impact your current practice?	**Number of Respondents (%)**
Yes No Unsure	9 (47.4) 9 (47.4) 1 (5.3)
Do you think only FDA-approved derivatives of cannabis medicines should be used?	**Number of Respondents (%)**
Yes No	11 (57.9) 8 (42.1)
Do you think that medical cannabis has been researched enough by scientists?	**Number of Respondents (%)**
Yes No	7 (36.8) 12 (63.2)

Table 4: Respondent Pharmacist Opinions About Medical Cannabis Scaled Responses

How concerned are you about the following factors regarding the use of medical cannabis?	
Safety concerns about cannabis use	Average: 4.266 Standard deviation: 1.710
Consistency in the quality of medical cannabis products	Average: 4.333 Standard deviation: 1.799
Federal regulation related to cannabis	Average: 4.133 Standard deviation: 1.552
Psychoactive effects and potential addiction form cannabis use	Average: 4.533 Standard deviation: 1.767
Limited evidence of therapeutic benefits from cannabis use	Average: 3.357 Standard deviation: 1.692
Please rate your competency level in medical cannabis pharmacotherapy knowledge in the following areas.	
Pharmacology	Average: 3.556 Standard deviation: 1.097
Pharmacokinetics	Average: 2.684 Standard deviation: 1.250
Pharmacodynamics	Average: 2.947 Standard deviation: 1.353
How confident are you in explaining these areas to patients?	
Cannabis efficacy	Average: 3.667 Standard deviation: 1.353
Side effects	Average: 4.158 Standard deviation: 1.573
Cannabis-drug interactions	Average: 2.889 Standard deviation: 1.023
Cannabis dosage forms available	Average: 3.529 Standard deviation: 1.463
How prepared are you to provide medication counseling to patients who use medical cannabis as part of their medication regimen?	
Average: 3.111 Standard deviation: 1.132	

All scales were done on a 1-7 basis with 1 being not at all concerned/competent/confident/prepared and 7 being extremely concerned/competent/confident/prepared

DISCUSSION

Interpretation and Implications of Results

When tested on their knowledge of marijuana in terms of its correct controlled substance schedule and the indications for which it has been approved for medical use, pharmacists were largely correct in their responses, with the exception of mis-categorizing migraines and terminal illness with less than a year of life expectancy as approved indications for medical marijuana use in Mississippi. Granted, this was a limited assessment of pharmacist knowledge. When asked to self-assess whether they were well-educated about medical marijuana, most respondents (n = 14) indicated that they were not. Because marijuana has been illegal in most medical settings in Mississippi until recently, it would be expected that there has not been much, if any, education given to pharmacists on the subject of marijuana usage. There appears to be a need for continuing education on this subject for all pharmacists in the state of Mississippi. Additionally, it may be timely to consider adding medical cannabis content to the required components of curricula in Mississippi pharmacy schools. The areas of education that might be considered are case-based approaches to addressing patient monitoring, documentation of cannabis use, drug interactions, and cannabis indications, as well as clinical research in medical cannabis.

For this education to become available to current and future pharmacists, there must first come research. As seen in the survey, a majority of the respondents (63.2%) were of the opinion that more research needs to be conducted in this area. However, there are barriers to this research being conducted. One of which is the classification of

cannabis as a Schedule I substance (Cooper et al., 2021). This puts marijuana in the same category as LSD and ecstasy (DEA, 2018) and makes it extremely difficult to get approval for clinical research purposes. One way to eliminate this barrier would be to move marijuana down from a Schedule I to a Schedule II substance. This category holds many prescription drugs that are in use today, such as oxycodone and Adderall. Research would be able to be conducted and questions answered for the benefit of patients and practitioners alike.

Ease of research could also lead to new drugs. The pharmacists questioned were in favor of FDA-approved derivatives of cannabis (57.9%). As is the usual process for drug approval, isolated pharmacophores, or the chemical structure that performs the desired biological action, could be identified and developed into FDA approved medications that have specific dosing, indications, strengths, side effects, and toxicities identified.

When it came to pharmacist opinions about medical marijuana use in Mississippi, results were mixed. Respondent pharmacists were split about whether they were in favor of the medical marijuana legislation. Such results are not surprising given the recency of the legislation allowing medical marijuana in Mississippi. While most respondents thought patients would benefit from medical cannabis, they were also concerned about medical marijuana use and were mixed on how it would affect their practice. Again, the newness of medical cannabis in Mississippi, with new research and dispensary facilities still in the process of emerging, may be the reason for these mixed results.

