

Original Research

Cannabis in Portugal - Knowledge, attitudes and training gaps of pharmacists and pharmaceutical sciences students

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Received (first version): 16-Jun-2024

Accepted: 30-Oct-2024

Published online: 20-May-2025

Abstract

Background: In 2018, the Law on the Use of Cannabis for Medical Purposes was passed in Portugal. The pharmacist, between the doctor and the patient, plays a fundamental role in the effective and safe use of this therapy. This study fills a gap in understanding the knowledge and opinions of pharmacists and pharmaceutical science students on medicinal cannabis in Portugal. **Objective:** The aim is to analyse the knowledge and opinions of pharmacists and future pharmacists on medicinal cannabis in Portugal. **Methods:** A survey was drawn up, based on other surveys used in international studies, adapting it to the national reality. It was divided into three parts: I) social-demographic data; II) knowledge, stigma and attitudes and III) training. The observational, cross-sectional study included a sample of 429 pharmacists and 190 pharmaceutical science students. The survey was distributed between December 2022 and May 2023 using social media and mailing lists. Data was analysed using descriptive statistics (using the SPSS platform, version 28). **Results:** We received 619 answers, 429 from pharmacists and 190 from pharmaceutical science students. Exploring the opinions, the majority of pharmacists seem to be receptive to issues such as the legalisation of the cannabis plant for recreational purposes, while pharmaceutical science students agree with the legalisation of the plant for recreational purposes and most were in favour of self-cultivation for medical use. Both cohorts agree that they have little knowledge on medicinal cannabis and most of the respondents felt they needed training. **Conclusion:** Increasing and improving the level of knowledge of these health professionals and future health professionals through under and post-graduate training is essential if the pharmacists are to maintain the same quality of services that their patients have grown used to, also in the area of medical cannabis. Clinical cases, current legislation and drug dispensing can be starting points in both cases.

Keywords: Cannabis; Medical Marijuana; Pharmacists; Students, Pharmacy

INTRODUCTION

In 2018 there was a paradigm shift in the history of cannabis in Portugal: the Law on the Use of Cannabis for Medicinal Purposes was passed. The passing of this law is in line with international events, as laws have been opening up to medicinal cannabis since the end of the 20th century. California was the first state to authorise the use of medical cannabis in 1996.¹ Since then, laws have been opening up to it globally. Europe is no exception.² According to this Portuguese law, the pharmacist, or whoever stands in for them if they are absent or not available,

dispenses at the community pharmacy prescribed cannabis-based medicines, formulations or substances.³

In Portugal, the community pharmacist is the first and last health professional to contact the patient. They are also the health professionals that patients have the easiest access to. As in other countries, i.e. Spain, pharmacists also carry out health promotion, health education and health information.⁴ In the case of cannabis-based medicines, formulations and substances, this is particularly important due to the specificities of the therapy. The pharmacist's role, which must be pro-active, is essential for monitoring the patient, adherence to therapy and, more generally, at an early stage, perceiving and reporting the effect of this therapy.

According to a study in Hamilton (Canada), a compulsory educational session taught by a pharmacist resulted in safer choices (particularly in terms of potency and administration routes). Pharmacists can play a key role in promoting the safe and appropriate use of this therapeutic option.⁵ Nearly five years after medicinal cannabis was introduced by law in Portugal, considering the number of applications for marketing authorisations (MA), the reaction of society, such as the creation of several national associations, as well as the growth in the use of this therapy at international level, the legal cannabis market is expected to expand in the near term, as a result of its growing therapeutic use.⁶ It is thus important to understand how health professionals and future health professionals are viewing this topic.

