Original Article

Predicting Physicians' Intentions to Recommend Medical Cannabis

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Abstract

Context. Although medical cannabis (MC) policies continue to evolve around the world, the integration of MC into clinical practice remains highly debated within the medical community.

Objectives. Relying on the Theory of Planned Behavior (TPB), this study aim was to identify underlying factors that influence physicians' intentions to recommend MC to patients and to examine whether there are differences in the strength of these associations across three medical specialties (family medicine, oncology, and pain medicine).

Methods. 247 physicians completed questionnaires including measures of TPB constructs (attitudes, subjective norms, and perceived behavioral control) and intentions to recommend MC to two clinical vignettes describing medical background of a cancer and a chronic pain patient. Regression models were used to measure the extent to which perceived knowledge and TPB constructs predict physicians' intentions to recommend MC.

Results. Physicians' intentions to recommend MC to the cancer patient vignette was higher than their intentions to recommend to the chronic pain patient vignette. Intentions to recommend MC to the patient with cancer were associated with more favorable attitudes toward MC, whereas intentions to recommend MC to the patient with chronic pain were associated with more favorable attitudes, higher levels of perceived control, and lower levels of perceived knowledge.

Conclusion. Clinical practices related to MC may be influenced by nonmedical factors, and this may be particularly prevailing in the field of chronic pain, suggesting that MC may be particularly contentious in this field.   J Pain Symptom Manage 2019;58:400–407. © 2019 American Academy of Hospice and Palliative Medicine. Published by Elsevier Inc. All rights reserved.

Key Words
Medical cannabis, clinical practices, physicians' intentions

Introduction

After an ancient history of use in other cultures, cannabis was introduced to Western medicine a century and a half ago,[1] when it began to be prescribed for varied symptoms.[2] However, from the 1920s, the use of medical cannabis (MC) was abandoned by the medical community in response to the introduction of pharmaceuticals that were deemed superior and later because of the UN Drug Conventions of 1961 and 1972, which outlawed the use of cannabis throughout the world, except for specific medical and scientific purposes.[3,4]

Recent growth in clinical research has increased the evidence base for the therapeutic potential of MC, indicating that cannabis may be a promising treatment for several medical indications. A comprehensive review of the medical literature recently concluded that there is conclusive or substantial evidence that herbal cannabis, or cannabis-based medicines, are effective for the treatment of pain, as well as for chemotherapy-induced nausea and vomiting and for spasticity associated with multiple sclerosis. The evidence regarding other indications was found to be limited, insufficient, or absent.[5,6]

Nevertheless, regulatory changes during the last decades have led to the reintroduction of MC as a viable treatment option in many states and countries.[7,8] Within the diverse MC policies around the world, physicians are generally the agents legally entitled to recommend MC for patients, and in some places to certify it directly.[9] As such, physicians play a vital role in the implementation of the emerging regulatory changes related to MC. However, little is known about physicians' perspectives related to MC and, more specifically, about their intentions to integrate MC into their clinical practice.

Although considerable support for MC has been found among oncologists[10] and physicians in palliative care,[11] less support for MC has been found among family care physicians,[12,13] rheumatologists,[14] and physicians in internal medicine and psychiatry.[15] Combined, this literature suggests that different physician populations have diverse beliefs and attitudes related to MC, and this variation is also supported by an internet survey made by WebMD.[16] Such differences may be expected because of differences in physician training, the clinical population served, and physicians' experiences. The only previous study that has explicitly examined physician group differences in opinions regarding MC found that compared with physicians specializing in addiction medicine, internists and obstetrician-gynecologists were significantly more likely to support MC.[15]

The Present Study

The Israeli MC program was established in the 1990s, and Israel is considered as a leading actor in the MC arena.[17] The number of Israeli MC licenses has risen dramatically in recent years, and it is currently estimated to be over 30,000. The two largest groups of licensed patients are the ones with chronic pain and cancer. According to the Israeli regulations, MC licenses are granted by the Medical Cannabis Unit at the Ministry of Health upon approval of a medical recommendation signed by a physician.[18]

This study's main objective was to expand the knowledge on clinical practices related to MC, by identifying underlying factors associated with Israeli physicians' intentions to recommend MC to patients. We also aimed to examine whether there are differences in the strength of these associations across three groups of physicians who are the most likely to treat Israeli MC patients, namely oncologists, pain physicians, and family physicians.

