

Knowledge, Attitude and Practices Regarding Marijuana usage among Medical Students: A Descriptive Cross-sectional Study

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ABSTRACT

Introduction: The increment in marijuana use across the world is concerning and needs to be addressed. There has been a cultural change regarding the perception and use of marijuana medicinally and recreationally, even among medical students. This needs to be studied to understand the outlook towards marijuana among young adults, including future doctors, to help improve their awareness of the risks and pitfalls of marijuana usage.

Aim: To evaluate the knowledge, attitude, and practices regarding marijuana usage among medical students.

Materials and Methods: This cross-sectional study recruited 159 medical undergraduate students from the tertiary healthcare institute, Smt. Kashibai Navale Medical College and General Hospital, Pune, Maharashtra, India via an online, anonymised, semistructured, self-designed questionnaire that was circulated over social media. The duration of the study was from October 2023 to February 2024. The study population was grouped into first-year and final-year MBBS students to identify differences, if any, in knowledge, attitude, and practices regarding marijuana usage among students between the start and end of their MBBS training. The responses to questions were compared to establish any statistical significance.

Results: Out of the total 159 participants, 106 (66.67%) were first-year MBBS students, and 53 (33.33%) were final-year MBBS students. Most students from both groups reported that marijuana was illegal in India. Both groups responded affirmatively to questions regarding their awareness of the effects of marijuana and whether it could be used as a medical therapeutic drug. The majority of students, 81 (76.42%) and 32 (60.38%), respectively in both groups, agreed with the statement that marijuana impairs concentration and movement. A total of 88 (83.02%) and 41 (77.36%) participants, respectively, were largely in favour of legalising marijuana, with a greater proportion of respondents from both groups opining that marijuana should be legalised, be it for medical therapeutic use or as a recreational drug.

Conclusion: Study results showed that the majority of students from both groups responded positively to the question about the legalisation of marijuana in India. Some interesting differences were found between the two groups with respect to marijuana use and the perceptions about its positive or negative effects. It is essential to educate medical students, as future physicians, on the adverse effects and implications of marijuana use.

Keywords: Awareness, Legalisation, Medical cannabinoids

INTRODUCTION

The increase in marijuana use worldwide is concerning and needs to be addressed. Over the past decade, there has been a cultural shift in the perception and use of marijuana, both medicinally and recreationally [1]. Multiple studies have reported psychiatric implications of marijuana use, such as intoxication, dependence, and an increased likelihood of developing psychosis in healthy individuals [2-5]. Despite this, recreational marijuana use is on the rise, especially among college students, due to perceived benefits of relaxation, stress relief, and improved ability to work responsibly [1]. In recent years, medical cannabinoids have been linked to managing conditions such as neuropathic pain, hypertension, poststroke neuroprotection, multiple sclerosis, epilepsy, and cancer, among others [6]. Previous studies suggest that medical students worldwide have poor knowledge of medical marijuana use [7,8].

Due to the various adverse effects and benefits, the legal status of marijuana varies widely across countries and regions [9]. In India, marijuana (hemp) is classified as a 'narcotic drug' under Section 2 (xiv) of the Narcotic Drugs and Psychotropic Substances Act (NDPSA), 1985 [10]. Recreational marijuana use and its various forms, such as ganja, charas, hashish, and any mixture of these preparations, are legally prohibited in India [10]. However, bhang (a preparation exclusively made from marijuana leaves) is excluded from this definition in the NDPSA [10]. There is an argument about

the need to legalise marijuana use in India, as the country could benefit from the medical uses of marijuana, generate revenue for the government, and potentially lower unemployment and crime rates [11]. However, the legalisation of marijuana use might further complicate the management of psychiatric disorders associated with its use [10]. Early marijuana use is likely to cause long-term neurocognitive deficits, supported by neuroimaging studies showing reduced hippocampal volume and density [12]. Marijuana impairs memory in the short-term, with more significant effects seen with chronic use, which may also be accompanied by poorer effort, slower processing, and impacted attention [12]. Research conducted overseas has found that college students, including medical students, tend to underestimate the risks associated with marijuana use [12,13].

According to prior studies conducted among college students in India, marijuana use has been found to range between 6.8-36% [1,14,15]. Awareness of marijuana use in terms of usage, effects, and legal status is still lacking among Indian college students [1,16].

