

Perceptions, Experiences, and Patterns of Cannabis Use in Individuals with Mood and Anxiety Disorders in the Context of Cannabis Legalization and Medical Cannabis Program in Canada – A Qualitative Study

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ABSTRACT

Introduction Perceptions of cannabis as a potential medical treatment for mood and anxiety disorders have been increasing in the context of legalizations, availability, and medical cannabis programs, though current evidence predominately indicates risks and negative effects of cannabis use (CU) on mental health outcomes. This study aims to understand motivations, perceptions, effects, and patterns of CU in individuals with mood and anxiety disorders.

Methods Thirty-six adult patients diagnosed with mood or anxiety disorders, obsessive-compulsive disorder, or posttraumatic stress disorder who were currently using cannabis completed an in-depth qualitative interview on individual motivations, perceptions, experiences, effects, and patterns of their CU. The thematic analysis focused on phases of CU and sources of cannabis products and information.

Results Reported motivations for initiation of CU included curiosity, peer pressure, and dissatisfaction with conventional treatments. Factors such as psychotropic effects and coping with mental health symptoms and insomnia contributed to the continuation of CU. More negative effects, including cognitive dysfunction, worsening of mood, and anxiety symptoms, were acknowledged with ongoing CU. Concerning findings included common initiation of CU before age 18, combined medical and recreational CU, rare consultation of medical professionals on CU, and potential effects and harms.

Discussion Findings indicate individual complexity of motivations, perceptions, and patterns of CU in the study population. The reported potential beneficial effects of specific cannabis products should be further investigated. Findings emphasize patient-provider dialogue on both CU and conventional treatments. Information from this study can contribute to and inform the development of education, prevention, and intervention strategies.

Introduction

In October 2018, Canada became the second nation to legalize the consumption of cannabis [1, 2]. This was associated with increased cannabis use (CU), particularly among young adults, and about 6.2 million Canadians aged 15 years and above (approximately 20%) reported using cannabis in the last three months, which increased from 14% before legalization and from 17.5% post-enactment of legalization [3]. A substantial proportion of cannabis users perceive cannabis as non-harmful and even beneficial for mental health despite limited supporting evidence [4]. Prior to the legalization in 2018, Canada also pioneered access to medical cannabis programs more than two decades ago [5].

The cannabis plant includes numerous cannabinoids; major constituents are Δ^9 -tetrahydrocannabinol (THC) and cannabidiol (CBD). THC induces psychotropic effects like euphoria and relaxation [6–8]. THC use has been associated with cognitive dysfunction, a potential increase in anxiety symptoms, or psychotomimetic effects, while for CBD, a non-psychotropic cannabinoid, antioxidant, anticonvulsant, anti-inflammatory, and neuroprotective properties, have been described [9]. Despite some potential benefits, evidence predominately suggests that CU is linked to negative mental health outcomes. Regular to heavy users face a quadrupled risk of developing psychosis, with findings suggesting a dose-risk relationship [10]. Chronic CU has been linked to impairments of motivation, energy, and cognitive function, including learning and memory [11–15]. Conversely, cannabinoids hold promise in treating certain conditions like chronic pain, neuropathic pain, chemotherapy-induced nausea/vomiting, AIDS-associated anorexia, and spasticity associated with multiple sclerosis [16–20].

Individuals with mood disorders show elevated rates of CU and cannabis use disorder (CUD) compared to the general population, and multiple cross-sectional studies have linked depression to CU [21]. Early CU initiation (before age 18) appears to correlate with higher risk and earlier onset of major depressive disorder (MDD) [22], and heavy CU can increase the risk for depression [23]. Although MDD incidence does not appear to increase in cannabis users, baseline MDD has been linked to CU initiation, suggesting a "self-medication" approach [24]. Bipolar disorder (BD) has been associated with frequent CU and higher comorbid CUD compared to the general population [23, 25, 26]. Anxiety disorders and obsessive-compulsive disorder (OCD) have been shown to be associated with cannabis misuse, even after adjusting for anxiety, depression, and stress [27].

