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journal homepage: [www.elsevier.com/locate/rcsop](http://www.elsevier.com/locate/rcsop)

## A cross-sectional survey of prospective healthcare professionals' knowledge, attitudes and perceptions of medical Cannabis



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## ARTICLE INFO

## Keywords:

Cannabis

Education

Continuing medical education

Medical students

## ABSTRACT

**Background:** Compounds isolated from *Cannabis* possess many beneficial effects creating a renewed worldwide interest in its therapeutic potential. With increased legalization for medicinal use globally, healthcare professionals must be familiar with the drug's uses and potential adverse effects.

**Objective:** To determine prospective healthcare providers' knowledge, attitude and perception to medical *Cannabis*.

**Method:** A self-administered online questionnaire comprising 21 questions to assess the knowledge, attitude and perception of medical *Cannabis* was distributed via google forms among students at the Faculty of Medical Sciences, the University of the West Indies, St Augustine Campus. Chi-square analysis was used to detect significant associations between demographics and measured variables. A *p*-value <0.05 was considered significant.

**Results:** Popular perceived therapeutic benefits of *Cannabis* were chronic pain (91.2%), anxiety (84.2%) and seizures (71.1%), and identification of the risks associated with the use of *Cannabis* was low. Users of *Cannabis* were able to identify indications and symptoms that can be treated with *Cannabis* but were less aware of the adverse effects of the drug than non-users (*p* < 0.001). More than three-quarters (87.3%) believed they could identify therapeutic uses and adverse effects but only 14.2% were ready to answer queries from patients. The main source of *Cannabis* information was the internet and information was lacking in the medical school curriculum.

**Conclusion:** The majority of students could not identify the drug's indications and adverse effects. There is a need to improve training for all prospective medical personnel to cater for the change in legislation status.

### 1. Introduction

The multifaceted use of *Cannabis* ranges from the manufacture of fibres, ropes, textiles, and paper, to its use in ritualistic and religious ceremonies,<sup>1</sup> culminating in its widespread debate about legalization and its potential medical benefit. It is estimated that about 5.5% of the global population (271 million people) aged 15–64 years used *Cannabis* at least once in 2016, which represents a 30% increase since 2009.<sup>2</sup> Throughout Europe until the end of the 19th century, *Cannabis* was deemed highly effective in the treatment of many conditions including chronic pain and depression.<sup>3</sup> It was available in American and British pharmacies until it was removed from the United States Pharmacopeia in 1942 due to concerns

about its psychotropic properties.<sup>4</sup> Later in 1976, *Cannabis* was classified as a Schedule I drug suggesting it had no medicinal value but a high propensity for abuse.<sup>5</sup>

Cannabinoids are the active components derived from *Cannabis sativa* or *Cannabis indica* that is used for medical or recreational purposes. More than 500 natural compounds have been identified,<sup>6</sup> including terpenes, flavonoids, and more than 100 phytocannabinoids.<sup>7</sup> These compounds possess many beneficial effects including anti-inflammatory, antimicrobial, and neuroprotective properties.<sup>8</sup> Pharmacological analyses have revealed the major psychotropic component is tetrahydrocannabinol (THC), and the major non-psychoactive ingredient is cannabidiol (CBD).<sup>6</sup>

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In 2016, 60% of the population of the United States agreed with the legalization of the drug.<sup>9</sup> *Cannabis* is now legal in 35 states and 4 territories in the USA.<sup>10</sup> Many countries are now taking steps to legalize the use of *Cannabis* for non-medical purposes as has been done in Canada and Uruguay.<sup>11</sup> An oromucosal spray comprising the plant extract of *Cannabis* approved for the treatment of pain and spasticity associated with multiple sclerosis was approved for use in Europe, the United Kingdom, and Canada.<sup>12</sup> With many nations adopting this approach, the Government of the Republic of Trinidad and Tobago (T&T), through the Dangerous Drug Act of 2019, decriminalized the possession of a maximum of thirty grams of *Cannabis*, 5 g of cannabis resin and allows for the cultivation of four female plants per household as of 23 December 2019.<sup>13</sup>

The Cannabis Control Bill was debated and passed unanimously in the Parliament of T&T on May 18th 2022.<sup>14</sup> This bill intends to provide regulatory control for the handling of *Cannabis* for medicinal and recreational purposes whilst establishing the Trinidad and Tobago Cannabis Licensing Authority. The bill included changes to the Proceeds of Crime Act, the Medical Board Act, and the Pharmacy Board Act. The bill comprises a section to regulate the use of medicinal *Cannabis*, dose limitation, record keeping and dispensing of medicinal *Cannabis*. The objective was to determine how familiar and prepared prospective healthcare providers are to cope with the demand for prescribing, dispensing and monitoring patients who are using medical *Cannabis*.

