Factors Associated with Problematic Cannabis Use in a Sample of Medical Cannabis Dispensary Users

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ABSTRACT

Background: With the recent legalization of cannabis for medical purposes in many countries, there has been an increased number of individuals using such products. While there is considerable evidence indicating that cannabis may have therapeutic effects for a range of different conditions, concerns remain about the risk of developing cannabis use disorders for those at risk, or patients without appropriate clinical guidance. The aim of the present study was to determine the prevalence of problematic cannabis use in a cohort of cannabis users who consumed the drug for medical purposes and to identify potential risk factors.

Methods: One hundred individuals who self-identified as using cannabis to improve their mental health were recruited from a community dispensary. Extensive details were collected about subjects' patterns of cannabis use and reasons for use. All subjects completed a structured clinical interview with the Mini-International Neuropsychiatric Interview, while information about perceived stress, depressive symptoms, and somatic symptoms were recorded with the Perceived Stress Scale-10, Beck Depression Inventory, and the Patient Health Questionnaire-15.

Results: Rates of problematic cannabis use were high, with 30% meeting the criteria. Only 10% of subjects reported medical cannabis use was recommended by their doctor. Significant risk factors for problematic use included earlier age of cannabis initiation, as well as self-reported use of cannabis products for depression.

Conclusions: The prevalence of problematic cannabis use in the community dispensary was higher than expected. Specific risk factors for problematic cannabis use may represent important areas for future intervention to ensure safer consumption for medical purposes.

INTRODUCTION

The use of cannabis for medical purposes is becoming more socially accepted and frequent in many Western countries, in part due to increased evidence in both preclinical and clinical fields for its therapeutic benefits.[1-4] In parallel, however, concerns over adverse outcomes have been raised. Although cannabis is generally considered less addictive than many other prescription and illicit drugs, there has been concern regarding the potential for problematic cannabis use.[5] Currently, much of the existing literature is from studies with recreational cannabis users. The difference in intention and goals of use between recreational and medical cannabis users (e.g., euphoria, relaxation vs. symptom control) often leads to differences in dose, route of administration, and frequency of use.[6]

This limits how well findings can be translated between the 2 groups. Based on the clinical observation, rates of problematic use in medical cannabis patients appear to be lower compared to recreational users.[7] However, trends for increases in delta-9-tetrahydrocannabinol (THC) potency, and greater accessibility to cannabis, necessitate further investigation on rates and risk factors for problematic cannabis use in individuals using with medical intent.

Recreational studies have identified several risk factors for problematic cannabis use, including the frequent use of higher potency THC, male gender, younger age of cannabis initiation, adverse childhood experiences, and use of other illicit drugs.[8] However, there remains ongoing debate about whether pre-existing mood disorders predispose individuals

to develop problematic use. A review of evidence by the National Academy of Sciences concluded that there is moderate evidence to suggest that anxiety, personality disorders, and bipolar disorder do not increase the risk of problematic cannabis use.[9] Major depressive disorder (MDD), however, did have moderate evidence indicating it is a risk factor,[9,10] consistent with studies which indicate that endogenous cannabinoids may underlie antidepressant mechanisms of action.[11]

Previously, community-based characterizations of mental health in cannabis dispensary users reporting medical use have been conducted.[12] However, inspection into the characteristics and potential risk factors for those with problematic cannabis use remains under-reported. Problematic cannabis use has been associated with several adverse outcomes, including worsening mental health, other substance use, poor work or social functioning, interference with productivity, and withdrawal symptoms such as anxiety or fatigue.[7,13] More research is strongly needed to determine the risk factors and prevalence of problematic cannabis use in those who use cannabis for medical purposes. Therefore, the present study was conducted to investigate factors associated with mental health and stress, which might be related to problematic cannabis use, using well-validated and standardized questionnaires. First, we sought to determine if the previously identified risk factors of gender and age of initiation were reproduced in our sample. Then, to explore the relationship with mental health in medical cannabis users, we assessed if poorer mental health outcomes related to depression and psychiatric diagnoses were associated with problematic use.