This study was guided by the Theory of Planned Behavior (TPB). The TPB is a behavioral theory, which presumes that human behavior is guided by three constructs that determine behavioral intentions and ultimately the performance of a given behavior:

1) attitudes toward the behavior, 2) subjective norms, and 3) perceived behavioral control.[19–22] Attitudes toward the behavior reflect the extent to which a person values a particular behavior as favorable or unfavorable and the beliefs about the likely consequences of the behavior. Subjective norms indicate the perceived social pressure to engage in a specific behavior and thus manifest normative expectations of others toward this behavior. Perceived behavioral control embodies a person's perceptions about his/her ability to perform a behavior and reflect the beliefs regarding factors that may facilitate or impede performance. The TPB has been widely used to predict, rather than merely describe, different health-related behaviors.[23] Moreover, studies have shown that the TPB is an appropriate framework to predict behaviors and decision-making of health care professionals.[24–27]

Methods

Participants

The convenience sample consisted of 247 Israeli physicians across three medical specialties (family medicine, oncology, and pain medicine). The classification of medical specialty relied on physicians' self-report, and board membership was not certified. Respondents were recruited at medical conferences across Israel and at staff meetings ("journal clubs") in hospitals and Health Maintenance Organizations. Potential participants were presented with the study's topic (i.e. physicians' perspectives and experiences related to MC recommendation) and were offered to participate, without any remuneration. Participants' informed consent was obtained subsequent to assurance of confidentiality and anonymity. The survey was administered by paper and pencil. The study was approved by the Institutional Review Board of the Faculty of Social Welfare & Health Sciences, University of Haifa (#70/14).

Measures

Dependent Variables. Intentions to recommend medical cannabis. Two clinical vignettes were presented to participants, one of a patient with chronic pain and the other of a patient with cancer. Both vignettes described patients who are eligible for MC according to Israeli regulations and were additionally validated through a Delphi study[28,29] in which 10 expert physicians participated (in press). The clinical vignettes are shown in Table 1. Participants were asked to rate their intentions to recommend MC to each of these vignettes on a seven-point scale (1 = very low, 7 = very high).

Table 1
Patient Vignettes

Chronic Pain Patient Clinical Vignette

A 52-year-old male, suffering from complex regional pain syndrome (CRPS) in his right hand, as a result of a work accident one year ago. He is currently being treated with *oxycodone* 120 mg/day, *amitriptyline* 50 mg/day, and with physical therapy. Previous treatments with *gabapentin* and *pregabalin* failed because of adverse effects, and *duloxetine* was inefficient. On physical examination, his hand seems swollen and cyanotic, and allodynia and hyperesthesia were present. His wrist and fingers do not seem to function, and his wrist joint has minimal passive movement, with no active movement. He is not interested in a spinal cord stimulation. He experiences sleep disturbances and is nonresponsive to sleeping tablets. He is undergoing a multidisciplinary rehabilitation program. His pain is rated as 9 of 10 on the Visual Analogue Scale (VAS) for pain.

Cancer Patient Clinical Vignette

A 54-year-old male, suffering from osteosarcoma of the left thigh. He has undergone chemotherapy and is in preparation for surgery planned for tumor removal with wide margins. He complains of pain radiating from the upper thigh along his leg for the past four months. The pain was not relieved after radiotherapy. The pain has been described as burning and stabbing along the leg. He receives the following medications: transdermal *fentanyl* 125 mcg/hour, transbuccal *fentanyl* 800 mcg ×4/day, and *pregabalin* 225 mg ×2/day. He has a good emotional support from his family and from the oncology staff. His pain is rated as 8 of 10 on the Visual Analogue Scale (VAS) for pain.

