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Physicians-in-training are not prepared to prescribe medical marijuana

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Abstract

Background—While medical marijuana use is legal in more than half of U.S. states, evidence is limited about the preparation of physicians-in-training to prescribe medical marijuana. We asked whether current medical school and graduate medical educational training prepare physicians to prescribe medical marijuana.

Methods—We conducted a national survey of U.S. medical school curriculum deans, a similar survey of residents and fellows at Washington University in St. Louis, and a query of the Association of American Medical Colleges (AAMC) Curriculum Inventory database for keywords associated with medical marijuana.

Results—Surveys were obtained from 101 curriculum deans, and 258 residents and fellows. 145 schools were included in the curriculum search. The majority of deans (66.7%) reported that their graduates were not at all prepared to prescribe medical marijuana, and 25.0% reported that their graduates were not at all prepared to answer questions about medical marijuana. The vast majority of residents and fellows (89.5%) felt not at all prepared to prescribe medical marijuana, while

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Contributors

LJB, ABE and TQ conceived the study, acquired, analyzed and interpreted the data, and drafted the paper. CD and MA made substantial contributions to the study design and interpretation of data, and they provided critical review of the paper for important intellectual content. All authors approved the final manuscript for publication and have agreed to be accountable for all aspects of the work in ensuring that questions related the accuracy or integrity of any part of it are appropriately investigated and resolved.

Conflicts of Interest

No conflicts declared.

35.3% felt not at all prepared to answer questions, and 84.9% reported receiving no education in medical school or residency on medical marijuana. Finally, only 9% of medical school curriculums document in the AAMC Curriculum Inventory database content on medical marijuana.

Conclusions—Our study highlights a fundamental mismatch between the state-level legalization of medical marijuana and the lack of preparation of physicians-in-training to prescribe it. With even more states on the cusp of legalizing medical marijuana, physician training should adapt to encompass this new reality of medical practice.

Keywords

cannabis; marijuana; medical education

1. Introduction

Medical marijuana has increasingly gained popularity as a treatment for diverse medical conditions including epilepsy, glaucoma, multiple sclerosis, post-traumatic stress disorder, and Crohn's Disease, as well as an alternative to opioids for treatment of pain (Federation of State Medical Boards, 2016; National Academies of Sciences, Engineering, and Medicine, 2017). Although federal law prohibits physicians from prescribing marijuana because of its classification as a Schedule 1 substance by the U.S. Drug Enforcement Administration, and thus defined as having no currently acceptable medical use and a high potential for abuse, marijuana has been legalized for medicinal purposes in 29 states and the District of Columbia, with additional states poised to make this change (National Academies of Sciences, Engineering, and Medicine, 2017; National Conference of State Legislatures, 2017; U.S. Food and Drug Administration, 2009). In most states where medical marijuana is legalized, medicinal users are required to have documentation from a physician "prescribing" marijuana treatment for their medical condition. Because marijuana is prohibited to be prescribed on the federal level, these "prescriptions" are often called "recommendations" (National Conference of State Legislatures, 2017). We asked whether current training prepares physicians to answer questions and prescribe medical marijuana to their patients.

2. Methods

2.1. Measures

We analyzed three data sources: (1) survey of curriculum deans at United States medical schools; (2) survey of residents and fellows at Washington University in St. Louis School of Medicine; and (3) search of medical school curricula through the Association of American Medical Colleges (AAMC) Curriculum Inventory.

2.1.1. Dean Survey—We invited curriculum deans at allopathic (141) and osteopathic (31) medical schools in the United States to participate. The Institutional Review Board-approved survey included questions regarding how well prepared their graduating medical students were to prescribe medical marijuana. A survey link and a letter describing the study were emailed to each dean's primary address. Follow up emails and a hard copy follow up

letter were sent to increase response rates. Questions in the survey included “How prepared are your graduating students with answering patients’ questions about medical marijuana?” and “How prepared are your graduating students with prescribing medical marijuana?” with answer choices including “not at all”, “slightly”, “moderately”, “very”, and “extremely”. The survey also asked, “Do you believe medical marijuana should be a required part of the medical school core curriculum at your institution?” with answer choices including “strongly disagree”, “disagree”, “neutral”, “agree”, “strongly agree”. Surveys were completed from May to August 2016.