## 2. Method

This study was granted approval from the Ethics Committee (CREC-SA.039/05/2020), UWI, St Augustine. The study was conducted by issuing a self-administered questionnaire using convenience sampling during the period July 2nd to September 30th 2020. This was a cross-sectional study where the study population was the student body at the University of the West Indies (UWI), Faculty of Medical Sciences (FMS), St Augustine Campus. The campus comprised approximately 2200 students from the School of Dentistry (DDS), Medicine (MBBS), Nursing (SoN), Optometry (OPTM), Pharmacy (PHARM) and Veterinary Medicine (DVM).

An anonymous questionnaire based on a modified questionnaire from Kusturica et al. (2019),<sup>15</sup> was prepared and reviewed by the study team who developed and revised individual questions to ensure students' understanding. The questionnaire comprised two sections and consisted of 21 questions. Section A collected information on demographics and Section B consisted of 16 questions to assess participants' knowledge attitudes and perceptions of the recreational and medicinal use of *Cannabis*. The questionnaire was pilot tested on 50 students at the FMS and no further modifications of the questions were required.

The questionnaire was distributed to all students in the individual schools of the Faculty of Medical Sciences via email. Participants were directed to a Google Doc link to complete the questionnaire. There was no personal information collected and responses could not be traced to any individual person. Eligible participants were persons aged 18 years and older who were full-time students at the UWI, FMS, St Augustine Campus. The sample size determined using a 50% prevalence and a margin of error of 5% was 327 students. Questionnaires that contained missing data were excluded from the study. Statistical analysis was carried out using Statistical

Package for the Social Sciences (SPSS)® version 24. Descriptive statistics were utilized to summarize students' demographics, knowledge and attitude toward *Cannabis*. Chi-square analysis was used to detect significant associations between demographic groups and measured variables.

## 3. Results

During the 12-week period of the study, 387 persons responded to the survey for a response rate of 17.6%. The mean age of respondents was  $22.88 \pm 3.22$  years, 77.0% were female, 36.4% enrolled in Medicine and 98.2% were Trinidadian (Table 1).

Among respondents, 42.1% reported having used *Cannabis* at least once. Students at the SoP were more likely to be non-users of *Cannabis* when compared to other programmes within the faculty ( $p < 0.001$ ). Reports of daily, weekly and three times a-week usage were low, 57.9% never used the drug, 36% of the sample admitted to repeated use of *Cannabis* whilst 6.2% used it only once (Table 2).

More than half (57.6%) were familiar with the legalization process in T&T with Pharmacy students more familiar with the process than in other schools ( $p < 0.008$ ). More than three-quarters (87.3%) believed they could identify therapeutic uses and adverse effects but only 14.2% were ready to answer queries from patients. Males were more likely to use *Cannabis* ( $p < 0.001$ ), and use was highest in the 21–25 age group ( $p < 0.025$ ) and in the MBBS programme ( $p < 0.014$ ). Users of *Cannabis* were more likely to know someone who used it for medicinal purposes ( $p < 0.001$ ), and non-users were more likely to suggest it should be a prescription-only drug ( $p < 0.001$ ). Whilst *Cannabis* use had no effect on the ability to identify therapeutic uses of the drug, non-users were more likely to be familiar with the adverse effects of the drug ( $p < 0.001$ ). Though only 14.2% of the population was ready to answer patient questions on *Cannabis*, users of the drug were more likely to be prepared to answer questions than non-users ( $p < 0.001$ ). DVM students were more likely to identify the need for higher doses of local and general anaesthetics in users of *Cannabis* while a greater proportion of medical students responded negatively to this when compared to the other schools ( $p < 0.008$ ). A large portion of the respondents (94.6%) would like the University to provide training seminars on *Cannabis* (Fig. 1).