Independent Variables. In accordance with theoretical guidelines of the TPB,[30] qualitative interviews with 25 physicians were conducted to elicit salient beliefs that are most relevant to physicians' intentions to recommend MC. Specifically, qualitative data relating to perceived advantages and disadvantages of MC recommendation were elicited to form items that measure attitudes, normative beliefs, and perceived behavioral control. Details about the characteristics of the physicians who participated in the qualitative study and the results of this phase have been published elsewhere.[31]

Attitudes. Attitudes toward MC recommendation were assessed using seven items. Four of the items included bipolar scales of adjectives (e.g. "I believe that MC recommendation is professional-unprofessional"), and three items measured participants' agreement to statements related to MC recommendation (e.g. "MC recommendation may put me at risk for aggressive interactions with patients and/or violence"). All items were measured on a seven-point scale. The scale showed adequate internal consistency ($\alpha = .84$), and the seven items were averaged to obtain a mean attitudes score.

Subjective norms. A particularly relevant reference group to participants is their fellow physicians. Thus, four subjective norms items, on a seven-point scale, were assessed in reference to this group. Example items are "Fellow physicians, whose opinion I appreciate, support me recommending medical cannabis" and "I have support for MC recommendation within my health care organization (hospital/Health Maintenance Organization)." The scale showed adequate internal consistency ($\alpha = .68$), and the items were averaged to obtain a single score of subjective norms.

Perceived behavioral control. Three items were used to assess perceived behavioral control, on a seven-point scale. The relevancy of control is accentuated because MC recommendation is different from prescription of conventional medications and it involves specific bureaucratic procedures that physicians may not be

familiar with. Sample items are "I believe I have the necessary tools for MC recommendation" and "I am confident that I can overcome any obstacle in the process of MC recommendation." The answers ranged from 1 (strongly disagree) to 7 (strongly agree). The scale showed adequate internal consistency ($\alpha = .77$), and items were averaged to obtain a score of perceived behavioral control.

Covariates. In addition to gender, age, and seniority, perceived knowledge of MC was measured by six items adopted from the study by Ziemianski et al.[32] Participants self-assessed their level of knowledge in different domains related to MC, such as "dosing and effective treatment plan," "potential harms," and "Ministry of Health regulations." Answers ranged from 1 (very low) to 5 (very high), the scale showed adequate internal consistency ($\alpha = .86$), and items were averaged to obtain a single score of "perceived knowledge."

Data Analysis

The characteristics of the sample were analyzed with descriptive statistics. To examine group differences in categorical variables ("gender" and "employment in the national health system"), χ^2 tests were performed. Kruskal Wallis H tests were performed to examine group differences in the continuous variables, which had a non-normal distribution ("age," "seniority," "perceived knowledge," "attitudes," "subjective norms," and "perceived behavioral control"). In cases of statistical significance, post hoc analyses were conducted to identify group differences. Two separate linear regression models were used to test whether the independent variables predicted intentions to recommend MC to the patients in each of the clinical vignettes. In the first step, the background variables were entered (seniority, gender, and medical specialty). In the second step, "perceived knowledge" and TPB constructs were entered (attitudes, subjective norms, and perceived behavioral control); the

Table 2
Descriptive Statistics

Variable	Total ($n = 247$)	Pain ($n = 69, 27.9\%$)	Oncology ($n = 80, 32.4\%$)	Family ($n = 98, 39.7\%$)	Statistical Test
Male, n (%)	147 (60.2)	44 (64.7)	46 (58.2)	57 (58.8)	χ^2 (2) = .788, P = .067
Age, mean (SD)	47.2 (11.87)	52.4 (10.23)[a]	42.2 (9.88)[b]	47.5 (12.82)[c]	F (2,228) = 15.01, $P <$ 0.001
Seniority, mean (SD)	17.1 (12.42)	21.9 (12.59)[a]	13.7 (10.42)[b]	16.3 (12.84)[b]	F (2,236) = 8.65, $P <$ 0.001
Employment in the national health system, n (%)	240 (97.6)	67 (98.5)	80 (100)	93 (94.9)	χ^2 (2) = 5.189, P = .075
Perceived knowledge on MC, mean (SD)	2.76 (.97)	3.14 (.93)[a]	2.91 (.96)[a]	2.38 (.87)[b]	F (2,243) = 12.19, $P <$ 0.001
Attitudes, mean (SD)	4.36 (1.28)	4.00 (1.36)[a]	4.54 (1.33)[b]	4.48 (1.14)[b]	F (2,243) = 3.99, $P <$ 0.05
Norms, mean (SD)	3.71 (1.47)	3.44 (1.49)[a]	4.42 (1.41)[b]	3.32 (1.31)[a]	F (2,243) = 15.42, $P <$ 0.001
Perceived behavioral control, mean (SD)	3.75 (1.61)	4.09 (1.64)[a]	4.12 (1.59)[a]	4.93 (1.58)[b]	F (2,243) = 10.01, $P <$ 0.001
Intention to recommend MC to the chronic pain vignette, mean (SD)	4.86 (1.67)	4.62 (1.71)	4.97 (1.73)	3.98 (1.65)	F (2,241) = .92, P = 0.4
Intentions to recommend MC to the cancer vignette, mean (SD)	5.53 (1.51)	5.86 (1.09)[a]	4.94 (1.88)[b]	5.77 (1.28)[a]	F (2,242) = 9.43, $P <$ 0.001