With this background, it becomes important to understand the perspective of medical students on marijuana use, which can be beneficial in filling the information-related gaps in their understanding and also in training them as future clinicians.

There are few studies in India comparing medical students' awareness of marijuana at entry and exit levels [16]. This study

was conducted due to the scarcity of data regarding marijuana use among medical students in Maharashtra, India. A highlight is that, to the best of the authors' knowledge, it is the first study of its kind in the state. Another highlight is that the study is semistructured, and participants were asked to elaborate on certain questions in their own words to gain a deeper insight into their perspectives on marijuana use. The aim was to study the knowledge, attitude, and practices regarding marijuana usage among medical students. The primary objective was to study the awareness among medical students regarding the physiological effects and legal status of marijuana. Additional objectives included comparing the awareness of marijuana usage in medical students at the entry level (first year) and at the exit level (final year).

MATERIALS AND METHODS

This cross-sectional study recruited medical undergraduate students from a tertiary healthcare institute, Smt. Kashibai Navale Medical College and General Hospital, Pune, Maharashtra, India via an anonymized online survey that was circulated over social media. It was a time-bound study conducted between October 2023 and February 2024. The online survey was distributed to a total of 250 students from the first and final year of MBBS, out of which 159 responses were received (106 first-year and 53 final-year students). The study was approved by the Institutional Ethical Committee (IEC number: SKNMC/Ethics/APP/2023/891).

Inclusion criteria: Responses from first and final-year MBBS students were included in the study.

Exclusion criteria: Incomplete or inapplicable responses were excluded from the study. However, all responses received were complete and appropriate and were therefore considered for the study.

The study population consisted of first-year and final-year MBBS students during the academic year 2023-2024, of either sex and aged 18 years or older, who voluntarily agreed to participate. The questionnaire was self-designed and semistructured, specifically created with the intention of obtaining more descriptive responses from the participants. The questions were partly based on data collected during clinical psychiatry interviews when assessing substance use patterns, particularly related to marijuana. The scale was not in a 5-point Likert format, as the present study aimed to focus more on the descriptive perspective of the participants, and the discussion was intended to center on the differences in perspective rather than objective scores [Annexure 1].

Along with demographic characteristics, data were collected to assess knowledge, attitudes, and practices regarding marijuana use among medical students.

The questionnaire consisted of 10 questions broadly divided into three parts. The first part comprised seven questions assessing the participants' knowledge regarding marijuana use, with questions on the legal status of marijuana, awareness of the effects of marijuana, and whether it can be used as a therapeutic drug. The participants' knowledge about the effects of marijuana was gauged through four questions with a three-point Likert scale for each ("Disagree," "Uncertain," and "Agree"). The responses to these Likert scale questions were compared in the analysis to gauge any statistical significance.

The second part comprised two questions about attitudes towards marijuana use, including participants' opinions on the legalisation of marijuana. The second question asked for the participants' opinion on the gender with a higher prevalence of marijuana use and to elaborate on possible reasons for this.

The third part had one question asking participants if they had consumed or thought of consuming marijuana. The responses to this question were also compared to establish any statistical significance. Participants were asked to further elaborate on the

reasons behind their yes/no response. The online survey was anonymously conducted, and the students' identities were not revealed at any point.

STATISTICAL ANALYSIS

Descriptive statistics was used to represent the data. The Chi-squared test was used for comparison between the two groups. Statistical analysis was performed using International Business Machines (IBM) Statistical Package for the Social Sciences (SPSS) version 20.0 (SPSS, Inc., Chicago, IL), with a p-value <0.05 defined as significant.

RESULTS

A total of 159 students participated in the study. All the students were in the age groups of 18 to 34 years. Out of 159, 106 (66.67%) were first-year MBBS students, and 53 (33.33%) were final-year MBBS students. Out of the 106 first-year students, 57 (53.77%) were males, and 49 (46.23%) were females. Among the 53 final-year students, 30 (56.60%) were males, and 23 (43.40%) were females [Table/Fig-1].

Gender	MBBS course year	
	First year	Final year
Males	57	30
Females	49	23
Total	106 (66.67%)	53 (33.33%)

[Table/Fig-1]: Demographic characteristics of medical students.