Respondents (54.5%) supported the legalization of Cannabis for recreational and medicinal purposes. DDS, MBBS and Pharmacy students favored legalization for medicinal use only, whilst Optometry and Veterinary students preferred legalization for medicinal and recreational purposes ( $p < 0.001$ ). The internet was the major source of information for students on *Cannabis*. Non-users were more likely to source information from family/friends, the media and the internet when compared to users of the drug ( $p < 0.001$ ). Only 4.2% of the respondents cited the school's curriculum as being a source of information. Among respondents, 47% believed that users of *Cannabis* may require larger doses of local and general anaesthetics with DVM students showing a greater ability to show this association ( $p > 0.002$ ). There was no difference in the ability to recognize this interaction between users and non-users of the drug ( $p < 0.764$ ) (Fig. 2).

The most popular perceived therapeutic benefits of *Cannabis* were chronic pain (91.2%), anxiety (84.2%) and seizures (71.1%). Those who

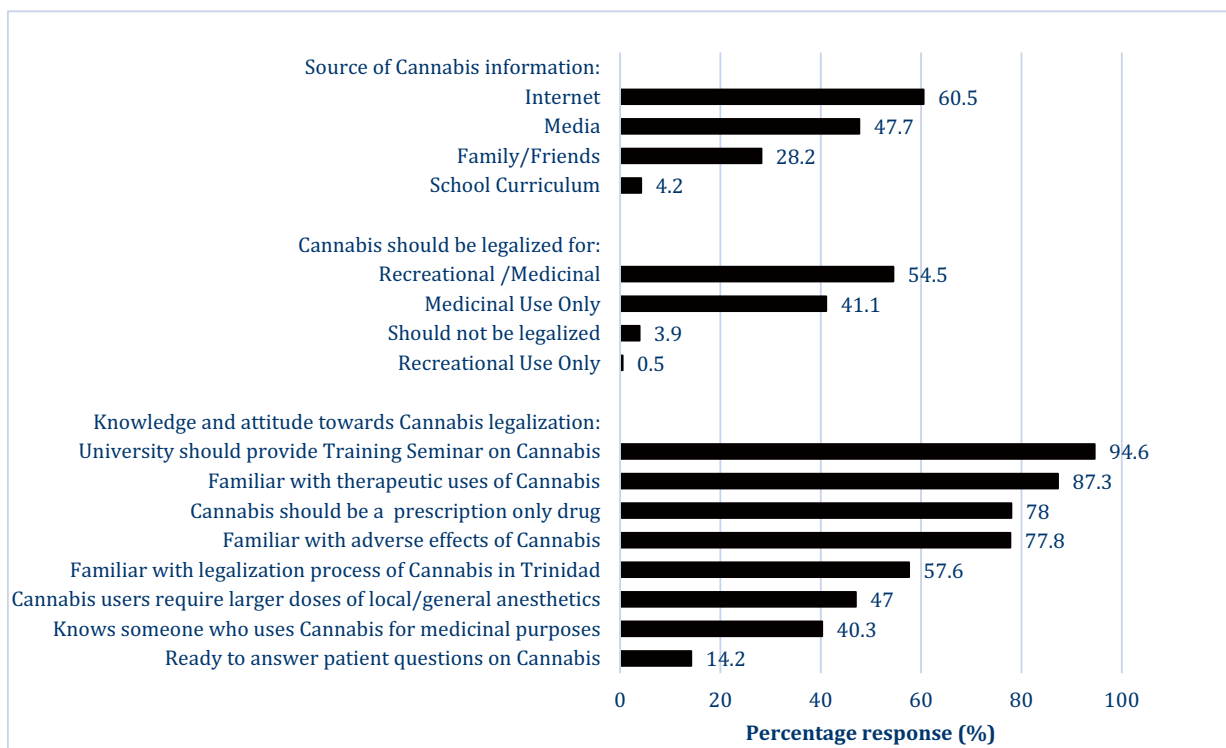
**Table 1**

Demographics of respondents at the FMS, The UWI, St. Augustine Campus. (School of Dentistry (DDS), Medicine (MBBS), Nursing (SoN), Optometry (OPTM), Pharmacy (PHARM) and Veterinary Medicine (DVM).

