ORIGINAL ARTICLE

Annals of Agricultural and Environmental Medicine 2025, Vol 32, No 2, 255–261
www.aaem.pl

Medical marijuana – knowledge and opinions of primary care physicians in Lublin province, Poland

Magdalena Florek-Łuszczki[1,A,C-D,F] ✉, Piotr Choina[1,B,F], Stanisław Lachowski[2,C,F], Jarosław Chmielewski[3,B,D,F], Jarogniew J. Łuszczki[4,B-C,E-F]

[1] *Department of Medical Anthropology, Institute of Rural Medicine, Lublin, Poland*
[2] *Institute of Sociology, Maria Curie-Skłodowska University, Lublin, Poland*
[3] *Department of Public Health, Medical Academy of Applied and Holistic Sciences, Warsaw, Poland*
[4] *Department of Occupational Medicine, Medical University, Lublin, Poland*
A – Research concept and design, B – Collection and/or assembly of data, C – Data analysis and interpretation, D – Writing the article, E – Critical revision of the article, F – Final approval of the article

Florek-Łuszczki M, Choina P, Lachowski S, Chmielewski J, Łuszczki JJ. Medical marijuana – knowledge and opinions of primary care physicians in Lublin province, Poland. Ann Agric Environ Med. 2025; 23(2): 255–261. doi: 10.26444/aaem/204099

Abstract

Introduction and Objective. After the legal approval of medical marijuana for therapeutic use in patients in Poland in 2017, it was important to assess the ability of primary care physicians (PCPs) to prescribe it to patients with various diseases. The aim of the study was to investigate the knowledge and opinions of PCPs regarding the possibility of prescribing medical marijuana, and in particular to obtain information about preparation of PCPs to prescribe it in clinical practice.

Materials and Method. A survey containing 28 questions was carried out from 2020 – 2022 among PCPs employed in primary healthcare in the Lublin province of Poland. Answers of 293 (out of 301) respondents underwent statistical analysis with CATREG (categorical regression with optimal scaling using alternating least squares) to determine predictors affecting the level of knowledge about medical marijuana.

Results. Almost 90.8% of surveyed PCPs correctly identified the active ingredient of medical marijuana, assessed its acceptability (70.2%), differences in the use of marijuana and synthetic cannabinoids (60.1%), and the possibility of conducting clinical trials using cannabinoids in Poland (57.3%). Only 21.2% of respondents knew that there are legal guidelines in Poland, allowing the issue of prescriptions for medical marijuana, and 15.7% of respondents correctly identified the addictive potency of marijuana. The biggest problem for the surveyed PCPs was to indicate correct answers about the plants from which cannabinoids are extracted, the main physiological effects of marijuana and the negative consequences of its use.

Conclusions. The surveyed PCPs self-esteemed that they have limited knowledge about medical marijuana and its clinical use in treating patients. More educational activities related with medical marijuana should be initiated for family doctors.

Key words

knowledge, opinion, medical marijuana, primary care physicians

INTRODUCTION

Legalization for the recreational and medical use of cannabis in the treatment of various diseases, initiated in the USA and Canada, is spreading to other countries worldwide, including central and eastern Europe [1]. Advances in scientific research and public awareness of the benefits of cannabinoids have contributed to increased interest in the therapeutic potential of cannabinoids [2]. However, there is a huge gap between regulations allowing physicians to prescribe cannabinoids to patients, and evidence-based research regarding the use and dosage of cannabinoids in some specific clinical situations [3].

The most documented effect of cannabinoids is their use in cancer patients where cannabinoids are used in palliative care for their pain-relieving effects, reducing nausea and vomiting associated with chemotherapy, and stimulating appetite in people debilitated by the disease [4]. On the other hand, common side-effects of cannabinoids, such as cognitive impairment, fatigue, dizziness, dry mouth, cardiovascular problems and psychoactive effects, should also be taken into account when prescribing cannabinoids to patients [5, 6]. It is important to emphasize the fact that tolerance to these side-effects develops very quickly in almost all patients, and cannabinoid withdrawal symptoms rarely occur [7, 8].