Note: Values in the same row not sharing the same superscript are significantly different at $P < .05$ in the two-sided test of equality for column means. Tests are adjusted for all pairwise comparisons using the Bonferroni correction.

constructs were centered to avoid multicollinearity. Multicollinearity statistics were calculated, and results showed that no variance inflation factor value exceeded 2.3, suggesting that multicollinearity did not influence the results. In the third step, the interactions between each of these variables and the medical specialty were entered, to examine whether there are group differences in the strength of the associations between "perceived knowledge" and TPB constructs and physicians' intentions to recommend MC.

Results

Sample Characteristics

In total, 247 questionnaires were completed by family physicians ($n = 98$, 39.7%), oncologists ($n = 80$, 32.4%), and physicians who work in pain medicine ($n = 69$, 27.9%). The mean age was 47 (SD = 11.87), and the majority of respondents were males ($n = 147$, 60.2%) who work in the national health system ($n = 240$, 97.6%, see Table 2). Compared with the other groups, pain physicians were older and had worked longer. This probably reflects the fact that pain medicine is a "second specialty" in Israel, that is, physicians must be certified in another specialty before they can specialize in pain medicine.

Pain physicians had less favorable attitudes toward recommending MC than the two other specialty groups; oncologists had more permissive norms regarding MC recommendation than the two other specialty groups; and family physicians had higher perceived control than the two other specialty groups. In addition, compared with pain physicians and oncologists, the "perceived knowledge" level of family physicians was lower. Intentions to recommend MC to

the cancer clinical vignette were higher than intentions to recommend to the chronic pain vignette (means: 4.86 and 5.53, respectively).

Intentions to Recommend MC to Patient With Chronic Pain

Intentions to recommend MC to the patient with chronic pain was not associated with gender, seniority, or specialty (Table 3). The addition of "perceived knowledge" and TPB variables in Step 2 increased the explained variance from 0.8% to 15.7%. More positive attitudes ($\beta = 0.3$, $P < 0.01$), higher perceived control ($\beta = 0.21$, $P < 0.01$), and lower "perceived knowledge" ($\beta = -0.31$, $P < 0.01$) were all significantly associated with higher intentions to recommend MC to the patient with chronic pain. None of the interactions were significant, indicating that there was no moderation by specialty.

Intentions to Recommend MC to Patient With Cancer

Table 3 presents the results of the regression analyses predicting intentions to recommend MC to the cancer patient vignette. Oncologists were less likely to have positive intentions to recommend MC to this vignette ($P < 0.01$), whereas seniority and gender were not associated with intentions. When adding in "perceived knowledge" and TPB constructs, attitudes was the only variable that had a main effect on intentions to recommend MC ($\beta = 0.26$, $P < 0.01$), so that positive attitudes toward MC recommendation predicted greater intentions to recommend MC to the cancer patient vignette. The addition of "perceived knowledge" and TPB variables in Step 2 increased the explained variance from 5.5% to 11.5%. With

Table 3
Predicting Intentions to Recommend MC to Patient Vignettes: Hierarchical Linear Regression Analyses (Unstandardized Regression Coefficients)