In a systematic review of health professionals' beliefs,

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knowledge and concerns about medical cannabis from 2019, three of the included studies (all published in 2016) only covered pharmacists. Two were conducted on the American continent, specifically in Canada and Minnesota (USA), and the third in Oceania, specifically in Australia. In the study that includes beliefs, 55 per cent of hospital pharmacists believed medicinal cannabis was mostly effective. Generally speaking, pharmacists' knowledge about medicinal cannabis on several levels, such as pharmacology, pharmacokinetics, pharmacodynamics, legislation and so on, was very poor. Most of the Canadian hospital pharmacists studied reported not having received any academic or professional training on the subject. Pharmacists also had concerns about side effects and drug interactions. They were interested in receiving more training in this area.⁷

More recently, a literature review focused on the beliefs and attitudes of pharmacists in several countries in different continents, namely Oceania, Europe and the Americas, who dispense medicinal cannabis through the pharmacy channel. Although the pharmacist plays a fundamental role in many of these countries, it is not known how they feel about counselling, dispensing and follow-up. Overall, it was possible to see that pharmacists do not mind dispensing the therapy, but they would like to receive more training in order to know more about the risks and benefits, *inter alia*, so that they can fulfil their functions more effectively and safely.⁸

In Connecticut, the results of a survey with pharmacists point to gaps in knowledge regarding medicinal cannabis and the need for more education on this subject.⁹ In Jordan, despite the fact that these medicines are still unavailable, a pilot study was carried out with pharmacists, which also pointed to an inadequate level of knowledge on the pharmacology of cannabinoids.¹⁰ In Australia, the conclusions point in the same direction.¹¹ In recent years, studies on knowledge, attitudes and beliefs of health professionals, and pharmacists in particular, have been gaining interest all over the world. This is reflected in a 2022 narrative review on pharmacists and medicinal cannabis, which emphasises the lack of knowledge of pharmacists, who feel ill-prepared to adequately answer their patients' questions.¹² Pharmaceutical science students are Portugal's future pharmacists, so assessing their knowledge, attitudes and training needs is equally important.

A review of the literature showed that future pharmacists (both in the US and Serbia) need to be better educated in order to advise on and dispense medicinal cannabis.⁸ Studies in Europe are sparse, and we identified no studies in most European countries that assess the knowledge and attitudes of health professionals towards medicinal cannabis.¹³ The scarcity of studies on pharmacists' perceptions and experiences with medicinal cannabis needs to be addressed in order to respond to growth of this sector.¹² We were unable to find any such study with pharmacists and/or students of pharmaceutical sciences that mirrored the national reality. Understanding the knowledge, attitudes and training needs of pharmacists and pharmaceutical science students in Portugal is necessary.

In this article, we will therefore focus on pharmacists and

students of pharmaceutical sciences in Portugal and their views, opinions, knowledge and training needs.

The following are the objectives of this study

- To find out about the position, opinions and experience of these two cohorts on issues that have been discussed in society and by the Portuguese government concerning cannabis;
- To analyse knowledge about medicinal cannabis in Portugal and whether these cohorts feel they know enough about it to advise and monitor their users;
- To identify training needs in this area and the topics of interest.

METHODS

A questionnaire was developed, with around 62 questions, based on questionnaires used abroad and adapted to the national reality^{14 15 16 17}. We tried to include questions on the knowledge, attitudes and stigma, and inquired about available training and training needs. The questionnaire asks about cannabis and its use for recreational and medicinal purposes. We can divide the questionnaire into three main parts: I) social-demographic data; II) knowledge, stigma and attitudes; and III) training. In some questions we used a 5-point Likert scale. The survey was then validated by experts (in terms of content and comprehension) and non-experts (for the average response time). The study was submitted to the Ethics Committee of the Faculty of Medicine of the University of Coimbra, which approved it (CE_Proc. CE-185/2022).

The survey was sent out through institutional e-mails, mailing lists and social media (facebook, linkedin, whatsapp) between 28 December 2022 and 29 May 2023 to pharmacists and students of pharmaceutical sciences (hereafter the students), and other professionals. It was advertised on the channels of the Order of Pharmacists and the National Pharmacies Association, and at Pharmacy Faculties and Pharmacy Student Associations, in order to reach as many pharmacists and students as possible to minimise selection bias.

Considering the total number of Portuguese pharmacists and students, the minimum size of the sample calculated to ensure 95 per cent confidence interval and 5 per cent margin of error, according to the Raosoft website (<http://www.raosoft.com/samplesize.html>) was 375 pharmacists, and for a 90 per cent confidence interval at least 256 students were necessary.