To explore the patterns and motivations of CU, researchers have adopted motivational models akin to those used in alcohol and tobacco studies [28–34]. These models acknowledge diverse motives for cannabis use, considering addictive use, withdrawal, craving, and psychological distress [28]. These results enhance understanding of comprehensive CU behavioral models and associations with risk/clinical factors. It has been reported that individuals with mood disorders using cannabis for therapeutic purposes (CTP) predominantly seek relief from anxiety (99%), sleep (93%), and depression (92%), along with other symptoms such as pain and appetite [35]. Studies have also highlighted expected relief of posttraumatic stress disorder (PTSD) symptoms, in particular intrusive symptoms, with CU [36, 37], while individuals using cannabis for PTSD anticipate negative effects such as cognitive impairment [38]. CU as a

coping strategy for negative affect and insomnia has been linked to CUD risk in veterans with PTSD and MDD [39], though this has not been consistently observed in non-veteran adults [40]. Reasons for CU frequently include psychological concerns (PTSD, depression, anxiety, sleep, chronic pain), followed by other health motives (appetite, pain, nausea, muscle spasms, seizures) [35, 40–43].

The high prevalence of CU among individuals with mood and anxiety disorders despite opposing scientific and clinical evidence in the context of cannabis legalization and access to medical cannabis programs in Canada indicates an urgent need to enhance knowledge and understanding of CU in these vulnerable populations who are potentially at higher risk of adverse effects and outcomes. Existing literature mainly consists of correlational, quantitative studies, lacking detailed insights into motivations, contexts, and changes over time associated with CU in individuals with mood and anxiety disorders. Thus, our qualitative research approach employed in-depth interviews on motivations, expectations, and effects of CU in individuals with mood and anxiety disorders to address this knowledge gap and to inform health care and policies, identify risk factors and patterns, and aid the development of targeted education and intervention.

Methods

The study is reported in accordance with the Consolidated criteria for reporting qualitative research (COREQ) [44].

Participants

Thirty-six participants were recruited and completed in-depth interviews at CAMH between January 2022 and March 2022. Inclusion criteria were age 18 years and older, being a patient of CAMH with a reported diagnosis of mood disorder (depressive or bipolar disorder), anxiety disorder, OCD, or PTSD, and current CU.

Procedure

The study was approved by the Research Ethics Board of the Centre for Addiction and Mental Health (CAMH) in Toronto, Ontario, Canada (REB# 040/2019). Participants were recruited from the mood and anxiety program at CAMH, and written informed consent was obtained from all participants. Due to COVID-19-related restrictions, written consent was obtained using virtual/electronic platforms WebEx and RedCap. Participants completed one qualitative interview. Interviews were conducted virtually using WebEx. Participants received compensation for their time.

Data collection and analysis

A semi-structured interview guide consisting of 19 questions divided into three major sections was used: A) reasons and motivations for CU, B) expectations and perceptions of the effects of cannabis, and C) cannabis purchasing trends and sources of information related to cannabis. Each section included suggested prompts to stimulate the discussion. Study data was coded by a graduate research assistant (AD) using NVivo software (NVivo 12 Plus, QSR International) and evaluated using codebook analysis. Following the completion of data collection, transcription, and familiarization, the codebook was inductively developed by AD under the su-

► **Table 1** Participant characteristics.

| | N (%) or Mean (SD) |
|--|--|
| Reported mental health diagnosis | Major depressive disorder: 29 (80.55%) |
| | Generalized anxiety disorder: 26 (77.77%) |
| | Bipolar disorder: 5 (13.88%) |
| | Posttraumatic stress disorder: 5 (13.88%) |
| | Obsessive-compulsive disorder: 3 (8.33%) |
| Frequency of cannabis use | Daily to multiple times daily: 10 (27.78%) |
| | Weekly or bi-weekly: 16 (44.45%) |
| | Monthly: 6 (16.66%) |
| Duration of cannabis use | Mean: 13.19 years (SD: 6.81; min 5 years, max 30 years) |
| | Age at first/onset of cannabis use (SD: 8.88; min 12 years, max 60 years) |
| Age < 18 years at first/onset of cannabis use | 18 (50%) |
| Mental health symptoms present at the time of initiation | 31 (86.11%) |
| SD = Standard Deviation. | |

pervision of a senior investigator (SK). Transcripts were then coded into codebook categories.