Knowledge regarding marijuana: There were seven questions in the questionnaire assessing the knowledge of MBBS students regarding marijuana. In response to the question about the legality of marijuana in India, the majority of students reported that it was illegal. Sixteen students from the first year reported that they didn't know about the legal status, while only one student from the final year did [Table/Fig-2]. The majority of the students from both groups responded affirmatively to questions regarding their awareness of the effects of marijuana and whether it could be used as a medical therapeutic drug [Table/Fig-2].

Response	First year, n (%)	Final year, n (%)
Legal status of marijuana in India		
Illegal	89 (83.96)	51 (96.22)
Legal	1 (0.95)	1 (1.89)
Don't know	16 (15.09)	1 (1.89)
Awareness of the effects of marijuana		
Yes	77 (72.64)	42 (79.25)
No	29 (27.36)	11 (20.75)
Can marijuana be used as a therapeutic drug		
Yes	88 (83.02)	43 (81.13)
No	18 (16.98)	10 (18.87)

[Table/Fig-2]: Knowledge about marijuana: legal status, effects and therapeutic use.

The students were asked four 3-point Likert scale questions to gauge and compare their knowledge about the effects of marijuana [Table/Fig-3]. The majority of the students in both groups agreed with the statement that marijuana impairs concentration and movement. Interestingly, a greater and statistically significant percentage of first-year students agreed with the statement (p-value=0.039). The majority of the responses to the next statement about marijuana helping a person to unwind and relax were affirmative, with no statistically significant difference between the two groups. The responses to the statement "Marijuana makes people feel more creative and perceive things differently" had a higher number of respondents from both groups agreeing with the statement. However, a statistically significant number of final-year respondents

were in agreement (p -value=0.001) compared to first-year students. As for the fourth statement about marijuana having bad effects and leading to volatile emotions, a higher, statistically significant majority of the first-year students agreed with the statement (p -value=0.001) compared to final-year respondents.

Statement/ Response	First year (n=106) (66.67%), n (%)	Final year (n=53) (33.33%), n (%)	Statistics
Marijuana impairs concentration and movement			
Disagree	7 (6.60)	10 (18.86)	$\chi^2=6.5252$; $p=0.039$
Uncertain	18 (16.98)	11 (20.76)	
Agree	81 (76.42)	32 (60.38)	
Marijuana helps a person unwind and relax			
Disagree	13 (12.26)	04 (7.55)	$\chi^2=1.0234$; $p=0.599$
Uncertain	18(16.98)	08 (15.09)	
Agree	75 (70.76)	41 (77.36)	
Marijuana makes people feel more creative and perceive things differently			
Disagree	33 (31.13)	04 (7.55)	$\chi^2=14.6966$; $p=0.001$
Uncertain	28 (26.42)	11 (20.76)	
Agree	45 (42.45)	38 (71.69)	
Marijuana generally has bad effects on a person and leads to volatile emotions			
Disagree	07 (6.60)	13 (24.53)	$\chi^2=27.1067$; $p=0.001$
Uncertain	12 (11.32)	18 (33.96)	
Agree	87 (82.08)	22 (41.51)	

[Table/Fig-3]: Knowledge regarding psychological effects of marijuana usage. Statistical significance ($p<0.05$) determined by Chi-square test

Attitude regarding marijuana: The participants were mostly in favour of legalising marijuana, with a greater proportion of respondents from both groups opining that marijuana should be legalised, whether for medical therapeutic use or as a recreational drug. The students were also asked about which gender they thought had a higher prevalence of marijuana use. Most of the students opined that marijuana use is higher in males [Table/Fig-4].

	First year, n (%)	Final year, n (%)
Should marijuana be legalised?		
Yes, for therapeutic purposes	73 (68.87)	25 (47.17)
Yes, for recreational use	01 (0.94)	01 (1.89)
Yes, for both of the above	14 (13.21)	15 (28.30)
Should not be legalised	18 (16.98)	12 (22.64)
Gender with higher prevalence of marijuana use		
Males	100 (94.34)	52 (98.11)
Females	06 (5.66)	01 (1.89)

[Table/Fig-4]: Attitude and opinion towards marijuana legalisation and gender prevalence.

The participants were asked to elaborate on their opinions about gender-specific marijuana use. The most common reasons expressed were "access/availability is higher in males" and "males are more likely to enjoy drugs/experimenting." Some students also opined that "males experience more stress," and a few mentioned that "males face more peer pressure."