METHODS

Participants

Study ethics were approved by the University of British Columbia Behavioral Research Ethics Board (Approval Number: H16-01830, Date: Dec 10, 2016). Participants (n = 100) were recruited from a local cannabis dispensary in Canada. Inclusion criteria required individuals to be 19 years of age or older and able to give signed informed consent. All subjects self-identified as using cannabis to self-treat mental health issues. No subjects were rejected during the initial screen, and no subjects dropped out of the study after giving their informed consent. Participants were given an honorarium for participating. Following consent, participants completed psychological questionnaires and the Mini-International Neuropsychiatric Interview (MINI) version 6.

Measures

In this prospective investigation, the MINI-6, a structured clinical interview for psychiatric diagnoses based on the Diagnostic and Statistical Manual of Mental Disorders 4th edition (DSM-IV) and the International Classification of Diseases, 10th edition (ICD-10) was used, as per previously by our group.[14,15] The DSM-IV classifies cannabis abuse and cannabis dependence as separate entities. However, it should be noted that in the more recent DSM-5, cannabis abuse and dependence are combined into cannabis use disorder. Given the change and potential confusion in terminology, the general term "problematic cannabis use" was used to describe any participant within this study who met the criteria for cannabis abuse or cannabis dependence using the MINI-6. Assessments for diagnosis of past or current MDD were also completed using the MINI. Indicators of mental health and general well-being were collected using validated scales. Perceived stress was assessed by the Perceived Stress Scale 10 (PSS10), a scale asking participants to rate the unpredictability, lack of control, and stress overload in their life. The Beck Depression Inventory-II (BDI-II) was used to assess depressive symptom severity and attitudes. Finally, the Patient Health Questionnaire 15 (PHQ-15) was used to measure somatic symptoms related to depression.

Statistical Analysis

Descriptive statistics of the data are presented with n (%) for categorical data and as *mean ± standard deviation (SD)* for normalized continuous variables or *median, interquartile range (IQR)* for non-normalized continuous variables. The Shapiro-Wilk test was used to assess the normality of continuous variables. Differences between continuous variables in those with versus without cannabis abuse were assessed with an independent sample's *t*-test if parametric, or Mann–Whitney *U* tests if non-parametric. Associations with categorical variables were assessed with the chi-square test of independence or Fisher's exact test. Analyses were done using IBM SPSS software version 27.0 (IBM SPSS Statistics for Windows, Version 27.0. Armonk, NY: IBM Corp). Statistical significance level was accepted as $P < .05$.

MAIN POINTS

- This study assessed risk factors for problematic cannabis use and prevalence in a sample of cannabis dispensary users who self-endorsed the use of cannabis for medical purposes.
- The prevalence of problematic cannabis use was high within this sample (30%).
- Gender, current or past Major Depressive Disorder episodes, and Beck Depression Inventory scores were not significantly associated with problematic cannabis use; however, the age of cannabis initiation and self-reported use for depression were.
- The high level of problematic cannabis use in this sample may highlight risks for self-treating medical cannabis users who are not under the guidance of a healthcare professional.
- To mitigate risk, individuals should be encouraged to seek HCP guidance when using cannabis medically.

RESULTS

Demographics

Demographic variables and associated statistical tests are displayed in Table 1. The study cohort was 68.00% male (n=68), 66.00% White (n=66), and 59.00% were under the age of 30 (n=59). Just over half the sample (n=51, 51.00%) had a college degree or higher level of education. Sixty-two percent (n=62) of the sample worked part or full time, while 18.00% (n=18) were unemployed. Criteria for problematic cannabis use was met in 30.00% (n=30) of participants. While the proportion of participants meeting criteria for problematic cannabis use versus not was greater in males (n=23, 33.82%) compared to females (n=7, 21.88%), this observation was not statistically significant (P = .224). However, the age of regular initiation was significantly lower for those with problematic cannabis use (*median*=18.00, *IQR*=4) compared to those without problematic cannabis use (*median*=20.00, *IQR*=6), (P=.023).