The main problem in cannabinoid therapy is a serious deficit of clinical studies indicating their clear effectiveness compared to classic standardized therapies in a given disease. Numerous reports on the single use of cannabinoids for recreational purposes allow the results to be transferred to clinical trials; hence, for example, the topical use of cannabinoids in glaucoma [9, 10]. In turn, the use of cannabinoids when other therapeutic methods have proved ineffective is not an ideal solution for assessing the effectiveness of cannabinoids in such therapy. However, any confirmation of the effectiveness of the cannabinoid-based therapy – even subjective – provides patients with a chance to improve the quality of their lives [11, 12].

Although the use of cannabinoid therapy at the end of the decision-making chain, e.g. in the treatment of therapy-resistant glaucoma or refractory neuropathic pain, can improve the patient's quality of life, at the same time, an ethical question arises regarding the possibility of an earlier

✉ Address for correspondence: Magdalena Florek-Łuszczki, Department of Medical Anthropology, Institute of Rural Health, Jaczewskiego 2, 20-090 Lublin, Poland
E-mail: magdalena.florek@wp.pl

Received: 19.03.2025; accepted: 16.04.2025; first published: 25.04.2025

and quicker introduction of such a cannabinoid-based therapy [13, 14]. Experts and clinicians have to decide whether or not to take the risk of introducing cannabinoids earlier into the therapy to prevent the development of a treatment-resistant condition [13]. On the other hand, the experience of clinical use of cannabinoids is limited to centres of the highest (third or fourth) reference level, where therapies are carried out using advanced classical methods or experimental therapies, and in the case of their ineffectiveness, patients are prescribed cannabinoids, or the patients themselves search for cannabinoid-based therapies [15]. Available clinical trials advocate the treatment of some diseases with cannabinoids in extremely difficult conditions, including drug resistance in epilepsy (Epidiolex® in Dravet syndrome) [16, 17].

Western medicine, based generally on chemical drugs (medicines), is reluctant to use herbs and medicinal plants in therapy, even though some of them have a well-established position regarding their use based on a thousand-year-old tradition and experience. Examples include green tea and cannabinoids, which have been used in Traditional Chinese Medicine and Ayurvedic Medicine for millennia [18, 19]. Of note, the negligence or ignorance of the effectiveness of herbs by western medicine limits their therapeutic use, even if cannabinoids have been effectively used in many diseases for millennia [19, 20].

Cannabinoids have always aroused emotions due to their psycho-stimulating properties, which is the reason for their use being strictly controlled [21, 22]. However, lack of clinical experience, and sometimes evidence-based knowledge, may be a potential barrier to prescribing cannabinoids to patients.

Poland belongs to the group of 21 countries among the 27 countries of the European Union where the use of medical marijuana is legal. In Poland, in accordance with the current Law of 7 July 2017, amending the Law on Counteracting Drug Addiction and the Law on Reimbursement of Medicines, Foodstuffs for Special Dietary Purposes and Medical Devices [23], as of 1 November 2017, specialist doctors and primary care physicians (PCPs) – family doctors – have had the possibility to prescribe authorized cannabinoid-containing medicines. In Poland, any form of cannabis preparations is now legally authorized for marketing, as long as it is prescribed by a doctor and the prescription is filled in a pharmacy. Given that PCPs provide medical care to chronically ill patients on a continuous basis, the attitude of PCPs toward the use of cannabinoid preparations in the treatment of patients with relevant indications has become the subject of research interest.

The aim of the study was to assess the level of knowledge regarding the prescription by PCPs of cannabinoids to patients for many diseases, and to reveal the concerns of the medical community about the limitations and boundaries related to the use of cannabinoids in patients.

MATERIALS AND METHOD

The survey was carried out from 2020 – 2022 among physicians employed in primary healthcare in the Lublin Province in south-east Poland, where approximately 1,000 physicians are employed in the aforementioned facilities. Although 301 physicians participated in the survey, the responses from 293 were included in the final statistical analysis. Since the size of surveyed sample amounted to 278 physicians (confidence level $\alpha = 0.95$), the total number of 293 physicians were selected as being representative for the population of primary care physicians (PCPs) in the Lublin province. It should be emphasized that although the study was carried out in the time period indicated above, the results obtained are up-to-date owing to the fact that, to date, the legislation on the issue of authorization to prescribe medical marijuana has not changed in Poland.

