


Cannabis Use Disorder Among First-Year Undergraduate Students in Gaborone, Botswana

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Substance Abuse: Research and Treatment
Volume 14: 1–7
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DOI: 10.1177/1178221820904136



ABSTRACT: Cannabis use disorder (CUD) poses major clinical and public health concerns globally. It is a growing problem among the youth in Botswana, yet little research has been done on this subject. The present study hoped to address this gap in knowledge by determining the prevalence and associated factors of CUD among first-year university students in Botswana. A cross-sectional study was conducted among 410 first-year university undergraduates, using a modified version of the 37-item World Health Organization (WHO) drug questionnaire and DSM-5 criteria for CUD. The mean age of the respondents was 20.8 (SD = 1.5) years, and the male to female ratio was 1:1.1. Of the 401 students whose responses were analyzed, 37(9.2%) had used cannabis at least once in the last 12 months, but only 19 (4.7%) met the DSM-5 criteria for CUD. After binary regression analysis, difficulty in coping with the new environment/academic activities, receiving more than 150 USD monthly were positively associated with CUD, while regular participation in religious activities was negatively associated. CUD was found among the first-year undergraduates studied. Promoting protective activities such as religious activities and strengthening programs that teach students how to cope with academic stress and a new environment would be helpful.

KEYWORDS: cannabis use, undergraduate, associated factors, student, Botswana

RECEIVED: December 18, 2019. **ACCEPTED:** January 10, 2020.

TYPE: Substance Use and Drinking among Students - Original Research

FUNDING: The author(s) received no financial support for the research, authorship, and/or publication of this article.

DECLARATION OF CONFLICTING INTEREST: The authors declare that there is no conflict of interest.

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Background

Cannabis is the most commonly abused illicit drug across all age groups, in Botswana and other countries.^{1–3} The highest rate has been reported in Western and Central Africa, North America, and Oceania.¹ Cannabis use typically starts in the mid-to-late teens,² with the most extensive use in the early twenties, and it declines throughout the late twenties into the early thirties.⁴ While this substance may have some beneficial effects such as improved mental well-being and treatment of chronic pain, it is associated with adverse outcomes, which include psychosis and impaired concentration.^{5,6}

Various aspects of student life, especially among fresh undergraduates, increase their vulnerability to drug use. These include a switch from the constrained life censored by parents to a more self-directed life influenced by the university environment; peer influence, possibly resulting from shared living quarters with strangers from different cultural and social backgrounds; and poor coping or survival skills in response to academic pressure and new environment. Several other demographic variables have been linked to cannabis abuse in students. Being male, younger age, and being a single or unmarried student has been associated with a high rate of use.^{7,8} Parental drug use, especially alcohol and tobacco, has been related to cannabis use in children.⁹ Religious affiliation, especially being a Christian and high frequency of participation in religious activities are protective, as shown by previous authors.^{10,11}

The prevalence of Cannabis Use Disorder (CUD), according to the Diagnostic and Statistical Manual of Mental

Disorders, 5th Edition (DSM-5) criteria is 4.4% among 18 to 29 years.¹² Studies conducted among university students in America have shown varying rates of cannabis use and rates were said to be as low as 1.5% and as high as 32.6%, especially in South America.^{7,13} About 5% prevalence of chronic use has been reported from Europe.¹¹ Reports from Africa showed a prevalence of CUD from a low of 2.5% among medical undergraduates in Nigeria¹⁴ to a high of 42% among 18 to 25 years old young adults in Ethiopia.¹⁵ In Botswana, studies on CUD, particularly among students are still very scanty as most concentrate on alcohol and tobacco.² One previous study conducted in Botswana among university students who were selected from all levels found 16.4% prevalence of problematic use of cannabis, using Cannabis Use Disorder Identification Test (CUDIT-R).¹⁶ Another study also conducted among students revealed a prevalence of 8%, although it did not specify if it was a lifetime or 12 months rate.¹⁷