Mental Health

Overall, there were relatively few statistical differences between indicators of mental health for those with and without problematic cannabis use (Table 1). Notably, in the problematic use group, a significantly greater proportion self-reported using cannabis for depression (n=19, 63.33%), compared to the non-problematic use group (n=28, 40.00%) (P = .032). However, there was insufficient evidence supporting that BDI scores were different between the problematic use group (*median*=6.00, *IQR*=8.25) compared to the non-problematic use group (*median*=6.50, *IQR*=8.25), P =.976. Similarly, for the PSS10 scale, there was insufficient evidence supporting a difference between the problematic use group (*mean ± SD* = 16.79 ± 6.26) compared to non-problematic use group (*mean ± SD*=15.76 ± 6.53), P=.469. Finally, there was minimal evidence (P=0.178) that PHQ-15 scores differed between the problematic use group (*median*=4.50, *IQR*=4.5) compared to non-problematic group (*median*=7.00, *IQR*=7). From the results of the MINI, it was not possible to statistically analyze any difference in proportions of those with current MDD, between the problematic cannabis use group (n=1, 3.33%) and the non-problematic use group (n=2, 2.86%), due to the sample sizes being not sufficient for the relevant statistical test. Those with problematic cannabis use did exhibit higher rates of past MDD (n=13, 43.33%) compared to the non-problematic group (n=20, 28.57%) but this did not achieve statistical significance (P =.150). Of potential interest, there was a non-significant trend (P=.088) for cannabis to be used less often for sleep conditions in those with problematic use (n=12, 40.00%) compared to those without problematic use (n=41, 58.57%).

To confirm that the scales used in the current study were reliable with the present population, we calculated measures of internal consistency reliability using Cronbach's alpha. For the BDI-II, cognitive subscale: Cronbach's alpha=0.746; affective subscales: Cronbach's alpha=0.734; somatic subscales: Cronbach's alpha=0.724. For the PHQ-15, Cronbach's alpha=0.718. For the PSS10, negative symptoms: Cronbach's alpha=0.680; positive symptoms (removing cope item alpha): Cronbach's alpha=0.749. These results are consistent with the high degree of reliability exhibited in previously published studies with these questionnaires, which included a reliability coefficient of 0.86 for the BDI-II,[16] a coefficient of 0.80 for the PHQ-15,[17] and a coefficient of 0.78 for the PSS10.[18]

DISCUSSION

Previously reported risk factors associated with problematic cannabis include frequent use of high potency THC, male gender, younger age of cannabis initiation, adverse childhood experiences, and use of other illicit

Table 1. Associations with Problematic Cannabis Use

	Problematic Cannabis Use		Total (%)	P
	No (n=70)	Yes (n=30)		
Gender, n (%)				.224
Male	45 (66.18)	23 (33.82)	68	
Female	25 (78.12)	7 (21.88)	32	
Age, n (%)				.308
Less than 30 years	39 (66.10)	20 (33.90)	59	
30 and more than 30 years	31 (75.61)	10 (24.39)	41	
Age of initiation, years				.023
Median, (IQR)	20.00 (6.00)	18.00 (4.00)		
Self-reported condition for cannabis use, n (%)				
Anxiety/stress	51 (72.85)	26 (86.67)	77	.133
Depression	28 (40.00)	19 (63.33)	47	.032
Sleep issues	41 (58.57)	12 (40.00)	53	.088
Psychiatric diagnoses, n (%)*				
MDD current	2 (2.86)	1 (3.33)	3	
MDD past	20 (28.56)	13 (43.33)	33	.150
BDI				.978
Median, IQR	6.00 (8.25)	6.50 (8.25)		
PHQ-15				.178
Median, IQR	7.00 (7.00)	4.50 (4.50)		
PSS10				.469
Mean ± SD	15.76 ± 6.53	16.79 ± 6.26		

*Percentages do not add to 100% as participants may be in multiple or no categories

drugs.[8,9] Problematic cannabis use has been associated with a host of adverse outcomes including poorer work or social functioning, interference with productivity, withdrawal symptoms such as anxiety or fatigue, and worsening mental health.[7,13,19,20] This study assessed risk factors for problematic cannabis use and prevalence in a sample of cannabis dispensary users who self-endorsed the use of cannabis for medical purposes. Interestingly, the prevalence of problematic cannabis use was high within this sample (30%). Gender, current or past MDD episodes, and BDI score risk factors were not significantly associated with problematic cannabis use; however, the age of cannabis initiation and self-reported use for depression were statistically significant

The findings related to gender and depression indicate that risk profiles for problematic cannabis use may differ, in some aspects, for those consuming with purely recreational intent compared to a medical intent. For example, male gender has been associated with an increased risk of problematic cannabis use in the recreational literature.[8] This risk for males is theorized in part to come from greater engagement in risk-taking behaviors compared to females.[21] However, our data showed no significant difference in prevalence between genders, suggesting that medical intent of use, in which there is a common goal of symptom control, may negate this risk factor. Although the lack of difference between genders is just one example of divergence in findings between recreational and medical samples, it supports the notion that previously reported risk factors for problematic cannabis use should be re-examined within the context of medical use.