The research was carried out using a diagnostic survey method and an original survey questionnaire containing 28 questions. The survey was originally developed for this study, and an English language version of this survey has been presented as a supplementary file. The creation of the survey instrument involved an experienced researcher – a sociologist and a medical doctor – whose area of scientific interest includes research on the use of cannabinoids in the treatment of patients. Due to the Covid-19 pandemic, which covered the period of implementation of the study, the research was conducted using an auditorium survey technique in the first period, and from the second quarter of 2020, using an online survey technique.

The research was carried out within the framework of a scientific project funded by a grant from the Ministry of Science and Higher Education, entitled 'Attitudes of primary care physicians towards the use of medicinal marijuana in the treatment of patients'. The project received a positive opinion from the Bioethics Committee of the Institute of Rural Medicine in Lublin (Decision No. 6/2019).

Statistical analysis of data was performed with IBM SPSS Statistics. Both, chi-square test (for independent variables normally distributed) and categorical regression with optimal scaling using alternating least squares (CATREG) analysis (for independent variables non-normally distributed), were used in the study. Statistical significance was established at $p<0.05$.

RESULTS

The study sample amounted to 293 physicians. In the analysis of socio-demographic variables, such characteristics as the gender of the respondents, age, place of permanent residence and place of medical practice, length of service, specialties held were taken into account (Tab. 1). The majority of respondents (64.2%) were women. Taking into account the age of the respondents, young doctors formed the predominant group – 29-years-old or younger (39.9%); the smallest group – 50-years-old or older (27.0%). Most of the doctors (71.8%) lived in the city, and the vast majority practiced in primary care located in the city (74.8%). Slightly more than 40% of the doctors surveyed had a length of service of 10 years or more, and the smallest percentage of respondents had worked in the medical profession for 3 – 9 years. More than half of the physicians (52.9%) employed in primary healthcare had a specialty in family medicine only, the rest in family medicine and another additional specialty (e.g. paediatrics, neurology, diabetology, pulmonology).

One of the aims of the current survey conducted among the PCPs was to assess their level of knowledge about medical marijuana. Respondents first self-assessed their level of knowledge on the subject, and then responded to 11 questions related to the composition of medical marijuana, its effects and possible use in medical practice. In 6 single-

Table 1. Demographic and social data

Characteristics		No.	%
Gender	Female	188	64.2
	Male	105	35.8
	Total	293	100.0
Permanent place of residence	Urban	204	71.8
	Rural	79	28.2
	Total	280	100.0
Age	Up to 29 years old	124	39.9
	30 to 49 years old	90	33.1
	50 years old or more	79	27.0
	Total	293	100.0
Seniority in the	Up to 2 years	90	30.7
profession of physician	3 t – 9 years	78	26.6
	10 years or more	125	42.7
	Total	293	100.0
Place of medical practice within the framework of primary healthcare	City	219	74.8
	Village	61	20.8
	City and Village	13	4.4
	Total	293	100.0
Specialties possessed	Only family doctor	155	52.9
	Family doctor and others	138	47.1
	Total	293	100.0

*Lack of data was not considered

Table 2. Number of correct answers to multiple-choice questions on medical marijuana by gender

Number of correct answers in each aspect of knowledge	GENDER				Total	
	Women		Men			
	N	% *N=188*	*N*	% *N=105*	*N*	% *N=293*
Plants from which marijuana is extracted						
0	53	28.2	10	9.5	63	21.5
1	119	63.3	91	86.7	210	71.7
2	15	8	4	3.8	19	6.5
3	1	0.5	0	0	1	0.3
Main physiological impacts of marijuana						
0	14	7.4	8	7.6	22	7.5
1	89	47.3	33	31.4	122	41.6
2	76	40.4	64	61	140	47.8
3	9	4.8	0	0	9	3.1
Effects of marijuana on various human organs						
0	10	5.3	3	2.9	13	4.4
1	7	3.7	7	6.7	14	4.8
2	26	13.8	8	7.6	34	11.6
3	48	25.5	27	25.7	75	25.6
4	49	26.1	33	31.4	82	28.0
5	47	25	27	25.7	74	25.3
6	1	0.5	0	0	1	0.3
7	0	0	0	0	0	0
Therapeutic indications in which cannabis may be used						
0	1	0.5	2	1.9	3	1.0
1	23	12.2	12	11.4	35	11.9
2	63	33.5	36	34.3	99	33.8
3	101	53.7	55	52.4	156	53.2
Negative consequences of marijuana use						
0	96	51.1	49	46.7	145	49.5
1	58	30.9	31	29.5	89	30.4
2	31	16.5	22	21.0	53	18.1
3	3	1.6	3	2.9	6	2.0