All the responses from the participants in the pharmacist and the student cohorts were considered valid.

In this observational, cross-sectional study, data was collected online and analysed using the SPSS platform (version 28). Descriptive statistics were used. The mean and standard deviation helped characterise the quantitative variables and percentages for the distribution of the nominal variables.

RESULTS

In total 429 pharmacists and 190 students answered the survey. All answers were considered valid. In the case of pharmacists,



a 95 per cent confidence interval was obtained, with a margin of error of 5 per cent; due to the number of student replies the confidence interval was below 90 per cent. Of the participating pharmacists, 78.3 per cent were women and 21.7 per cent men. The youngest respondent, a pharmacist, was 23 years old and the oldest was 80 years. The average age of the pharmacists was 39.60. Women made up 84.2 per cent of the students and the average age was 21.40, with the youngest being 18 and the oldest 53 years. Most of the pharmacists taking part in the survey worked in community pharmacies. The majority of the students were in their 3rd year, followed by those in the 5th year, although all years of the course were represented.

Opinion and experience

Table 1 summarises the opinion of the participants in both cohorts regarding self-cultivation of the cannabis plant for medical and recreational purposes, and the legalisation or liberalisation of the cannabis plant for recreational use. Among the respondents who agree with the liberalisation and/or legalisation of cannabis for recreational use, 48.7 per cent of the pharmacists say it should be sold in places fit for purpose, 43.5 per cent in pharmacies, 6.9 per cent in places where alcohol and tobacco are sold and 0.8 per cent in other places. As for the student group, 46.2 per cent chose the answer “in places fit for purpose”, 48.5 per cent “in pharmacies” and 5.4 per cent chose “in places where alcohol and tobacco are sold”.

Table 2 shows the results when asked if they knew anyone who uses cannabis or if they themselves have ever used it to treat symptoms or illnesses. In relation to the first question, when asked whether such use had been legal or illegal 51.1 per cent of pharmacists answered legally, 21.5 per cent said illegally, 14.0 per cent say they have used it both ways and 13.4 per cent did not know. With regard to the student group, 56.8 per cent said “legally”, 20.5 per cent “illegally”, 13.6 per cent “both ways” and 9.1 per cent did not know.

Considering the second question in the table, when asked

why they use cannabis, anxiety was the most frequent answer provided by most pharmacists and students. In this case, the illegal form was the answer that the pharmacists (47.6 per cent) and the students (58.3 per cent) who answered this question gave the most. “I prefer not to answer” was the answer of 14.3 per cent of pharmacists who had already used cannabis as consumers to treat symptoms and illnesses, against 16.7 per cent of students.

When asked whether a patient had ever asked them about cannabis for medicinal use, 42 per cent of pharmacists answered affirmatively and 48.7 per cent said no. In the case of students, 8.9 per cent were affirmative and 51.6 per cent answered negatively. When the participant pharmacists were asked if they had patients who could benefit from the use of cannabis for medicinal purposes, 63.2 per cent said they did, 1.9 per cent answered negatively, 26.1 per cent chose “neither agree nor disagree” and 8.9 per cent did not answer. Regarding “I believe I have patients who are illegally using cannabis to treat symptoms or illnesses”, 35.6 per cent gave a positive answer, 21.5 per cent answered negatively, 36.6 per cent chose “neither agree nor disagree” and 6.3 per cent did not answer.

When confronted with the statement “The Law on Cannabis for Medicinal Use in Portugal responds to the needs of patients”, 50.6 per cent of pharmacists chose the option “neither agree nor disagree”, 38.2 per cent disagreed and 11.2 per cent agreed. In the case of students, 48.4 per cent answered “neither agree nor disagree”, 45.2 per cent answered negatively and 6.3 per cent positively. On the affordability of cannabis-based medicines, formulations or substances, 42.2 per cent pharmacists “neither agree nor disagree”, 53.8 per cent disagreed and 4 per cent agreed. In the student group, 65.3 per cent chose “neither agree nor disagree”, 32.1 per cent answered negatively and 2.6 per cent answered affirmatively.