One of our respondents left a comment about “pharmacy left out.” Indeed, it is interesting to note that Mississippi’s legislation did not include pharmacists as other

states' legislation have. Some states require pharmacists to be present to operate dispensaries, much like a pharmacy. At most, medical cannabis dispensaries are required to report their transactions to the Mississippi Prescription Monitoring Program. So, it is not surprising to have seen this comment or find that some pharmacists do, in fact, feel "left out" of medical cannabis dispensing. That being said, having pharmacists dispense drugs that are federally Schedule I drugs, meaning it does not have a legal use in medicine, certainly presents a legal and ethical dilemma. Nonetheless, it anecdotally appears that at least some pharmacists in Mississippi feel as though they should have been included in the legislation.

Future Research

Future studies employing larger and more generalizable sample sizes will not only increase the validity and representation of responses but also allow us to determine how knowledge and perceptions of medical cannabis in Mississippi may vary depending on differing demographic characteristics and backgrounds.

Additionally, as the administration of medical cannabis continues to be implemented in Mississippi, it will not be surprising to observe changes in pharmacist knowledge, perceptions, and experiences. Future research to track these changes, as well as qualitative data collection methods to take a "deeper dive" into knowledge, perceptions, and experiences is warranted.

Limitations

A small, non-representative convenience sample was by far the most significant limitation of this study. Readers are cautioned to interpret this as largely a pilot study in anticipation of future work in this area. And as with all surveys of this nature, especially

with a topic that can be somewhat controversial, self-selection bias is always to be considered. The self-selection bias may not only be evident in perceptions, but also in knowledge: meaning in their willingness to voluntarily take this survey, respondents may have been more knowledgeable about medical cannabis than the average pharmacist.

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APPENDIX: SURVEY

Default Question Block

Study Title: Pharmacists' Perceptions and Knowledge of the Legalization of Medical Marijuana in Mississippi

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Key Information for You to Consider:

Purpose: To assess Mississippi pharmacists knowledge and confidence in implementing the new medical marijuana law.

Duration: This survey should take no more than 5 minutes to complete.

Activities: You will be asked a series of questions about medical marijuana.

Why you might not want to participate: You do not have time to complete this survey.

Why you might want to participate: Your participation is entirely voluntary. Some of the benefits include contributing to knowledge about pharmacists' knowledge of medical marijuana. Your responses will be completely confidential. Data will be reported in aggregate only, and no names will be reported.

Description
My name is Faith Houston, and I am completing my first year in the pharmacy school at the University of Mississippi. I am asking for your participation in this research survey which I am conducting as part of my Honors College Thesis.

This survey includes various questions about your knowledge and recommendations regarding medical marijuana. Your willingness to participate in this research will help to us to better understand how this new law may affect our state.

Cost and Payments
There are not costs to participants of this survey.

Risks and Benefits
No risks or benefits are anticipated in the completion of this survey.

Confidentiality
All information collected will remain anonymous. Only the research team will have access to the data you provide and all data will be analyzed in aggregate.

Right to Withdraw
You do not have to take part in this study and you may stop participation at any time. If you start the study and decide that you do not want to finish, you may simply exit the survey.

IRB Approval
This study has been reviewed by The University of Mississippi's Institutional Review Board (IRB). If you have any questions, concerns, or reports regarding your rights as a participant of research, please contact the IRB at (662) 915-7482 or irb@olemiss.edu.

Statement of Consent
By clicking the 'next' button, I attest that I am 18 years of age or older and consent to taking this survey.

What pharmacy school did you graduate from?

What year did you graduate from pharmacy school?

Please select the region of Mississippi where you practice pharmacy:

- ◯ North Mississippi
- ◯ Central Mississippi
- ◯ Southern Mississippi

What is your age?

What is your gender?

- ◯ Male
- ◯ Female
- ◯ Prefer not to answer

Your race is:

- ◯ White
- ◯ Non-white
- ◯ Prefer not to answer

For how many years have you been practicing pharmacy?

What is your current employment status?

- ◯ Full time
- ◯ Part time or casual
- ◯ Retired or not currently employed

Please indicate your ***highest*** level of ***pharmacy*** education?

- ◯ Bachelor of Science
- ◯ Doctor of Pharmacy
- ◯ Post-Graduate Training

What is your ***primary*** pharmacy practice setting?