Practice regarding marijuana: The study also asked a question about individual marijuana use and the reasons behind it. Four students from the first-year group had consumed or thought of consuming marijuana, while the number among the final-year group was 23. This difference between the two groups was statistically significant (p -value <0.01) [Table/Fig-5].

The most common reason given for consumption/thought of consumption was "for recreational purposes." Some students also mentioned that they had consumed due to "peer pressure." The most common reason expressed for not consuming/not having

Practice			
Response	First year, n (%)	Final year, n (%)	Statistics
Have you ever consumed/thought of consuming marijuana?			
Yes	04 (3.77)	23 (43.40)	$\chi^2=39.3485$; $p<0.01$
No	102 (96.23)	30 (56.60)	

[Table/Fig-5]: Practices regarding recreational marijuana use. Statistical significance ($p<0.05$) determined by Chi-square test

thought of consuming was "bad health effects." Some students also expressed "marijuana is addictive" as the reason for not consuming it, while some also mentioned "marijuana is illegal" as a reason.

DISCUSSION

There is a paucity of studies comparing the knowledge of first and final-year medical students regarding marijuana use, with only one study in India so far [16], to the best of the authors' knowledge. The present study attempts to shed light on medical students' perspectives about marijuana at the entry and exit levels of undergraduate study and to compare salient points about knowledge and practices. The term "medical marijuana" refers to a wide variety of preparations; however, the most widely used in clinical practice are cannabinoid-based medicines [17]. Cannabinoids are constituents of marijuana, of which Tetrahydrocannabinol (THC) and Cannabidiol (CBD) are the most studied so far [18]. Most respondents from both groups in the present study were aware that marijuana can be used as a medical therapeutic drug. Marijuana has been purported to cause some degree of euphoria, relaxation, and changes in perception, like distortion of time and intensification of ordinary experiences such as hunger, eating, and listening to music [19], and is also known to impair attention and working memory during intoxication, thereby impairing concentration abilities as well [12].

A study about marijuana use and risk perception in medical students of Mexico found that the students underestimated the risks associated with marijuana use [20]. A study conducted in India that had only 2nd-year medical students as subjects reported that the students' knowledge regarding addiction-causing drugs was inadequate [21]. A comparative study similar to the present study, done in southern India, reported that both the first and final-year medical students had poor awareness and inadequate knowledge about the various adverse effects of marijuana usage [16]. In that study, only about 32% of both first and final-year students agreed about marijuana causing cognitive impairments, and only 13% from both groups agreed with the statement about cannabis making people feel more creative and altering perceptual abilities. The study also did not find any statistically significant difference between the two groups that were assessed [16]. The results of the present study, interestingly, contrast with these findings. In the present study, 76.42% of first-year students and 60.38% of final-year students agreed that marijuana impairs concentration and movement. A 42.45% of first-year students and 71.69% of final-year students agreed with the statement about marijuana increasing creativity and altering perception.

The present study findings indicate that most of the first and final year medical students who participated in the study had adequate knowledge about the adverse effects of marijuana. Interestingly, in the current study, a higher, statistically significant number of first-year students agreed with statements about the adverse effects of marijuana, such as impairments in concentration, movement, leading to overall negative effects, and emotional instability. On the other hand, a higher percentage of final-year students were found to agree on some potential benefits, such as the calming effects of marijuana and its ability to make a person feel more creative after use. As reported in the results section, a significantly higher proportion of final-year students had consumed or thought of consuming marijuana. This interesting finding suggests that though

there is no lack of knowledge regarding the adverse effects of marijuana, even at the level of first-year MBBS, there seems to be a difference in outlook, with final-year students looking more at its potential benefits than its negative effects. Drug use normalisation describes the process whereby drug use becomes less stigmatised and more accepted as normative behaviour, in an attempt to create a descriptive framework for understanding these kinds of drug use changes in society [22]. Drug use among peers and self-experimentation can reduce the stigma around psychoactive substances and make their use more acceptable [23]. This phenomenon could help explain the inclination of final-year students in the present study towards the benefits of marijuana more than adverse effects compared to first-year students.

The respondents from both groups in the present study had a positive outlook towards the legalisation of marijuana. The majority, totaling 83.02% of first-year students and 77.36% of final-year students, were in favour of marijuana legalisation, whether for therapeutic purposes or recreational use. These findings are similar to a previous study conducted in the United States of America, which found that 64% of the medical students who participated in it supported marijuana legalisation [24].