Knowledge

With regard to their knowledge of the situation in the country

Table 1 - Opinion of pharmacists (n= 429) and pharmaceutical science students (n=190) regarding self-cultivation of the cannabis plant for medicinal use, for recreational use and regarding legalisation and liberalisation for recreational use.

		Yes		No		I have no opinion		Total	
Questions	Cohort	Frq	%	Frq	%	Frq	%	Frq	%
Do you agree with self-cultivation of the cannabis plant for medical use?	P	153	35.7	229	53.4	47	11.0	429	100
	SPC	105	55.3	68	35.8	17	8.9	190	100
Do you agree with self-cultivation of the cannabis plant for recreational use?	P	73	17	307	71.6	49	11.4	429	100
	SPC	46	24.2	114	60	30	15.8	190	100
Do you agree with legalisation of the cannabis plant for recreational use?	P	229	53.4	168	39.2	32	7.5	429	100
	SPC	117	61.6	55	28.9	18	9.5	190	100
Do you agree with the liberalisation of the cannabis plant for recreational use?	P	111	25.9	285	66.4	33	7.7	429	100
	SPC	75	39.5	87	45.8	28	14.7	190	100

(P - Pharmacists; SPC - Students of Pharmaceutical Sciences)



Table 2 - Results of the answers of pharmacists (n=429) and students of pharmaceutical sciences (n=190) to the questions: “Do you know anyone who uses or has used cannabis to treat symptoms or diseases?” and “Have you used cannabis as a consumer to treat symptoms or diseases?”

Questions	Cohort	Yes		No		Total	
		Frq	%	Frq	%	Frq	%
Do you know anyone who uses or has used cannabis to treat symptoms or diseases?	P	183	42.7	246	57.3	429	100
	SPC	42	22.1	148	77.9	190	100
Have you ever used cannabis as a consumer to treat symptoms or diseases?	P	16	3.7	413	96.3	429	100
	SPC	8	4.2	182	95.8	190	100

(P - Pharmacists; SPC - Students of Pharmaceutical Sciences)

regarding the cannabidiol (CBD) and tetrahydrocannabinol (THC) content of the only medicinal cannabis-based substance authorised by INFARMED for sale in Portuguese community pharmacies at the time of the study, 23.3 per cent of pharmacists chose the correct answer, 66.2 per cent answered “don’t know” and the rest chose the wrong answers. As for the students, 17.9 per cent answered correctly, 64.7 per cent did not know and the rest chose the wrong answers.

When asked about the therapeutic indications approved in Portugal, the majority in all situations said they did not know, except for chronic pain, where “yes” was chosen by 83.0 per cent of pharmacists and 75.8 per cent of students, and spasticity associated with multiple sclerosis or spinal cord injuries for which 54.1 per cent of pharmacists said it was a therapeutic indication in Portugal. Among the pharmacists who took part, 15.4 per cent felt that their knowledge was sufficient to advise patients on the use of medical cannabis, 15.9 per cent neither agreed nor disagreed and most of the answers (68.8 per cent) were negative. Likewise, a small number of student respondents answered yes (7.9 per cent), 14.7 per cent said they “neither agreed nor disagreed” and 77.4 per cent believed their knowledge was not sufficient to advise patients on the use of cannabis for medicinal purposes.

Table 3 shows the results of the questions about knowledge concerning the biological effects of THC and CBD, the psychotropic effects and the Law on Cannabis for Medicinal Use, both with regard to prescription and dispensation. In the pharmacists’ group, 40.1 per cent said they knew at least one

medical cannabis cultivation company in Portugal and 59.9 per cent said they did not know any. In the case of students, 32.1 per cent knew a company, while 67.9 per cent said they did not know any. There were 31 per cent of pharmacists who said that the topic “cannabis” had been addressed in university and 69 per cent responded negatively. In the student group, 67.4 per cent said they had discussed it, while 32.6 per cent reported not having addressed it at university. After graduating, 79 per cent of the pharmacists who answered this question had not attended any training on cannabis.