choice questions, only one of the response categories was true (Tab. 3). The largest percentage of surveyed physicians correctly identified the active ingredient of medical marijuana (90.8%). A much smaller proportion of respondents correctly assessed the acceptability of medical marijuana (70.2%), the differences in the use of marijuana and synthetic cannabinoids (60.1%), and the possibility of conducting clinical trials using cannabinoids in Poland (57.3%). Only 21.2% of respondents knew that there are legal guidelines in Poland allowing the prescription of medical marijuana and 15.7% of respondents correctly identified the addictive potency of marijuana. The level of knowledge on the aforementioned marijuana-related issues was very similar among men and women. Only on the question of conducting clinical trials in Poland using cannabinoids had a higher percentage of correct answers in the group of women than in the group of men, but the differences were not statistically significant.

The remaining questions on marijuana knowledge were multiple-choice questions with varying numbers of correct answers (Tab. 2), including plants from which marijuana is extracted (3 correct answers, i.e.: *Cannabis sativa*, *Cannabis indica* and *Cannabis ruderalis*), the main physiological effects of marijuana (3 correct answers, i.e., effects on adipose tissue, neural transmission and cognitive function), effects of marijuana on various human systems and organs (7 correct answers, including effects on the immune system, nervous system, cardiovascular system, musculoskeletal system, and organ of vision, and no effects on respiratory and digestive systems), therapeutic indications for the use of cannabis (3 correct answers out of 8 correct answers proposed by the authors of the survey or the surveyed doctors, i.e. treatment of chronic pain, epileptic seizures, supportive in chemotherapy, obesity, cardiovascular diseases, rheumatoid arthritis, multiple sclerosis, diseases whose course is accompanied by muscle spasticity), and the negative consequences of marijuana use (3 correct answers out of 4 correct answers proposed by the authors of the survey or surveyed doctors, i.e. weakness, impairment, change in cognitive function, weight gain, increased appetite, motor slowing, impaired concentration, disturbances in thinking).

Analysis of the distribution of the number of correct answers to each question showed that the biggest problem for the doctors surveyed was to indicate 3 correct answers about the plants from which marijuana is extracted, the main physiological effects of marijuana and the negative consequences of its use. Gender was not a variable that significantly differentiated responses.

In order to assess the level of knowledge about the composition of medical marijuana, the respondents were asked about the difference in the effects of medical marijuana and synthetic cannabinoids, the strength of the addictive effect of marijuana, as well as the legal and organizational conditions for the use of medical marijuana by PCPs in the

treatment of patients (Tab. 3). Analysis of the obtained data showed that the biggest problem for the surveyed doctors was to determine the strength of the addictive effect of marijuana on a 10-point scale. The correct answer, which was '7', was given by only 15.7% of doctors. Only 1 in 5 physicians surveyed had knowledge of the guidelines allowing them to issue prescriptions for medical marijuana, and just over half of respondents were aware that clinical trials using cannabinoids are underway in Poland. The highest percentage of correct responses (90.8%) from respondents related to knowledge of the active ingredient in medical marijuana – cannabinoids. Gender was not a variable that significantly differentiated responses.

Table 3. Correct answers to single-choice questions on medical marijuana by gender

Question	Men (%)	Women (%)	Total (%)
Active ingredient of marijuana	93.3	88.3	90.8
Admissibility of using medical marijuana	71.2	69.7	70.2
Difference in the effects of medical marijuana and synthetic cannabinoids	59.0	60.6	60.1
Conducting clinical trials using cannabinoids in Poland	53.3	59.6	57.3
Existence of legal guidelines allowing for the issuance of prescriptions for medical marijuana	21.0	21.3	21.2
Addictive effect of marijuana	15.2	16.0	15.7

Elements of knowledge about medical marijuana were assessed and the corresponding number of points were assigned for correct answers. Each correct answer to the questions on knowledge of medical marijuana received 1 point (Tab. 4). A respondent could receive 24 points for all correct answers. None of the respondents received the maximum number of 24 points, and only 4 gave 18 correct answers (the highest number of points in this group of respondents). At the same time, 7.8% of the surveyed physicians indicated a very small number of correct answers (6 or less correct answers). Assuming that a positive assessment of the level of knowledge about marijuana is held by those who obtained a minimum of 50% plus one of the total number of correct answers (13 correct answers), it was found that 64.2 respondents did not obtain a positive assessment. Table 5 shows the sum of correct answers obtained by each respondent.