Programme	DDS (n = 75)		MBBS (n = 141)		SoN (n = 20)		OPTM (n = 32)		PHARM (n = 55)		DVM (n = 64)		TOTAL (%)
	M	F	M	F	M	F	M	F	M	F	M	F	
Year 1	4	13	5	2	2	3	0	0	0	16	0	5	50 (13.4)
Year 2	6	12	9	13	0	0	3	6	0	17	2	1	69 (18.4)
Year 3	3	8	4	7	2	5	3	8	0	12	3	10	65 (17.4)
Year 4	5	24	12	46	2	6	2	7	0	10	6	21	141 (36.4)
Year 5	0	0	13	30	0	0	1	2	0	0	2	14	62 (16)
TOTAL	18	57	43	98	6	14	9	23	0	55	13	51	387 (100)

**Table 2**  
Frequency of Cannabis use among students at FMS, UWI, St Augustine Campus.

	Programme (responses expressed as %)						TOTAL (%)
	DDS (n = 75)	MBBS (n = 141)	SoN (n = 20)	OPTM (n = 32)	PHARM (n = 55)	SVM (n = 64)	
Never used	62.3	56	30	46.9	74.5	56.3	224 (57.9)
Only once	0.03	5	10	6.3	5.5	12.5	24 (6.2)
Monthly	0.08	7.8	5	28.1	5.5	3.1	32 (8.3)
Occasionally	14.7	21.3	35	6.3	12.7	15.6	67 (17.3)
Thrice weekly	0.03	0.01	15	6.3	0.02	0	10 (2.6)
Weekly	0.01	4.3	5	0	0	7.8	13 (3.4)
Daily	0.08	4.3	0	6.3	0	4.7	17 (4.4)



**Fig. 1.** Knowledge, attitude and source of information for FMS, UWI STA students regarding Cannabis.

used Cannabis were more likely to suggest seizures, loss of appetite, insomnia, weight loss ( $p < 0.001$ ), nausea/vomiting ( $p < 0.006$ ), anxiety ( $p < 0.039$ ), and depression ( $p < 0.004$ ) as probable indications of the drug.

The ability to identify possible indications/uses for the use of Cannabis was low among medical sciences students with identification of chronic pain (91.2%), anxiety (84.2%), epilepsy (71.1%) post-traumatic stress disorder (70.8%), and cancer (64.1%) being the most popular responses (Fig. 2). Users of Cannabis showed a greater inclination to suggest uses of the drug as cancer ( $p < 0.019$ ), glaucoma, post-traumatic stress disorder, hypertension ( $p < 0.001$ ), irritable bowel syndrome ( $p < 0.007$ ), diabetes ( $p < 0.004$ ) and asthma ( $p < 0.045$ ).

The most common risks associated with the use of Cannabis were psychotic symptoms (71.3%), memory problems (66.1) and respiratory symptoms (65.9%). DDS students were more inclined to identify Cannabis as producing respiratory problems than other programmes, with Optometry students being the least inclined to do so ( $p < 0.032$ ). DVM students reported the risk of stroke with reduced frequency when compared to other programmes in the Faculty ( $p < 0.032$ ). Year 5 students were better at reporting the risk of psychotic symptoms and depression due to Cannabis use, with first-year students showing lower awareness of these effects ( $p < 0.001$ ). Those who used Cannabis were less aware of the risk of psychotic symptoms ( $p < 0.027$ ) (Fig. 3).

#### 4. Discussion

Approximately 40% of the population used Cannabis at least once, and knew someone who used it for medicinal purposes. Most respondents believed they could identify therapeutic indications and adverse effects of Cannabis but the majority identified chronic pain and anxiety as potential uses. The main source of Cannabis information was the internet, but the information was lacking in the medical school curriculum. The majority of students were not prepared to answer patient questions from patients and would like the University to provide seminars to improve therapeutic knowledge of the drug, its adverse effects and the risks associated with its use. Users of Cannabis were able to identify indications and symptoms that can be treated with Cannabis but were less aware of the adverse effects of the drug than non-users.