DISCUSSION

This study focuses on the knowledge, attitudes, experiences and training needs of pharmacists and future pharmacists in Portugal in the topic of cannabis. We believe our pharmacist cohort is representative, both in terms of the number of participants and gender: 78.3 per cent were women and 21.7 per cent men. On the website of the Order of Pharmacists (2020 data), according to the data used to calculate the sample, 80 per cent of professionally active pharmacists are women and only 20 per cent are men, which is similar to our pharmacist cohort. On the other hand, student representation (data from the 2021/2022 academic year) is not as good as for the pharmacist sample, since we did not obtain the number of student responses needed to achieve a 90 per cent confidence interval, and gender representation alike. The majority of the participating students were female (84.2 per cent), equivalent to student population in the country, according to the data

Table 3- Results of the questions about knowledge of the biological effects of THC and CBD, with regard to psychotropic effects and knowledge of the Law on the Use of Cannabis for Medical Purposes, concerning prescription and dispensation

Questions	Cohort	Totally agree	Agree	Do not agree nor disagree	Disagree	Totally disagree
		%	%	%	%	%
I know the biological effects of THC and CBD, in terms of their psychotropic effects	P	13.1	34.7	15.2	28.0	9.1
	SPC	7.9	38.4	16.3	20.5	16.8
I am familiar with the Law on the Use of Cannabis for Medical Purposes, as far as prescription is concerned.	P	7.0	21.0	18.2	40.1	13.8
	SPC	2.6	6.8	21.1	42.6	26.8
I am familiar with the Law on the Use of Cannabis for Medical Purposes, as far as dispensing is concerned.	P	8.6	26.3	17.9	34.0	13.1
	SPC	2.1	6.8	25.3	38.9	26.8

(P - Pharmacists; SPC- Students of Pharmaceutical Sciences)



we used to calculate the sample, although in this case women account for 78.7 per cent of all student respondents and men are only 21.3 per cent. Beginning with the opinion on self-cultivation of medicinal cannabis, 53.4 per cent pharmacists did not agree, while most students (55.3 per cent) were in favour of it. On self-cultivation for recreational purposes, the majority of pharmacists and students answered “no” (they did not agree) (71.6 per cent in the case of pharmacists and 60.0 per cent in the case of students). Both cohorts were in favour of legalising the cannabis plant for recreational purposes, but when we asked about liberalisation for the same type of use, the majority of respondents in both cohorts said they did not agree.

It should be noted that when those who agree with legalisation or liberalisation were asked “where to sell?” a high proportion of respondents in both cohorts (43.5 per cent of pharmacists and 48.5 per cent of students) answered at the “pharmacy”. Both cohorts seem very open to new challenges, and acknowledge the fundamental role of the pharmacist, even in the context of legalisation of recreational cannabis. The countries where recreational use of cannabis is legal have adopted different marketing models. It can be sold in a pharmacy or in a specialist shop. In Europe, Switzerland is conducting a study where recreational cannabis is dispensed in community pharmacies.¹⁸ In Portugal, in the Opinion of the Order of Pharmacists on the draft laws to legalise cannabis for personal and recreational use - Bloco de Esquerda (Draft Law no. 1050/XIII/4.^a, of December 2018) and the PAN party (Draft Law no. 1062/XIII/4.^a, of January 2019) - the Association published its views on the sale of recreational cannabis in pharmacies: “The Pharmacist Association shares the view taken by the International Pharmaceutical Federation (FIP), which categorically opposes the sale of cannabis for recreational purposes in pharmacies.”¹⁹ Perhaps we should analyse experiences from abroad in order to contribute with science to viable medium-term legislative pathways in Portugal.