Taking into account the highest number of points obtained (18), the respondents were divided into 3 groups according to the number of points obtained on a scale from 1 – 18. A low or very low level of knowledge about marijuana was determined against those who gave less than 10 correct answers. Knowledge at an average level was determined when the number of correct answers was between 10 – 13, while those who gave 14 – 18 correct answers were assigned a rather high level of knowledge. Taking this scale, it was found that 19.8% of respondents had a low or very low level of knowledge about medicinal marijuana, against 44.4% of respondents whose level of knowledge was assessed as average, and 35.8% of respondents had a rather high level of knowledge in this area. Analysis of the level of knowledge according to the independent variables showed that the number of years working in the medical profession was significantly related to the level of knowledge about medicinal marijuana (Tab. 6).

Table 4. Range of assessed knowledge (Knowledge Elements) about medicinal marijuana and number of points for correct answers.

No. of Question	No. of correct answers
The active ingredient in marijuana	1
Plants from which marijuana is extracted	3
Conducting clinical trials with cannabinoids in Poland	1
Impact on the immune system	1
Impact on the nervous system	1
Impact on the cardiovascular system	1
Impact on the musculoskeletal system	1
Impact on the respiratory system	1
Impact on the gastrointestinal system	1
Impact on the organ of sight	1
Main physiological effects of marijuana	3
Therapeutic indications in which medical marijuana may be used	3
Negative consequences of marijuana use	3
The addictive power of marijuana	1
Conducting clinical trials with cannabinoids in Poland	1
Permissibility of medicinal marijuana use	1
Total No. of points	24

Table 5. Total correct answers obtained by individual respondents (from a total of 24 correct answers)

Total No. of correct answers	N	%
1	1	0.3
2	2	0.7
3	1	0.3
4	2	0.7
5	4	1.4
6	10	3.4
7	8	2.7
8	9	3.1
9	21	7.2
10	20	6.8
11	28	9.6
12	40	13.7
13	42	14.3
14	46	15.6
15	24	8.2
16	22	7.5
17	9	3.1
18	4	1.4
	293	100.0

Table 6. Assessment of the level of knowledge by seniority in the medical profession

Level of knowledge	Up to 2 years		3 – 9 years		10 years and more		Total	
	N	%	N	%	N	%	N	%
Very low or low (<10)	15	16.7	10	12.8	33	26.4	58	19.8
Average (10 do 13)	46	51.1	30	38.5	54	43.2	130	44.4
Rather high (>13)	29	32.2	38	48.7	38	30.4	105	35.8
Total	90	100	78	100	125	100	293	100

Chi squared = 11.661. p=0.020; other independent variables did not significantly differentiate the level of knowledge

The overall index of the level of knowledge about medical marijuana, expressed by the sum of correct answers to specific questions, is contained on a scale of 1 – 18 (1 – 18 correct answers). To determine the predictors affecting the level of knowledge in this area, a CATREG (categorical regression with optimal scaling using alternating least squares) analysis was used as an alternative to linear regression, since the distribution of the independent variable – the level of knowledge about medical marijuana is significantly different from the normal distribution. In the theoretical model, the dependent variable is a quantitative variable – the index of the level of knowledge about medical marijuana. It was assumed that the level of knowledge about marijuana is related to 5 variables: gender of the respondents, age, seniority in the medical profession, place of residence, place of medical practice. Only 4 variables were included in the model, excluding the variable age, which is strongly correlated with the variable seniority in the medical profession (r=0.947) (Tab. 7).