2.1.2. Resident and Fellow Survey—Residents and fellows at Washington University in St. Louis School of Medicine were invited to participate in our survey from March to June 2016. The graduate medical education office emailed the Institutional Review Board-approved survey to 1176 residents and fellows, and a reminder email was sent two weeks later to all initial survey recipients. Questions included, “How prepared are you with answering patients’ questions about medical marijuana?”, and “How prepared are you with prescribing medical marijuana?” with answer choices including “not at all”, “slightly”, “moderately”, “very”, and “extremely”. The survey also asked, “Have you received any education about medical marijuana?”, and “Do you believe education about medical marijuana should be required?” with answer choices including “no”, “yes in medical school”, “yes in residency or fellowship”, and “yes in both”. We also asked for the Accreditation Council for Graduate Medical Education specialty group of the participants – hospital-based, medical, or surgical.

2.1.3. Curriculum Inventory Report—The AAMC Curriculum Inventory contains curriculum content from participating U.S. medical schools, and includes course names, session titles, and learning objectives. We requested a custom report for academic year 2015–2016 to determine the number of schools that documented medical marijuana in their submitted curriculum content (Association of American Medical Colleges). Marijuana keywords such as “Marijuana, Cannabis, Marihuana” were identified throughout the submitted curriculum information to find references to marijuana, and the keywords were used to find connected words such as “Legal, Medical, Therapeutics” to find curriculum artifacts related to medical marijuana. A review of the specific search results was then performed, and results that focused on marijuana addiction and hallucinogens were excluded.

2.2. Analysis

Comparisons between response options on the dean and resident surveys were made using two-tailed chi-squared tests on GraphPad Prism (7), collapsing groups (such as “strongly agree” and “agree” into one group) when cells had too few responses.

3. Results

3.1. Dean Survey

101 curriculum deans responded to the survey (58.7% response rate), representing 82 allopathic and 19 osteopathic medical schools from 37 states and Puerto Rico. Twenty-five

percent of deans reported that their graduates were not at all prepared to answer questions about medical marijuana, while 51.0% felt that their graduates were slightly prepared, and only 24.0% felt their graduates were moderately, very, or extremely prepared to answer questions (Table 1). Furthermore, most deans (66.7%) reported that their graduates were not at all prepared to prescribe medical marijuana, while 27.3% felt that they were slightly prepared, and only 6.0% felt that their graduates were moderately, very, or extremely prepared. Nearly half of deans (48.4%) agreed or strongly agreed that education about medical marijuana should be included in undergraduate medical education.

In states where medical marijuana was not legal, 29.2% of deans reported that their graduates were not at all prepared to answer questions about medical marijuana, versus 17.1% of deans in states where medical marijuana was legal. This difference, though large, was not statistically significant (Chi-square=3.17, df=2, p=0.20). Other comparisons showed minimal differences between deans' responses in states where medical marijuana was not legal vs. legal (not at all prepared to prescribe: 68.8 vs. 62.9%; agree or strongly agree that education about medical marijuana should be included in the curriculum: 47.7 vs. 50.0%).

3.2. Resident and Fellow Survey

258 out of 1176 (21.9% response rate) residents and fellows completed the online survey (54 hospital-based, 138 medical, and 66 surgical). 35.3% of respondents felt not at all prepared to answer patients' questions about medical marijuana, while 41.5% felt slightly prepared, and 23.3% felt moderately, very, or extremely prepared (Table 2). Residents and fellows in medical specialties were significantly more likely to report being at least moderately prepared to answer questions (29.1%), followed by residents and fellows in hospital-based specialties (22.2%), with surgical residents and fellows least likely to be at least moderately prepared to answer questions (12.2%) (Chi-square=19.01, df=4, p=0.0008). The vast majority of residents, 89.5%, felt not at all prepared to prescribe medical marijuana, while 4.7% felt slightly prepared and 5.9% felt moderately, very, or extremely prepared. No differences between hospital-based, medical, or surgical specialties were seen in perceived preparation to prescribe medical marijuana.