Model/Variable	Chronic Pain Patient Vignette			Cancer Patient Vignette		
	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3
Adjusted R^2	0.8%	15.7%	15.7%	5.5%	11.5%	22.3%
1. Seniority	0.008	0.001	0.003	−0.001	−0.005	0.000
Gender	0.124	0.120	0.106	−0.041	−0.035	−0.001
Specialty: Oncology	0.328	−0.174	−0.178	−0.928[a]	−1.125[a]	−1.273[a]
Specialty: Family	0.305	0.074	0.072	−0.121	−0.212	−0.367
Specialty: Pain						
2. Attitudes		0.304[a]	0.465[a]		0.262[a]	0.212
Norms		0.198	−0.039		0.004	−0.0095
Control		0.212[a]	0.221		0.118	−0.074
Knowledge		−0.318[a]	−0.319[a]		−0.060	−0.053
3. Attitudes x Oncology			−0.224			−0.088
Attitudes x Family			−0.258			0.147
Norms x Oncology			0.191			0.128
Norms x Family			0.354			−0.024
Control x Oncology			0.209			0.686[a]
Control x Family			−0.172			−0.009

[a]$P < 0.05$.

the inclusion of interaction terms, the model was significant and the explained variance was further increased to 22.3%. The interaction of "perceived behavioral control" and "specialty" was significant ($\beta = 0.68$, $P < 0.01$). To ease the interpretation of this result, we plotted the predicted scores (see Fig. 1). The figure illustrates that among oncologists with low perceived control, intentions to recommend MC were particularly low and that the intentions for this group increase substantially as perceived control becomes higher. This is in contrast to the two other physician groups where perceived control was unrelated to intentions to recommend MC.

Discussion

As MC policies continue to develop around the world, and given the important role of physicians in the implementation of such policies, it is essential to examine physicians' practices and to consider their willingness to implement policies by integrating MC into health care. The present study relied on a behavioral theory, which has previously been used to investigate health care professionals,[33−36] to examine the underlying factors that may affect physicians' decisions regarding MC within their clinical practice. Although previous studies have shown that attitudes, subjective norms, and perceived behavioral control affect a range of clinical decisions, future studies would benefit from examining whether any of these constructs may affect MC practices more strongly than other, less controversial, medical practices.

Overall, respondents had higher intentions to recommend MC to the patient with cancer presented in the clinical vignette than to the patient with chronic

pain. Although this difference may be related to the dissimilarities across the vignettes, both patient scenarios were indeed validated as eligible cases for MC recommendation according to the Israeli policies. Furthermore, there were more psychosocial (nonmedical) factors associated with intentions to recommend MC to the patient with chronic pain than to the patient with cancer. Specifically, whereas intentions to recommend MC to the patient with cancer were associated with more favorable attitudes, physicians' intentions to recommend MC to the patient with chronic pain were associated with more favorable attitudes, higher level of perceived control, and lower level of "perceived knowledge." Combined, these results suggest that MC recommendation is more contested within the chronic pain field than in the oncology field.
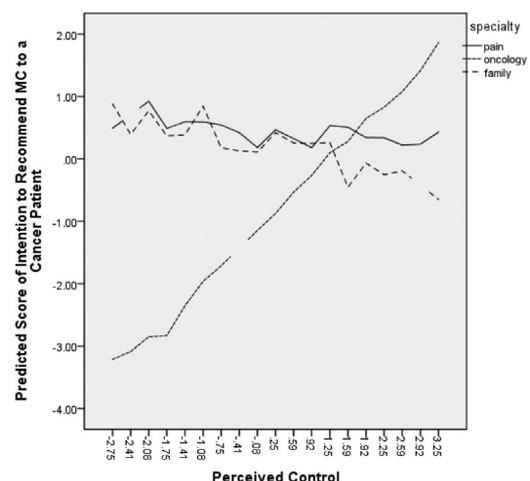

Fig. 1. Interaction of perceived control and specialty groups.

These results echo previous studies of health care providers who have found that clinicians who treat patients with cancer reported more positive perceptions of MC than in other fields of medical care.[10,11,37] More favorable consideration of MC for patients with cancer may be explained by the fact that cancer has pathogenic mechanisms that have been identified and its diagnosis is acquired by pathological markers.[31] This stands in contrast to chronic pain, which is primarily diagnosed relying on subjective patient reports. Consequently, physicians' decisions about MC recommendation for patients with chronic pain are based on trust, and not merely on biomedical criteria, which may be a reason for why social factors are more central to decisions on whether to recommend MC to chronic pain. Not only is it plausible that the subjectivity of chronic pain renders MC as particularly contested, patients with chronic pain are also expected to use MC for extended periods, which may be associated with more uncertainties regarding adverse effects. Moreover, intentions to recommend MC to patients with chronic pain may be associated with physicians' concerns about addiction to pain medications,[31] alluding to why social factors are more essential in these cases.