According to DSM-5, an individual is said to have CUD when he exhibits a problematic pattern of use in a way that results into clinically significant damage as manifested by at least two of the listed symptoms within 12 months.¹² These symptoms include among others, intense desire, spending more time on use than intended, and continued use despite the knowledge of harm, tolerance.¹² CUD has been related to negative outcomes such as poor school performance and reduced productivity at work. It is associated with antisocial behaviors, such as violence, vandalism, rape, theft, and multiple drug abuse.¹² Arseneault and colleagues¹⁸ have also linked cannabis



use with an adverse medical outcomes such as psychosis. In Botswana, unpublished data from the only mental referral hospital revealed a high prevalence of CUD among adolescents and young adults with psychiatric disorders, especially those with psychotic disorders. Adolescents and young adults fall within the university admission age bracket and make up the highest proportion of the population of Botswana. These age group will form not only part of the nation's workforce but also the country's future leaders.

The present study among university students became necessary in order to provide the data needed for the control and prevention of drug use and psychiatric disorder.¹⁹ The study hoped to add to the existing data by using the DSM-5 criteria to determine the prevalence and associated factors of CUD among first-year university students in Botswana.

Methods

A cross-sectional study was conducted among first-year university undergraduates in Gaborone, Botswana. Gaborone, which is the capital city of Botswana, is home to about 10% of the population of Botswana and has a mix of all the ethnic groups in Botswana. At the time of the study, there were three universities in the city. One of these was used as the study site. However, ethical approval was given on the condition of anonymity; hence, the name of the study site cannot be revealed in this paper. The sample size was calculated using a single proportion formula and was 410, including the added 10% attrition rate. Participants were selected using a multi-stage random sampling technique, where the selection was made in stages from faculties through departments until we arrived at the final sampling units.

This paper was derived from secondary data which had been previously published.² Two sets of questionnaires were used in obtaining information from the selected participants: a modified version of the 37-item World Health Organization (WHO) drug questionnaire which was described in detail in the previous publication,² and the DSM-5. Two of the variables, 'difficulty in coping with the academic and new environment' and 'perceived availability of cannabis,' were only presented in the current report, where they are more relevant. These two variables were rated on a five-point Likert scale. For example, a subjective experience of unusual change in attitude, behavior, and emotion in the past six months in response to academic stress or demands and change in environment was rated from 'impossible or unable to cope,' 'very difficult,' 'difficult,' 'easy' and 'very easy' or 'do not know.' Perceived difficulty in accessing cannabis was also rated from 'probably impossible,' 'very difficult,' 'difficult' to 'fairly easy,' and 'very easy' or 'do not know.' These variables were recategorized into 'present or absent' for academic demand and reaction to change in environment, 'difficult/impossible to find or readily available' for the availability of cannabis. The response 'do not know' was excluded from the analysis.

The DSM-5 criteria for substance use disorder were synchronized into the WHO questionnaire and were only used for

alcohol, tobacco, and cannabis, which are the major drugs available in Botswana. The DSM-5 has 11 items under criterion 'A' from which two are needed to make a diagnosis of substance use disorder (SUD). It has specifiers that include the severity, that is, mild, moderate, and severe, and whether in early or sustained remission. Those who met at least two of the criteria in the past 12 months were said to have CUD, regardless of these specifiers.

Ethical clearance was obtained from the University of Botswana Research and Ethical Review Committee (UBR/RES/IRB/1628). The approval to embark on the study was conditioned on the assurance that the name of the study site (institution) would remain anonymous. Also, written informed consent was obtained from every eligible interviewee. Four research assistants were employed and adequately trained on how to approach the eligible participants, distribute the questionnaire, and clarify unclear or ambiguous items on the questionnaire. They frequently communicated with the principal investigator (PI), who was also part of data collection, on items/issues that were difficult for them to clarify.

Nonetheless, the questionnaires were mainly self-administered and required minimal assistance. Instructions were given to the participants not to discuss their responses and not to write any form of identification on the forms. After completion, they were asked to drop the completed responses into a pool of questionnaires. The questionnaires were distributed mostly during the school hours when most students were waiting for lectures or after lectures. This was done to ensure that the selected departments were significantly represented.