The study documented the lack of Cannabis education in the medical school's curriculum. It highlights the need for incorporation into the curriculum and possibly the need for continuing medical education. It also included all schools in the faculty of medical sciences and therefore gauged all categories of the medical team. The study included the use of convenience sampling and the low participation rate of male students, which suggests the findings may not be generalized to the entire FMS student population.

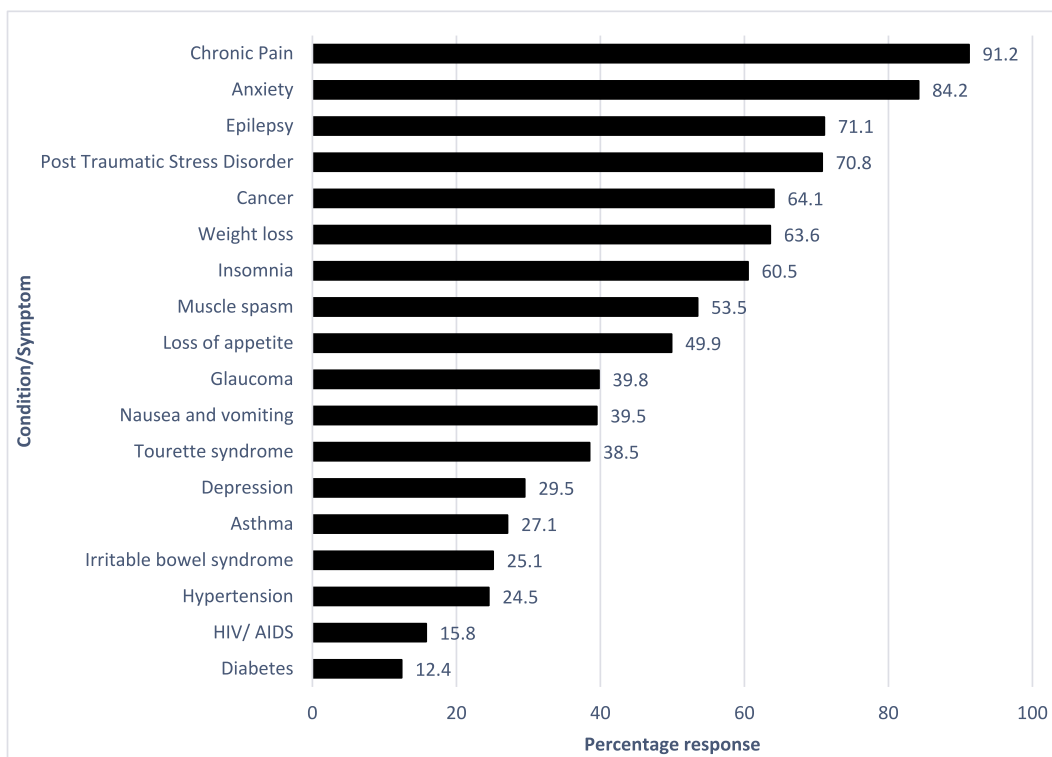


Fig. 2. Medical student's perception of conditions/symptoms that Cannabis can be used to treat.