The majority of residents and fellows, 84.9%, reported receiving no education about medical marijuana in medical school or residency, with some differences observed based on specialty. Residents and fellows in medical specialties were significantly more likely to report receiving education during their training (21.0%), followed by surgical specialties (9.1%), with hospital-based specialties (7.4%) the least likely to have received education (Chi-square=13.7, df=6, p=0.03). Notably, 12 (8.7%) medical residents and fellows reported receiving medical marijuana education in residency or fellowship, whereas no surgical or hospital-based residents reported receiving education in residency or fellowship.

The residents and fellows who reported that medical marijuana was legal in their state at the time of their medical education were more likely to report receiving education on medical marijuana in medical school (8 out of 26, 30.8%) than their counterparts who did not attend school in a state where medical marijuana was legal (18 out of 211, 8.5%) (Chi-square=11.72, df=1, p=0.0006).

Residents and fellows who reported receiving education on medical marijuana in medical school, residency/fellowship, or both (39 out of 258, 15.1%) stated a greater preparedness to answer questions about medical marijuana than their counterparts (61.5% vs. 16.4% reporting being at least moderately prepared; Chi-square=40.13, df=2, p<0.0001). (Table 3) Residents and fellows who received education also felt more prepared to prescribe medical marijuana than their counterparts (10.3% vs. 5.1% being at least moderately prepared) though this difference did not reach statistical significance (Chi-square=2.72, df=2, p=0.26).

A majority of residents and fellows (78.1%) thought education about medical marijuana should be required in medical school and/or residency. No differences in opinions on education were seen based on specialty or graduation from medical school in a state where medical marijuana was legal.

3.3. Curriculum Inventory Report

Of the 145 U.S. medical schools included in the AAMC Curriculum Inventory academic year 2015–2016 benchmarked data, 82 of the 145 (56.6%) schools were in a state where medical marijuana was legal. Only 13 (9.0%) of the participating schools documented any medical marijuana education in their submitted curriculum content. No differences were seen in inclusion of medical marijuana education in the curriculum based on legality of medical marijuana in the state; 8 of the 82 (9.8%) medical schools in a state where medical marijuana was legal documented education about medical marijuana and 5 of the 63 (7.9%) medical schools in a state where medical marijuana was not legal documented education about medical marijuana (Chi-square= 0.14, df=1, p=0.70).

4. Discussion

This study is the first to examine the preparation of physicians-in-training to prescribe medical marijuana. We examined this question through multiple channels – a survey of curriculum deans at U.S. medical schools, a survey of residents and fellows at our institution, and a search of medical school curricula through the Association of American Medical Colleges (AAMC) Curriculum Inventory. All three sources converge on a similar finding: although medical marijuana use is now legal in 29 U.S. states and the District of Columbia, physicians-in-training are not prepared to “prescribe” medical marijuana, and there is little formal educational training in this area.

Over 75% of medical school curriculum deans reported that their graduates are not at all prepared or are only slightly prepared to answer patients’ questions about medical marijuana, and 94% reported that their graduates are not at all prepared or only slightly prepared to prescribe medical marijuana. These findings are mirrored by our institution’s residents’ and fellows’ perceptions of their own lack of preparation. Furthermore, the findings from the curriculum deans and residents and fellows at our institution are consistent with our curriculum survey of U.S. medical schools conducted through the AAMC, which finds that less than 10% of medical schools have medical marijuana documented in their curriculum.