Data extracted from the questionnaires was entered into the Statistical Package for Social Sciences (SPSS for Windows), Version 16 for analysis. Descriptive statistics such as frequencies, mean, and percentages were used to describe the sociodemographic variables of the study participants and the prevalence of CUD. Chi-square tests were performed to explore the relationship between identified socio-demographics and the presence of CUD. Fishers Exact Test (FET) was used where applicable. To further explore this relationship, the significant variables on chi-square tests were entered into a binary logistic regression model, with CUD as the dependent variable. The level of statistical significance at a 95% confidence interval for the model was set at <0.05 .

Results

Of the 410 questionnaires administered, only 401 (97%) were analyzed. Nine of the questionnaires which were either incompletely filled or contained inconsistent responses, such as admitting to the use of fictional drug 'maladrine' (intentionally included to forestall over-reporting), were discarded.

Socio-demographics of the participants

There were 199 (49.6%) males and 202 (50.4%) females, giving an approximate male to female ratio of 1:1.1. The mean age of

the respondents was 20.8 (SD = 1.5) years. Most of the respondents were from the Tswana (58.3%) ethnic group, and the most dominant religious affiliation was Christianity (63.6%). The age of the participants and the monthly upkeep were dichotomized using the median for the two variables: age 20 years and upkeeps 150 USD per month. More than half of the students received <150 USD per month (85.3%), and 175 (45.7) of them came from a parent who uses one psychoactive substance (see Table 1).

Prevalence of CUD and associated factors

Of the 401 students surveyed, 37 (9.2%) had used cannabis at least once in the last 12 months, and only 19 (4.7%) of the participants met the DSM-5 criteria for CUD. Males were more likely to meet these criteria compared to females, but the difference was not significant statistically. Having difficulty coping with academics and or the new academic environment, receiving a monthly upkeep above 150 USD, believing that cannabis is readily available and low participation in religious activities were all significantly associated with CUD (see Table 2). For a comprehensive understanding of CUD, a single model of binary logistic analysis was conducted, and only the significant variables on chi-square tests were included in the model. After the analysis, students who complained of difficulty in coping with the new environment and academic activities were five times more likely (adjusted odds ratio [AOR] = 5.0, 95% CI: 1.60-15.65) to have CUD. Those who receive more than 150 USD per month were also five times more likely to meet the criteria (AOR = 5.2, 95% CI: 1.69-16.3). Conversely, those who regularly participate in religious activities are less likely to have CUD (AOR = 0.136, 95% CI: 0.43-0.43) (see Table 3).

Discussion

Substance use is a significant problem among youth in Botswana, with cannabis being the most commonly used illicit drug with the onset of use in early adolescence.^{20,21} Research on Cannabis use in Botswana is minimal, yet it is a growing problem. Most studies conducted in this setting have mainly concentrated on alcohol or tobacco use.² To the best of our knowledge, this is the first study to look at the presence of CUD in first-year university undergraduates in Botswana, using a diagnostic tool. Only 4.7% of the 401 students whose responses were analyzed met the criteria for CUD according to DSM-5. This prevalence is lower than that of Kgatitswe and Amone-P'Olak,¹⁶ who used a different screening tool, CUDIT-R, among a relatively smaller sample of students from all levels (year one to five). Nevertheless, the prevalence rate was within the ranges from estimated rates and studies done elsewhere.^{12,14,22}

While most of the students who admitted to Cannabis use in the last 12 months did not have CUD, this study elicited its presence in 4.7% of the participants, possibly because some students use cannabis occasionally, and for recreational and social reasons. Such motivation for Cannabis use has been found in

Table 1. Demographic characteristics of the newly admitted university undergraduates in Gaborone, Botswana.

VARIABLE	STATISTIC	
Age, years; mean (sd)	20.8(1.5)	
Age range	18-24 years	
	FREQUENCY N	%
Age group*	391	100
20 years and below	219	56.0
21 years and above	172	44.0
Gender	401	100
Male	199	49.6
Female	202	50.4
Religion*	396	100
No religious affiliation	23	5.8
Christianity	252	63.6
Islam	11	2.8
Others**	110	27.8
Ethnic group*	393	100
Non-citizen	27	6.9
Tswana	229	58.3
Kalanga	122	31.0
Other ethnic groups	15	3.8
Monthly Upkeeps*	347	100
150 USD and below	296	85.3
Above 150 USD	51	14.7
Difficulty in coping with the academic and new environment	345*	100
Absent	280	81.2
Present	65	18.8
A parent using any drug*	383	100
No	208	54.3
Yes	175	45.7