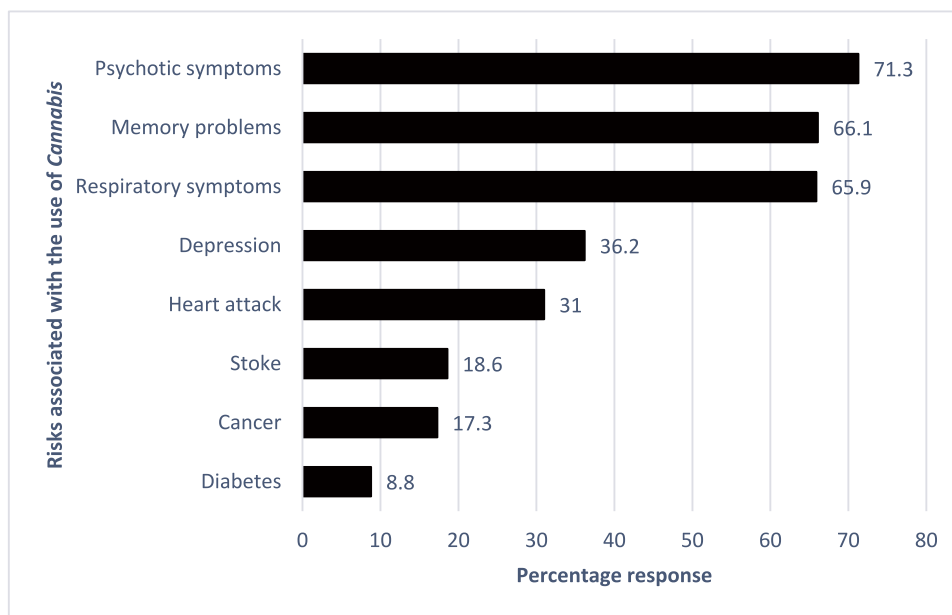


Fig. 3. Medical students' perception of the adverse effects associated with Cannabis use.

Among respondents, 42.1% reported using Cannabis at least once, which was higher than the prevalence of Cannabis use nationally in Trinidad and Tobago (12.09%).<sup>16</sup> This was lower than that reported among University students in Serbia (53.8%),<sup>15</sup> Colorado, USA (58.5%),<sup>17</sup> South Africa (69.1%),<sup>18</sup> but greater than in Kansas (36.7%),<sup>19</sup> Greece (21%),<sup>20</sup> Chile (33%),<sup>21</sup> Colombia (8.2%),<sup>22</sup> and Brazil (16.5%).<sup>23</sup> Cannabis use was highest among Nursing students and lowest among Pharmacy students. The usage among nursing students was higher than that reported in Spain (31.5%),<sup>24</sup> and Greece (41.9%).<sup>25</sup> Approximately 40% of students

reported that they knew of a person who used Cannabis for medical reasons suggesting its use for medical purposes was relatively high despite its illegal status at that time. A study conducted in Trinidad,<sup>26</sup> showed that Cannabis use was high among cancer (52.7%) and glaucoma (33%) patients, although the majority used it for recreational use rather than its medicinal value.

The majority of respondents indicated their ability to recognize the therapeutic and adverse effects of Cannabis but only a small portion were ready to answer patient questions on the topic. This was similar to findings in

Serbia,<sup>15</sup> where 81.6% reported they could recognize the indications for *Cannabis* whilst 64.9% stated they were familiar with the adverse effects. There was a consensus among medical schools in the United States that indicated 25% of medical school graduates were not ready to answer questions on *Cannabis*.<sup>27</sup> The discomfort with answering patient questions is evident from the high proportion in this study who would like the University to provide evidence-based seminars on *Cannabis*. Despite a shift in the legal status of the drug, only 4.2% of students reported getting any information on the use of *Cannabis* from the school's curriculum. The lack of *Cannabis* education within the University curriculum was similar to the findings in Belarus,<sup>28</sup> where 83.1% of the students reported no formal education about medical *Cannabis* with 87.5% proposing increased training and education. Canadian Pharmacists received no undergraduate (65%) or professional development training (66%) on medical *Cannabis*,<sup>29</sup> in contrast to Austria,<sup>30</sup> where 64% of students gained knowledge of *Cannabis* from the school's curriculum. In the USA,<sup>27</sup> data obtained from 101 curriculum deans showed that graduates were not prepared to prescribe medical marijuana (66.7%), and the majority (84.9%) reported receiving no education in medical school. There is a need for the University to incorporate *Cannabis* into the school curriculum to provide students with current information that will enhance their competence and improve their confidence to prescribe, administer and advise patients with up-to-date information.

The majority of students (95.6%) believed that *Cannabis* should be legalized for medical/recreational purposes or medicinal use only. Most Serbian students (96%),<sup>31</sup> believed it should be available as a prescription-only medicine and only 20.8% supported its legalization for recreational use. Most of the Nursing students (>75%) surveyed in Spain,<sup>32</sup> and medical students in Colorado USA,<sup>17</sup> (63%) believed that *Cannabis* should be legalized for medicinal uses only.