Though these three sources demonstrate the lack of education and the lack of preparedness of physicians-in-training to discuss medical marijuana with patients or “prescribe” medical marijuana, nearly 50% of curriculum deans and the majority of residents and fellows (78.1%) at our institution support the inclusion of training about medical marijuana. This support of medical marijuana training is consistent with a recent study at the University of Colorado that reports that 98% of its students believe that physicians should have formal training about medical marijuana before recommending it to patients (Chan et al., 2017). Importantly, this survey provides evidence that education about medical marijuana can improve physicians’ comfort about this topic. The residents and fellows in our survey who reported receiving education about medical marijuana stated greater preparedness to answer questions about medical marijuana (61.5% reporting being at least moderately prepared) as well as to prescribe medical marijuana (10.3% being at least moderately prepared) than their counterparts (16.4% and 5.1%, respectively).

There are several strengths to this study, including multiple sources of data, the relatively high response rate from the deans, and the broad national coverage of the AAMC curriculum survey. Limitations of this study include small numbers of respondents in some categories, such as residents who attended medical school where medical marijuana was legal, which could have obscured differences between groups, and a modest response rate of the residents and fellows, which could have affected the generalizability of the results. This study also only includes resident and fellow data from one institution, though the residents and fellows matriculated from a broad geographic range of medical school programs. Our survey was brief and many other important questions remain. For example, we did not query about a physician’s knowledge and ability to discern between therapeutic use versus misuse of medical marijuana.

5. Conclusions

In summary, our study highlights a fundamental and potentially growing mismatch between the legalization of medical marijuana at a state level and the ability of physicians to properly address patients’ questions about medical marijuana or to appropriately prescribe it. This change in policy reflects the increasing evidence of potential positive health effects from medical marijuana. The recent National Academy of Medicine report on “The Health Effects of Cannabis and Cannabinoids” documents conclusive or substantial evidence of the effectiveness of medical marijuana for a variety of conditions, including chronic pain, chemotherapy induced nausea and vomiting, as well as patient-reported spasticity associated with multiple sclerosis (National Academies of Science, Engineering, and Medicine, 2017). These positive therapeutic effects of medical marijuana must be balanced by potential adverse consequences, including impaired cognition, increased motor vehicle crashes, lower birth weight offspring, and addiction (National Academies of Science, Engineering, and Medicine, 2017). With more states on the cusp of legalizing medical marijuana, we must address this mismatch between policy and physician training so that we can best help our patients obtain the potential benefits and minimize adverse consequences from using medical marijuana.

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Highlights

- Physicians-in-training are not prepared to prescribe medical marijuana
- Physicians-in-training think education about medical marijuana should be required
- Only 9% of medical schools have medical marijuana documented in their curriculum
- Education can improve physician preparedness to prescribe medical marijuana

Table 1

Dean survey responses. Total, and stratified by legality of medical marijuana in the state where the dean’s medical school is located.

	Total		Medical Marijuana Legal		Medical Marijuana Not Legal	
	N (101)	%	N (35)	%	N (66)	%
How prepared are your graduating students with answering patients’ questions about medical marijuana?						
	25	25.0%	6	17.1%	19	29.2%
Slightly	51	51.0%	22	62.9%	29	44.6%
Moderately	22	22.0%	7	20.0%	15	23.1%
Very	2	2.0%	0	0.0%	2	3.1%
Extremely	0	0.0%	0	0.0%	0	0.0%
Not at all	66	66.7%	22	62.9%	44	68.8%
Slightly	27	27.3%	11	31.4%	16	25.0%
Moderately	4	4.0%	2	5.7%	2	3.1%
Very	2	2.0%	0	0.0%	2	3.1%
Extremely	0	0.0%	0	0.0%	0	0.0%
Strongly Disagree	2	2.0%	0	0.0%	2	3.1%
Disagree	15	15.2%	4	11.8%	11	16.9%
Neutral	34	34.3%	13	38.2%	21	32.3%
Agree	44	44.4%	17	50.0%	27	41.5%
Strongly Agree	4	4.0%	0	0.0%	4	6.2%
Do you believe medical marijuana should be a required part of the medical school core curriculum at your institution?						
	2	2.0%	0	0.0%	2	3.1%
Disagree	15	15.2%	4	11.8%	11	16.9%
Neutral	34	34.3%	13	38.2%	21	32.3%
Agree	44	44.4%	17	50.0%	27	41.5%
Strongly Agree	4	4.0%	0	0.0%	4	6.2%

“Prefer not to answer” was an option for each question, which accounts for the variability in numbers of responses. Only 0–2 participants chose this answer for any given question.