*N = n not equal to 401 due to missing data. **Others = African traditional religion, and Hinduism and Buddhism.

earlier studies in Botswana.¹⁶ The fact that some students already have CUD is nonetheless a worrying finding because of its implications. Apart from the possible effect on the academic performance and mental state, prolonged use of cannabis may ultimately lead to the abuse of harder drugs. Cannabis has been hypothesized to be a gateway drug on the model of progression to hard drugs like cocaine and amphetamines.²³ It is, therefore,

Table 2. Associated factors of cannabis use disorder in the newly admitted university undergraduates in Gaborone, Botswana.

VARIABLES	CANNABIS USE DISORDER				STATISTIC		
	ABSENT		PRESENT		DF	χ^2	P
	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE			
Age group							
20years and below	211	96.3	8	3.7	1	1.57	.211
Above 20years	161	93.6	11	6.4			
Gender							
Male	188	94.5	11	5.5	1	0.55	.460
Female	194	96.0	8	4.0			
Ethnic group							
Non-citizen	27	100.0	–	–	3	2.38	.498
Tswana	219	95.6	10	4.4			
Kalanga	114	93.4	8	6.6			
Other ethnic groups	14	93.3	1	6.7			
Religion							
No religious affiliation	21	91.3	2	8.7	3	1.69	.639
Christianity	242	96.0	10	4.0			
Islam	10	90.9	1	9.1			
Others	104	94.5	6	5.5			
The frequency of religious participation							
Never or rarely	79	88.8	10	11.2	1	11.4	.001
Often or regularly	292	97.3	8	2.7			
Monthly upkeep							
150 USD and below	285	96.3	11	3.7	1	12.0	.001
Above 150 USD	43	84.3	8	15.7			
A parent using any drug							
No	199	95.7	9	4.3	1	0.39	.533
Yes	165	94.3	10	5.7			
Having a friend who uses any drug							
No	298	95.8	13	4.2	1	1.06	.304
Yes	66	93.0	5	7.0			
Difficulty in coping with the academic and new environment							
Absent	272	97.1	8	2.1	1	20.0	<.01
Present	54	83.1	11	16.9			
Availability of Cannabis							
Difficult/impossible to find	189	96.4	7	3.6	1	6.66	.01
Readily available	87	88.8	11	11.2			

Significant *P* values in bold.

Table 3. Logistic regression analysis of significant variables.

CHARACTERISTICS	WALD	SIG.	AOR	95% CI FOR EXP (B)	
				LOWER	UPPER
Difficulty in coping with academic and the new environment					
Present	7.68	0.006	5.00	1.60	15.6
Monthly Upkeep					
Above 150 USD	8.23	0.004	5.24	1.69	16.6
Availability of Cannabis					
Readily available	2.53	0.112	2.49	0.81	7.66
The frequency of religious participation					
Often or regularly	11.5	0.001	.136	0.43	0.429

Significant *P* values in bold. Nagelkerke $R^2=0.31$.

necessary to target the students in the early stages of their undergraduate life before they develop a disorder or proceed to harder substance use.

Gender difference is an essential correlate of CUD with males more likely to use cannabis and meet the criteria for CUD.^{7,12} This study found a significant gender difference in terms of past-year use of cannabis. It also revealed that male students were more likely to meet the DSM-5 criteria for CUD, but the relationship was not statistically significant. This disparity may have been accounted for by the size and the nature of the current study. Regardless, male gender and sensation-seeking behaviors have been correlated with cannabis use,²⁴ and this underscores the need to come up with programs specifically targeting male youth.