When asked if they knew anyone who had used cannabis to treat symptoms or illnesses, significantly more pharmacists (42.7 per cent against 22.1 per cent) responded affirmatively, possibly due to their daily professional relationship with patients. On the other hand, self-reported use for the same purpose is low in both cases (3.7 per cent pharmacists and 4.2 per cent students). In any case, we would like to highlight the slightly higher proportion of the younger population, which has predictably fewer pathologies. Such use, which is not always legal, corroborates the results of the European Web Survey on Drugs, which reports on the use of cannabis to treat illnesses and symptoms.²⁰

Patients/users turn to pharmacists for clarification, and 42 per cent of pharmacists had already been consulted on this subject. On the other hand, only a few students had been consulted since, depending on the year they are in, students do not contact patients on a regular basis. Many pharmacists (63.2 per cent) believe they have patients who could benefit from this therapy and 35.6 per cent believe they have patients using cannabis illegally to treat symptoms or illnesses. Most

respondents in both cohorts “neither agree nor disagree” when asked whether the Portuguese Law on the Use of Cannabis for Medical Purposes responds the needs of patients. This answer is possibly indicative of lack of knowledge on the subject. A higher percentage of students responded negatively to the same question, which may suggest that students have a clearer view of the reality. When it comes to price (which can be included in patients’ needs), pharmacists seem to be better informed, which may have something to do with their daily work.

Addressing the national reality and in particular the composition of the only cannabis-based substance available in Portuguese pharmacies at the time of the study, 66.2 per cent of pharmacists say they do not know the qualitative and quantitative composition and 64.7 per cent of students gave the same answer. Self-perceived knowledge was assessed and 68.8 per cent of pharmacists said it was not enough to advise patients, against 77.4 per cent of the students. Both cohorts are also not very knowledgeable of the legal aspects, particularly concerning the prescribing and dispensing of the substance, although more pharmacists believe they are better informed, possibly due to their profession. Similarly, other studies involving pharmacists from the California Pharmacists Association and in Australia report that pharmacists do not feel prepared to discuss the topic with their patients.¹¹² The percentage of pharmacists who said they had studied the subject at university was 31 per cent, much less than students (67.4 per cent). Since many are still first year students, this percentage could be higher by the end of the studies. Higher education establishments seem to be opening up to this topic following the legislative changes of 2018, which made the legal cannabis market grow and requires monitoring from health professionals and future health professionals. However, the majority of pharmacists (70 per cent) have not received any training on this subject since completing higher education.

It was possible to conclude that the knowledge of pharmacists and future pharmacists regarding cannabis is low, as other studies carried out in various countries concluded as well. The majority of the respondents in a survey of members of the California Pharmacist Association said that they do not have much information about medicinal cannabis, nor do they know where it can be obtained.¹ Also in Jordan, a more recent study provided the same evidence on all aspects of cannabinoid pharmacology (indications, adverse effects, interactions and contraindications).¹⁰ In order to ensure compliance to therapy and effective and safe use, it is essential to supply these health professionals and future health professionals with scientific knowledge. Training on the subject is a necessity, according to 92.8 per cent of pharmacists and 88.4 per cent of students. Clinical cases, current legislation and drug dispensing can be starting points in both cases. Limitations include possible selection bias due to online-only distribution and possible volunteer bias.

CONCLUSION

Pharmacists and students alike believe they do not know



enough to advise on the use of medicinal cannabis. Pharmacists and students would like to receive more training on the subject. It is important to make scientific knowledge available to these health professionals and future health professionals. In Portugal, as has been suggested in other countries on the American and European continents, higher education training and lifelong learning must keep pace with market opening, both internationally and at the national level. Both cohorts seem willing to embrace new professional challenges in this area, including the use of recreational cannabis. Looking forward we suggest introducing the subject as compulsory in higher education curricula and providing postgraduate training on the topic. In order to ensure that pharmacists in particular have easy access to information about available training, the involvement of the pharmaceutical associations (for example the ANF - National Association of Pharmacies) and the Order of Pharmacists itself in the dissemination, and even in training, could be an asset for the recognition of the professional class in this sector. A commitment to training is paramount if pharmacists are to keep up the high service level their patients

are used to, also in this emerging area.

AUTHORS CONTRIBUTION

Paiva C: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Writing - Original Draft

Santos T: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Writing - Review & Editing

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CONFLICTS OF INTEREST

The authors declare there are no conflicts of interest.

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