Previous research among physicians suggests that being less religious and politically liberal is associated with greater support for legalising marijuana [25]. Additionally, support for legalisation has been associated with “non moralism” and “permissiveness” [26]. Further research is needed to establish these reasons among the Indian medical student population. A majority of students in the current study expressed that marijuana use is greater in males than in females. This finding was consistent with the results of other studies and surveys [23-25]. Surveys in Europe indicate a lifetime cannabis use level of 9.1% for males compared to 4.4% for females [27], figures that are very similar to those in the United States, where cannabis use rates are 9.3% for males and 4.9% for females [28]. A large sample online survey with 2459 participants reported that 73.4% of men used cannabis recreationally, compared to 65.5% of women [29]. It has been found that males tend to use different methods for administering this drug and are more likely to use high-potency marijuana products compared to females. However, the gender gap in terms of marijuana use seems to be decreasing [30]. Additionally, the phenomenon of telescoping, i.e., a quicker transition from marijuana use to developing marijuana use disorders, is more commonly seen in females than in males [31], making it important to further study trends and effects of marijuana use in females. In this study, the majority of first-year students had either not consumed or not considered consuming marijuana. The reasons for this were attributed to the adverse effects of marijuana, its addictive properties, and awareness of its illicit status. It will be interesting to reassess the same study group during their final year to determine any changes in attitude and practices towards marijuana use in relation to increased exposure and the normalisation of drug use.

Limitation(s)

This study has a few limitations. Data were collected via a self-report internet survey, which can cause overreporting or underreporting and could lead to recall biases. The sample size was small, and there was a difference in the number of respondents in the two study groups, leading to a lack of generalisability. Another limitation was that gender differences in marijuana use and concomitant use of other psychoactive substances were not assessed.

CONCLUSION(S)

Study results showed that there was no lack of knowledge regarding marijuana use and its effects among the respondents; however, they brought up findings that certainly give some food for thought regarding the outlook towards marijuana use among medical

students. Some interesting differences were found between the two groups with respect to marijuana use and perceptions about its positive or negative effects, as well as how the positive or negative effects of marijuana are reported when comparing responses of first-year students to final-year students. It is essential to educate medical students, as future physicians, on the adverse effects and impact of marijuana usage. If the trend of drug use normalisation continues to increase, it could have potentially negative implications on the healthcare providers of the future. Therefore, the authors opine that teaching regarding marijuana and substance use in general, with a greater focus on detrimental effects, needs to be emphasised and updated in undergraduate medical curricula. Further studies, especially of a longitudinal nature and with greater sample sizes, would lead to a better reflection of the trends in the young population regarding their knowledge, attitudes, and practices of marijuana and other substance use.

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- Q1. What do you think is the legal status of marijuana in your country?**
- Illegal
 - Legal
 - Don't know
- Q2. Are you aware of the effects of use of marijuana in an individual?**
- Yes
 - No
- Q3. Marijuana impairs concentration and movements of a person (slows them down).**
- Disagree
 - Uncertain
 - Agree
- Q4. Marijuana helps a person unwind and relax.**
- Disagree
 - Uncertain
 - Agree
- Q5. Marijuana makes people feel more creative and perceive things differently.**
- Disagree
 - Uncertain
 - Agree
- Q6. Marijuana generally has bad effects on a person & leads to volatile emotions (people become angry or careless; after feeling high a person may feel down).**
- Disagree
 - Uncertain
 - Agree
- Q7. Can marijuana be used as a medical therapeutic drug?**
- Yes
 - No
- Q8. Should marijuana be legalised:**
- Yes, as a drug for medical therapeutic purposes
 - Yes, as a recreational drug
 - Yes, for both of the above
 - It should not be legalised
- Q9. Which sex has higher prevalence of marijuana use?**
- Males
 - Females
- Why do you think so?**
- _____
- Q10. Have you consumed/ever thought of consuming marijuana?**
- Yes
 - No
- If yes, why?**
- Peer pressure
 - Academic induced stress
 - Recreational activities
 - Curiosity
 - Others_____
- If no, why?**
- Because it's illegal
 - Adverse health effects
 - Considered taboo/uncultured habit
 - Addictive
 - Others_____