Table 7. Determinants of doctors' level of knowledge about medicinal marijuana (categorical regression analysis using the optimal scaling method (CATREG))

Predictor (coding)	β	F	p	corrected R^2	Significance of the model	
					F	P
Gender (1 female, 2 male)	0.101	3.834	0.050	0.044	3.132	0.015
Seniority in the medical profession	-0.167	7.456	0.007			
Place of permanent residence (1 city; 2 village)	0.065	1.720	0.191			
Place of medical practice (1 city only; 2 village or village and city)	0.103	2.779	0.097			

CATREG's optimal scaling analysis identified an empirical model containing 2 variables that have a significant relationship with the level of knowledge about medicinal marijuana: gender of respondents (p=0.050), seniority in the medical profession (p=0.007). The model was statistically significant (F=3.132; p=0.015), and its predictors explain 4.4% of the variation in the level of knowledge about medicinal marijuana (adjusted R^2=0.044). The positive value of the β coefficient for the predictor gender of respondents indicated that male physicians have a significantly higher level of knowledge about marijuana than their female counterparts. Seniority in the medical profession was negatively related to the level of knowledge about marijuana. The longer the seniority in the medical profession, the lower the level of knowledge (β=-0.167; p<0.01). Seniority in the medical profession was a slightly stronger and more significant predictor of level of knowledge than the gender of the respondents.

DISCUSSION

The use of medical marijuana for medicinal purposes is a debated topic among doctors of various specialties in different countries. This is due to the lack of a uniform legal approach to prescribing medical marijuana to patients. The aim of the current study was an analysis of the knowledge of Polish primary care physicians about medical marijuana, its effects on the human body, and the legal possibilities of its application by family doctors.

The experience of family physicians practicing in Ontario, Canada, the country that in 2001 was the earliest to legalize medical marijuana, indicates continuing concerns about limited scientific evidence on the therapeutic use of medical marijuana, its negative effects on neurocognitive development, and potential exacerbation of mental illness in patients taking marijuana, and indicates a lack of exact knowledge among physicians about the interactions of marijuana with other medications in older adults [24].

The results obtained in the study show that the majority of Polish family doctors surveyed (90.8%) correctly identified the active ingredient of medical marijuana. At the same time, the biggest problem for the doctors in the study was to indicate 3 correct answers about the name of the plants, from which marijuana is extracted, the main effects of marijuana on the human body, and the negative consequences of its use.

In contrast, a survey of 201 primary care physicians in Israel found that after legalization of medical marijuana in 2016, its use for patients with various conditions, increased. More than half (51%) of the physicians surveyed confirmed that medical marijuana is an effective treatment method, and 75% of the physicians surveyed indicated a desire to increase their knowledge of the use of medical marijuana [25]. At the same time, another survey of 152 family physicians practicing in Israel found that 78% of them favoured the use of medical marijuana for patients, with 84% of doctors believing that medical marijuana helps cancer patients and 82% believing that it helps relieve chronic pain. The family physicians were aware of the psychiatric (82%) and neurological (78%) side-effects of marijuana. In addition, 95% of doctors believed that the main obstacle to prescribing medical marijuana is the possibility of patients abusing the drug [26]. The slight discrepancy between the 2 surveys conducted in Israel is due to physicians' prescriptions of medical marijuana (51% of physicians), compared to physicians' belief in the efficacy of medical marijuana for chronic pain (82% of physicians) and supportive treatment for cancer (84% of physicians).

The current study also shows that the higher level of knowledge of the younger generation of doctors, as opposed to their older colleagues, may be due to the fact that the modern medical curriculum contains issues related to the use of cannabinoids and their effects on the human body. It seems that young doctors acquired knowledge of the therapeutic uses of cannabis during their studies, while doctors with a longer tenure had to further their own education in this area to acquire a sufficiently high level of knowledge. Similar results were obtained in research conducted in Canada on a group of 83 medical students which showed that they had sufficient knowledge about the indications for the use of medical marijuana in various diseases; however, they were unable to present any contraindications to its use in clinical situations. Medical students reported the need for training to supplement their knowledge, especially regarding the addictive potential of marijuana and its long-term side effects [27].

Similar results were obtained in Poland during a survey of 6th-year medical students (n = 181), in which approx. 92.9% of young medics knew the therapeutic effects of medical marijuana, and at the same time, 99% expressed the need for more education dedicated to the medical properties of

medical marijuana [28]. In turn, 77.3% of 6th-year medical students supported the legalization of medical marijuana for medicinal purposes in Poland. A survey of the state of knowledge of young medics showed that future doctors knew the common indications for the use of medical marijuana, which included chronic pain management, cancer therapy by inhibiting vomiting, multiple sclerosis, depression, anorexia, cachexia, and glaucoma. One of the main problems reported by students, was the lack of systemic education of students about the therapeutic properties of medical marijuana [28].