Clinical concerns about the association between mental health and problematic cannabis use exist within both recreational and medical cannabis-use contexts. Mental health disorders are often co-morbid with substance use disorders.[22] The links between cannabis use and mental health are complex, and establishing directionality remains an ongoing challenge. Previous literature from both medical and recreational populations has identified depression as a risk factor for subsequent problematic use.[23] Consistent with this, individuals with problematic cannabis use currently reported using cannabis more frequently to relieve depressive symptoms. However, in our findings, neither validated mental health scale scores nor diagnoses of current or prior MDD were significantly associated with problematic cannabis use. Notably, however, 43% of individuals with problematic use were diagnosed with a past MDD episode, but only 3% met the criteria for a current disorder. Although preliminary, one possibility for this large difference is that cannabis has been helpful in controlling their depressive symptoms—however, this will clearly take substantial further research in this population to confirm. Cannabis has long been subject to conflicting findings as to whether it hinders or improves mental health. While the evidence is in no way conclusive, there are reported findings that cannabis may improve some symptoms of depressive disorders.[24] Intent of use and patient education on how to use cannabis with a safety-focused approach may be a key differentiating factor between mental health improvement or harm.

Finally, the high level of problematic cannabis use in this sample may point out important differences and risks between self-treating medical cannabis users and healthcare professional (HCP)-guided medical cannabis users. Although participants reported using cannabis for medical purposes, only 10% reported medical cannabis use was recommended by their doctor. A lack of guidance and education due to the self-taught nature of these individuals may have increased the risk of problematic use. In patients working with an HCP, as is seen with authorized medical cannabis users in Canada, continued monitoring and guidance from HCPs allow for intervention prior to problematic use. Therefore, to mitigate risk, individuals should be encouraged to seek HCP guidance when using cannabis medically. Additionally, HCPs should have open, non-judgmental conversations with their patients to assess if cannabis is being used medically. If it is, and the HCP is not comfortable with managing care, the patient should be referred to a clinician experienced in medical cannabis where they can receive proper education and guidance on how to meet their treatment goals. For all individuals who are using cannabis recreationally, that is, recreational only or medical intent + some recreational use, lower-risk approaches for recreational cannabis use, such as those outlined in Canada's Lower-Risk Cannabis Use Guidelines, should be encouraged.[25]

An equally important consideration when assessing the seemingly high rate of problematic use is the validity of measures for medical cannabis users. As with most scales, including the MINI-6, the assumed sample is a general population who are not using cannabis with medical intent. Medical patients use cannabis more frequently and chronically, which may lead them to be misclassified as higher risk due to additional scoring for frequency of use. There is currently a paucity of research investigating problematic cannabis use and mental health in medical cannabis users. In order to better classify risk within this population, it will be important to develop validated tools appropriate for these medical users. Moreover, evidence from this study supports that, within the medical population, there are important differences between those self-treating versus receiving guidance from an HCP. Therefore, risk factors likely differ between recreational, self-treating medical, and HCP-treated medical cannabis users; This should be considered in future research.

The modest sample size may have limited our statistical power and decreased the ability to make

broad generalizations confidently. Although important findings were observed with the current sample size of 100 participants, future investigations will benefit from evaluating larger sample sizes. The self-report nature of measures may have also impacted the precision of results, as external verification of answers (such as from medical chart review) was beyond the scope of the study. Finally, though individuals reported using cannabis for medical purposes, few were supervised by an HCP. This may have led to some participants using in a manner more similar to recreational users. Evaluations on the differences between recreational, self-reported medical use and medical cannabis use under the guidance of an HCP should also be undertaken.

CONCLUSION

This study identified several factors related to mental health which differentiated those with or without problematic cannabis use. Furthermore, findings of high rates of problematic cannabis use in this cohort suggest that individuals who are self-treating with medical cannabis may be at an increased risk for developing adverse outcomes, such as cannabis use disorder, compared to those receiving HCP guidance. Greater encouragement to seek HCP guidance and more accessibility to information on how to safely use cannabis would be useful to mitigate this risk.

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