After logistic regression, three variables remained strongly associated with CUD in this study, and these accounted for 31% of the variability in the model. Students who complained of difficulty in coping with the new environment and academic demands were five times more likely to meet the criteria for CUD. As previously alluded to, the first-year of university education is a time of great transition from a relatively structured and dependent high school environment to an environment where students have more freedom and independence. This change can be stressful and may be adapted to negatively or positively by the students. Studies have found significant levels of stress in fresh undergraduate students as well as college students in general.^{25,26} The stress arises from various factors, including a new environment, increased academic workload, fear of failure, family expectations, among other factors.²⁷ Students use various strategies to cope with stress, some of which are adaptive, and some of which are not.²⁶ Cannabis use as a maladaptive coping strategy to deal with stress or to relax has been recognized.^{16,28} A study on motives for cannabis use found coping as one of the principal motivations for use among undergraduates in Botswana.¹⁶ Perhaps those who used cannabis in the present study had difficulties coping with academics

or a new environment. Hence, programs targeted at the identification of stressors, prevention of burnout, and counseling regarding problem-solving and adaptive coping strategies should be instituted or made available to these individuals. Reducing distress and coping-related use of cannabis²⁸ may be an avenue to explore in reducing the rate of cannabis and other psychoactive substances abuse in the community.

Students whose monthly upkeep exceeded USD 150 were also five times more likely to have CUD in the present study. Studies have shown a correlation between income levels and substance use.^{29,30} For instance, Martin et al²⁹ found that reduced levels of alcohol drinking correlated with low levels of average monthly spending money, while Patrick et al³¹ related a high level of cannabis use to increased level of socioeconomic background among young adults. These findings may partly explain the reasons for the low prevalence of CUD compared to past year use in the present study. This is because cannabis is still an illicit substance in Botswana, and its use is an expensive habit to maintain. Many of these students are from low socioeconomic and mostly depend on the monthly stipend from the government. It is thinkable that most of them have little disposable income to spend on maintaining a substance use habit and non-essentials. Thus, it is not surprising that the few students who satisfied the criteria for a CUD received a comparatively higher level of monthly financial upkeep. Youth from affluent families appear to be particularly disposed to substance abuse.³¹ This observation may be attributed to uncontrolled access to funds, permissive parental attitudes, inconsistently enforced rules, and inadequate supervision. Interventions that involve parents' education on the active participation and supervision of their children, even in the tertiary institutes, might prove useful.

It is also noteworthy that a higher proportion of students with CUD said that cannabis was readily available, albeit the relationship is not significant. Availability and affordability are important factors which drive substance use.^{31,32} Whilst

parents must collaborate with the school management in curbing substance use, the government should spare no effort in checking the trans-border trade in illicit substances of abuse.

We found a negative association between regular participation in religious activities and CUD. Most of the sampled students had some religious affiliation and reported participating often or regularly in religious activities. Even though no association was found between the type of religious affiliation and CUD, participation in religious activities is protective, as reported by previous authors,^{10,11} and this could be because some religions prohibit the use of substances. Religious students are also more likely to have non-drug-using peers, and since peer influence is known to play a role in substance use, having non-drug using peers could be an additional protective factor. Determining how to leverage on such protective factors can help in developing substance use and specifically cannabis use prevention programs.

Limitations

This study was carried out in only one of the several universities in Botswana, and hence the findings might not be generalizable to all universities in the country. The study was cross-sectional in design, and therefore causality is difficult to determine from the reported correlates. Reporting bias could not be eliminated due to the nature of the topic and the need for some clarifications by the research assistants.

Conclusion

The study showed evidence of CUD among first-year undergraduate students in a university in Botswana. The associated factors of CUD in the sample were identified. Students who complained of difficulty in coping with the new environment and academic activities were five times more likely to have CUD. Those who receive more than 150 USD per month were also five times more likely to meet the criteria.

Conversely, those who regularly participate in religious activities are less likely to have CUD. Therefore, encouraging and leveraging on seemingly protective activities like participation in religious activities should be promoted as a means of prevention. Having and strengthening programs that teach students how to cope with academic stress and a new environment would be helpful. Other possible preventive measures include, getting parents more involved in their children's education at tertiary level and improving border control of drugs.

Since these factors only explained 31% of the correlates, further research is needed to determine other unidentified associated factors of CUD, and their causal relations and how these factors can be used to prevent or control drug use in Botswana.

Acknowledgements

We acknowledge the efforts of the research assistants, and all the students who participated in the study.

Authors' contributions

AO conceived the idea. AO and PO analyzed the data and prepared the initial manuscript. AO, PO, JO, and JA were involved in the editing of the final manuscript. All authors read and approved the final manuscript.

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