- ◯ Chain Pharmacy (for example, CVS, Walgreens, Rite-Aid, etc.)
- ◯ Mass Merchandiser Pharmacy (for example, Walmart, Sam's Club, Target, etc.)
- ◯ Supermarket or Grocery Store Pharmacy (for example, Kroger, Piggly Wiggly, etc.)
- ◯ Independent Community Pharmacy
- ◯ Hospital Inpatient Pharmacy
- ◯ Hospital Outpatient Pharmacy
- ◯ Ambulatory Care Pharmacy
- ◯ Managed Care Pharmacy
- ◯ Long-Term Care Pharmacy
- ◯ Academia
- ◯ Other

Which of the following geographic locations most accurately describes where your workplace is located?

- ◯ Rural
- ◯ Suburban
- ◯ Urban

Definition of medical marijuana

Medical marijuana is a term for derivatives of the Cannabis sativa plant that are used to ease symptoms caused by certain medical conditions. Medical marijuana is also known as medical cannabis. Cannabis sativa contains many active compounds. The best known are delta-9 tetrahydrocannabinol (THC) and cannabidiol (CBD). THC is the primary ingredient in marijuana that makes people "high."

- The Mayo Clinic

Were you in favor of the legalization of medical marijuana in our state?

- ◯ Yes
- ◯ No
- ◯ Unsure
- ◯ Prefer not to answer

Do you have patients that would benefit from medical cannabis?

- ◯ Yes
- ◯ No
- ◯ Unsure

Under the Controlled Substances Act (CSA), how is medical cannabis classified?

- ◯ Schedule I
- ◯ Schedule II
- ◯ Schedule III
- ◯ Schedule IV
- ◯ Schedule V

Do you have any concerns about the use of medical merijuana?

- ◯ Yes
- ◯ No

On a scale of 0-7 how concerned are you about the following factors regarding the use of medical cannabis?

	Not concerned			Slightly concerned			Extremely Concerned
	1	2	3	4	5	6	7
Safety concerns about cannabis use.							

	Not concerned			Slightly concerned			Extremely Concerned
	1	2	3	4	5	6	7
Consistency in the quality of medical cannabis products.							
Federal regulation related to cannabis							
Psychoactive effects and potential addiction from cannabis use.							
Limited evidence of therapeutic benefits from cannabis use.							

Do you feel as though you are well-educated about medical marijuana?

- ○ Yes
- ○ No

On a scale of 1-7, please rate your competency level in medical cannabis pharmacotherapy knowledge in the following areas.

	Not at all competent						Very competent
	1	2	3	4	5	6	7
Pharmacology							
Pharmacokinetics							
Pharmacodynamics							

On a scale of 1-7, how confident are you in explaining these areas to patients?

	Not at all confident						Very confident
	1	2	3	4	5	6	7
Cannabis efficacy							

	Not at all confident						Very confident
	1	2	3	4	5	6	7
Side effects							
Cannabis-drug interactions							
Cannabis dosage forms available							

Are you concerned about how the Mississippi Medical Cannabis Program will impact your current practice?

- ◯ Yes
- ◯ No
- ◯ Unsure

Please explain.

On a scale of 1-7, how prepared are you to provide medication counseling to patients who use medical cannabis as part of their medication regimen?

	Not at all prepared						Very prepared
	1	2	3	4	5	6	7
Click to write Choice 1							

Which of the following medical conditions are eligible for medical cannabis use in Mississippi? (Select all that apply)

- ☐ Agitation of dementia
- ☐ ALS
- ☐ Alzheimer's disease
- ☐ Autism
- ☐ Cancer-related pain
- ☐ Chronic pin
- ☐ Chron's disease
- ☐ Diabetic/peripheral neuropathy

- [ ] Glaucoma
- [ ] Hepatitis C
- [ ] HIV/AIDS
- [ ] Huntington's disease
- [ ] Hydrocephalus
- [ ] Migraine
- [ ] MS
- [ ] Muscular dystrophy
- [ ] Parkinson's disease
- [ ] PTSD
- [ ] Rheumatoid arthritis
- [ ] Seizures/epilepsy
- [ ] Severe and persisten muscle spams
- [ ] Sick-cell anemia
- [ ] Spastic quadriplegia
- [ ] Spinal cord disease or severe injury
- [ ] Terminal illness with less than one year of life expectancy
- [ ] Tourette syndrome
- [ ] Ulcerative colitis

Do you think only FDA-approved derivatives of cannabis medicines should be used?

- ◯ Yes
- ◯ No

Do you think that medical cannabis has been researched enough by scientists?

- ◯ Yes
- ◯ No