Physicians in the USA have also indicated similar problems regarding the limited amount of training in the use of medical marijuana. A study conducted in the form of an online survey of 344 physicians in the state of Pennsylvania, found that only about 51% of clinicians had completed formal training in the use of medical marijuana. These physicians also indicated a need for more training on the effects of medical marijuana on patients with various comorbidities [29].

The problem of negative effects of medicinal marijuana use is being recognized by doctors and healthcare professionals in various countries. An online survey of 70 medical professionals among doctors, nurses and pharmacists in Canada found that the strongest obstacle to prescribing medical marijuana is the uncertainty among doctors about the safety of dosage and routes of administration of medical marijuana. At the same time, the study found that during the Covid-19 pandemic, a greater number of patients used medical marijuana to alleviate pandemic-related anxiety and depression [30].

A summary of physicians' knowledge and opinions on medical marijuana can be seen in a meta-analysis conducted in the PRISMA protocol on assessing physicians' and students' knowledge and attitudes toward medical cannabinoids, which analyzed the opinions of 15,200 respondents. The meta-analysis revealed that 89% of Canadian physicians and students, 83% of Israeli physicians and students, 76% of Serbian physicians and students, 59% of Irish physicians and students, and 45% of Australian physicians and students, were in favour of legalizing medical marijuana. Respondents in this meta-analysis noted the strong need for more education about the addictive properties of medical marijuana (potential to cause dependence and addiction). In addition, the meta-analysis showed that professionals showed more support for legalizing medical marijuana than students (52% vs. 42%). Surprisingly, the meta-analysis revealed that self-reported confidence about respondents' knowledge of medical marijuana was low for healthcare professionals in contrast to that of students (33% vs. 58%), respectively [31].

The current study shows that male physicians generally have a significantly higher level of knowledge about medical marijuana than their female counterparts, although there was a noticeable predominance of women in the group of doctors of the younger generation with a high level of knowledge about medical marijuana. Significantly higher levels of knowledge are presented by those with less seniority, and therefore those who graduated in the not-too-distant past. At the same time, it should be noted that only 19.8% of respondents presented a low level of knowledge about the possibility of using marijuana in patients with certain diseases. The obtained data revealed that the biggest problem for the surveyed doctors was to determine the strength of the addictive effect of marijuana on a 10-point scale. The correct answer, which was '7', was given by only 15.7% of doctors.

Only 1 in 5 surveyed physicians had knowledge of the guidelines allowing them to prescribe medical marijuana, and just over half of the respondents were aware that clinical trials using cannabinoids are underway in Poland.

In conclusion, the results obtained indicate an insufficient level of knowledge among family physicians about the therapeutic effect of medical marijuana and its possible side-effects, the legal possibilities of prescribing it to patients, and accompanying doubts. At the same time, it should be noted that the problem of limited knowledge of the therapeutic effect of medical marijuana and concerns about applying it to patients, does not apply only to doctors working in Poland. It is also perceived among doctors employed in other countries, such as the USA, Israel, Canada, Australia, Ireland, Norway, which is an indication of the educational needs of both medical students and already active doctors [24–26, 29–34]. Education, however, should be based on scientific evidence and guidelines regarding the indications for medical marijuana use and its side-effects, and successively updated as knowledge on the subject advances.

The main limitations of the study are related to the original research survey created specifically for this study, due to the lack of a standardized tool. Although the sample size is representative for the primary care physicians in a specific region – the Lublin province of Poland, the research area should be expanded so as to make a generalization for the population of primary care physicians in the whole of Poland.

CONCLUSIONS

1. The family doctors surveyed have limited knowledge about medical marijuana and its use in treating patients.
2. Significantly higher levels of knowledge about medical marijuana and the possibility of prescribing it to patients are held by male doctors, and those with short tenure.
3. Only 1 in 5 of the doctors surveyed had knowledge of the guidelines allowing them to prescribe medical marijuana, and one in two is aware that clinical trials using cannabinoids are underway in Poland.
4. The results obtained indicate the need for educational activities which should begin at the stage of study, and continue for the improvement of qualifications throughout the period of professional activity of family doctors, as well as doctors with other specialties.

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