Table 2

Resident/fellow survey responses. Total, and stratified by specialty.

	Total (258)		Hospital-based Specialty (54)		Medical Specialty (138)		Surgical Specialty (66)	
	N	%	N	%	N	%	N	%
How prepared are you with answering patients' questions about medical marijuana? *								
Not at all	91	35.3%	21	38.9%	34	24.6%	36	54.6%
Slightly	107	41.5%	21	38.9%	64	46.4%	22	33.3%
Moderately	41	15.9%	8	14.8%	28	20.3%	5	7.6%
Very	17	6.6%	4	7.4%	10	7.3%	3	4.6%
Extremely	2	0.8%	0	0.0%	2	1.5%	0	0.0%
How prepared are you with prescribing medical marijuana? **								
Not at all	230	89.5%	47	87.0%	126	92.0%	57	86.4%
Slightly	12	4.7%	4	7.4%	4	2.9%	4	6.1%
Moderately	12	4.7%	2	3.7%	7	5.1%	3	4.6%
Very	3	1.2%	1	1.9%	0	0.0%	2	3.0%
Extremely	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Have you received any education about medical marijuana? **								
No	219	84.9%	50	92.6%	109	79.0%	60	90.9%
Yes in medical school	22	8.5%	4	7.4%	13	9.4%	5	7.6%
Yes in residency/fellowship	12	4.7%	0	0.0%	12	8.7%	0	0.0%
Yes in both medical school and residency/fellowship	5	1.9%	0	0.0%	4	2.9%	1	1.5%
Do you believe education about medical marijuana should be required? *								
No	56	21.9%	15	28.3%	27	19.7%	14	21.2%
Yes in medical school	73	28.5%	18	34.0%	31	22.6%	24	36.4%
Yes in residency/fellowship	40	15.6%	6	11.3%	26	19.0%	8	12.1%
Yes in both medical school and residency/fellowship	87	34.0%	14	26.4%	53	38.7%	20	30.3%

* Significant difference between specialties in preparedness to answer questions about medical marijuana (Chi-square=19.01, df=4, p=0.0008)

** Significant difference between specialties in receiving education during medical school (Chi-square=13.7, df=6, p=0.03)

"Prefer not to answer" was an option for each question, which accounts for the variability in numbers of responses. Only 0-2 participants chose this answer for any given question.

Table 3

Resident/fellow survey responses. Total, and stratified by whether the resident/fellow reported receiving education about medical marijuana.

	Total (258)		Received Education (39)		Did Not Receive Education (219)	
	N	%	N	%	N	%
How prepared are you with answering patients' questions about medical marijuana? *						
Not at all	91	35.3%	3	7.7%	88	40.2%
Slightly	107	41.5%	12	30.8%	95	43.4%
Moderately	41	15.9%	14	35.9%	27	12.3%
Very	17	6.6%	8	20.5%	9	4.1%
Extremely	2	0.8%	2	5.1%	0	0.0%
How prepared are you with prescribing medical marijuana?						
Not at all	230	89.5%	32	82.1%	198	90.8%
Slightly	12	4.7%	3	7.7%	9	4.1%
Moderately	12	4.7%	4	10.3%	8	3.7%
Very	3	1.2%	0	0.0%	3	1.4%
Extremely	0	0.0%	0	0.0%	0	0.0%

* Significant difference in preparedness to answer questions about medical marijuana based on whether the resident/fellow received education about medical marijuana (Chi-square=40.13, df=2, p<0.0001)

“Prefer not to answer” was an option for each question, which accounts for the variability in numbers of responses. Only 0–2 participants chose this answer for any given question.