The majority of respondents indicated that *Cannabis* can be used to treat chronic pain, anxiety and seizures. At least half of the student population was able to identify post-traumatic stress disorder, epilepsy and cancer as possible indications for the drug, and 50% of medical students in Serbia,<sup>15</sup> identified cancer and chronic pain. Less than 30% of the sample identified HIV, muscle spasms, nausea/vomiting, glaucoma and multiple sclerosis. More than 90% of Austrian medical students were able to identify cancer and chronic pain as uses of *Cannabis* but less than half of the respondents suggested it may be used for multiple sclerosis, epilepsy, HIV, Tourette's syndrome, epilepsy, glaucoma, anxiety and depression.<sup>29</sup> Almost half of the medical students (45.4%) in South Africa indicated that they were unable to identify any indications of *Cannabis*.<sup>18</sup> Close to 70% of Polish medical students chose epilepsy as an indication for *Cannabis*, but <40% identified cancer, nausea, depression, post-traumatic stress disorder, insomnia and anorexia, with <20% indicating glaucoma as a possible use.<sup>33</sup> Pharmacy students at Midwestern University, USA were able to identify epilepsy (39%) and cancer (33%) as uses of *Cannabis*, but <20% correctly indicated multiple sclerosis, Crohn's disease, and nausea.<sup>34</sup>

Some of the negative effects associated with *Cannabis* use include decreased coordination, epithelial damage to the lungs, increased risk of infection, cardiovascular effects and cognitive deficits.<sup>35</sup> Psychotic memory and respiratory symptoms were the only risks identified by more than half of the population. Interestingly, similar to the study in Serbia,<sup>15</sup> and Colorado, USA,<sup>17</sup> non-users were able to identify the adverse effects associated with *Cannabis* use and users were more likely to identify the therapeutic indications. It suggests that non-users of the drug refrained from using it because they were aware of the dangers associated with its use, whilst users may prefer to focus on its beneficial effects. The impact of *Cannabis* use on anesthesia has been documented in the recent past with studies suggesting users of the drug may require higher doses of anesthetic agents for induction and maintenance of anesthetic depth.<sup>36,37</sup>

Almost half of the respondents were unaware of the potential pharmacokinetic interaction between lidocaine and *Cannabis* with *Cannabis* acting as an inducer of CYP1A2 with lidocaine being its substrate.<sup>38</sup> Pharmacy students showed the lowest usage of *Cannabis* among the FMS students. The majority of Pharmacy students (92.8%) believed that *Cannabis* should be

legalized for medicinal/recreational purposes, which was higher than the responses from Kansas University (58%).<sup>19</sup> They were confident in identifying potential indications and adverse effects of the drug but only half of the Pharmacy respondents identified indications as Cancer, epilepsy and post-traumatic stress disorder. This was similar to findings at the University of Kansas,<sup>19</sup> where only half of the students were able to identify cancer and glaucoma as indications of *Cannabis* use and at Midwestern University,<sup>34</sup> USA; half of the student population was able to identify cancer, anxiety and epilepsy as indications. In Serbia,<sup>39</sup> 48.7% of Pharmacy students got information about *Cannabis* from the school curriculum, which contrasted with the 7.8% of Pharmacy students in this study.

Further research.

Further work on the topic can include the evaluation of current healthcare providers to determine the need for continuing medical education topics relating to *Cannabis*. The implementation of *Cannabis* related pharmacology into the curriculum can be assessed to determine if this measure improves the competence of prospective healthcare providers.

## 5. Conclusions

The majority of students were not able to identify indications and adverse effects of the drug and confidence in answering questions were lacking. Information on *Cannabis* through the University's curriculum was low, as most students cited alternative sources of information. Students were in favour of seminars from the University to improve knowledge levels of *Cannabis*, which is necessary, based on the legalization of *Cannabis* for medicinal use. Due to the sampling method and response rates, the generated information cannot be generalized to all students at the FMS. There is a need to improve training for all prospective medical personnel to cater for the change in legislation status in T&T.

## Funding

None.

## Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

## Declaration of Competing Interest

None to report from any author.

## Acknowledgements

The authors would like to thank the student body who completed the questionnaire.

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