The present study also finds that psychosocial factors predict intentions to recommend MC over and above "perceived knowledge" of MC, which suggests that factors other than knowledge are likely to be linked to MC recommendation practices. Thus, in addition to knowledge provision, physicians' training should be developed in a way that acknowledges that attitudes, norms, and perceived control may relate to MC practices.

Surprisingly, physicians in the present study who assessed higher levels of "perceived knowledge" of MC had lower (as opposed to higher) intentions to recommend MC to the patient with chronic pain. It is plausible that more knowledge related to MC means more awareness about the uncertainties regarding safety and efficacy of MC treatment, and thus lower intentions to recommend it to patients. It may additionally be the case that these physicians are more knowledgeable in other medical treatments as well and thus are more reluctant to consider MC. Nevertheless, our measurement of "perceived knowledge" should not be considered to be an accurate or objective knowledge, but rather it is physicians' perception of their knowledge. Indeed, it may be that participants hold myths or misconceptions about MC but still perceive themselves to be knowledgeable. In light of recent calls on physicians' needs for more knowledge about MC,[32] more studies are needed to test the effects of knowledge provision on physicians' intentions to integrate MC into their practice. Future research should additionally examine the associations between perceived and actual knowledge of MC among medical personnel.

Interestingly, family physicians and chronic pain physicians were more likely than oncologists to intend recommending MC to the cancer patient vignette. According to the Israeli regulations, MC may be recommended to patients with cancer only by oncologists. It may be that physicians who are not eligible to recommend MC to patients with cancer are less reluctant to consider MC as a treatment option. This is similar to what was recently found in a study of health care providers; providers who were ineligible to certify for MC held more favorable views toward MC than physicians who were eligible to certify.[37] This may be explained by the fact that eligible physicians may be more vulnerable to legal and professional ramifications when certifying for MC that might jeopardize their professional license or their clinical reputation.

Given our study design, actual recommendation practices could not be measured directly in the present study. Future studies would benefit from obtaining measures of actual clinical practices. We did, however, use clinical vignettes, which are largely accepted as a good behavior simulation for examining physicians' decisions.[38,39] Specifically, the clinical vignettes were verified as good representations of eligible patients for MC through consensus among a panel of experts in a Delphi process (in press). In addition, previous studies suggest that intentions are strongly associated with actual behavior.[40,41]

While the present study is a first step toward understanding the integration of MC into the clinical practice, the vignettes were developed according to the Israeli regulations and guidelines and were validated as describing patients with high eligibility for MC recommendation by an expert panel through a Delphi process (in press). Nevertheless, these vignettes may not represent typical cases in other jurisdictions. Another limitation is that our findings relied on self-reports of physicians, who may have only a limited ability to assess accurately their own competence.[42,43] Furthermore, we used a convenience sample and it is uncertain how well the sample is representative of physicians in Israel. Indeed, given that MC is a contentious topic, it is possible that people in the medical community with particularly strong attitudes and feelings toward it would be particularly likely to take part in the survey. Nevertheless, the physicians surveyed practice in a wide array of settings—in hospitals as well as in outpatient and community clinics—and in different geographical areas of Israel.

In conclusion, the present study suggests that factors beyond clinical practice and knowledge, such as attitudes, norms, and perceived control, are likely to impact clinical practices related to MC. In other

words, the implementations of MC policies may be affected not only by medical considerations. Any attempt to improve or change MC recommendation practices should therefore go beyond knowledge provision. The finding that more of the TPB constructs were related to intentions to recommend MC to the patient with chronic pain than to the cancer patient suggests that chronic pain field is a particularly contentious field for MC. At the same time, oncologists had lower intentions to recommend MC to the patient with cancer, which suggests that reservations toward MC may be additionally prevalent in oncology.

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