The first two sections of the interview (A) reasons/motivations and B) expectations/perceptions of CU) were further explored under four broad themes: (1) initiation phase, (2) continuation/post-initiation phase, (3) maintenance phase, and (4) consideration to discontinue. The interview questions aimed to explore how motivations/reasons and expectations/effects of CU changed over time, from the time of initiation to the present. For the initiation phase, the interview focused on the period prior to initiating CU, for the continuation phase, it explored aspects related to continuing CU after initiation, and for the maintenance phase, it evaluated the time period of ongoing cannabis use until the present time/time of participation in this study. In addition, participants were asked about considerations to discontinue cannabis. In the third section of the interview C), three additional themes were explored: (1) purchasing trends and Sources of cannabis products, (2) sources of information on CU (including information on medicinal use), and (3) type and preferences of cannabis products.

The interview was designed to allow participants to provide multiple answers/responses to questions, e. g., various perceived effects of cannabis. In the manuscript, we report a total number of specific responses. Results are reported with representative participant quotes to illustrate the themes generated from the data.

During codebook formation, interesting aspects emerged with respect to differences in reasons/motivations of individuals who initiated cannabis before the age of 18 compared to individuals who were older at that time, and differences in effects of CU reported by individuals who consumed cannabis frequently compared to individuals who consumed cannabis occasionally. Manual coding was done to analyze and report these aspects.

Research team positionality

The interviewer and analyst of this study was a female physician with a South Asian background with medical education completed in India, holding a position as Graduate Research Assistant at the Centre of Addiction and Mental Health.

Results

Participant characteristics

The characteristics of participants are summarized in ► **Table 1**.

Initiation Phase

Motivations and reasons to initiate cannabis use

i. Curiosity and peer pressure

Most participants (n = 29, 80.6%) reported they initiated cannabis due to peer pressure (n = 11, 37.9%) or curiosity (n = 18, 62.1%). For example, participants stated “it was a cool thing to do in high school” and that it made them feel “chill and social”, or they “decided to partake in it because a lot of my friends were doing it.” Participants reported using cannabis as a way to “fit in” with their peer group.

ii. Coping with mental health symptoms

Of the 31 (86.11%) participants who reported having mental health symptoms at the time of initiation, 15 (48.4%) participants used cannabis to cope with their mental health symptoms/conditions such as depression, anxiety, posttraumatic stress, and sleep problems associated with anxiety. These symptoms and conditions were reported to be in part related to stressors in school or unpleasant situations at home. Two participants initiated cannabis in the form of CBD oil after it was recommended for depression by their family physician.

iii. Unfavorable experiences with previous medications

Nine participants (25%) reported initiating cannabis due to limited effects and negative experiences with pharmacotherapy for the treatment of their mental health problems. Reported medications included benzodiazepines such as lorazepam and clonazepam, antidepressants such as bupropion, and mood stabilizers such as lamotrigine. Participants described they wanted to, e. g., “give it a chance as a last resort as it has helped other people,” as “everything else seemed to fail,” or described their symptoms as “getting worse”, or experienced negative side effects from medications like “chest tightening, shortness of breath, headaches, concentration, and memory issues, hallucinating, poor sleep.” In participants’ words, “Cannabis was the only thing that kind of calmed me back down” or the “only thing that actually worked.” One participant reported that cannabis helped them feel better after they felt suicidal when taking antidepressant medications.

iv. A healthier alternative to other drugs

Four participants (11.1%) described cannabis as “natural” and shared the belief that cannabis was a “healthier alternative” to drinking alcohol. One participant reported that they used cannabis when they “tried to cut down on any addiction.” Another participant emphasized that they were scared to get addicted

to alcohol as difficulties with alcohol use have been present in their family. One participant believed cannabis to be safer than crack and heroin, which they had been using before, and thus started using cannabis.

From manual coding analysis, it was further observed that the participants who initiated cannabis before the age of 18 cited peer pressure to feel accepted by peers at school, curiosity, and social facilitation as the main reasons for starting cannabis. The main reasons to start CU at age 18 and above included mental health conditions, migraines, and insomnia, followed by recreational use to escape from boredom and for relaxation.

Expected effects of cannabis use before initiation

i. Impairment of memory and cognition

Interestingly, 15 participants (41.7%) expected negative effects on cognition. Participants also reported that they believed that cannabis would reduce their self-esteem, affect them academically, and make them lazy and unmotivated.

ii. Negative effect on anxiety

Seven participants (19.4%) believed that cannabis might negatively affect their anxiety and might make them paranoid. Among them, 2 participants explicitly expressed fear that cannabis might increase the risk for schizophrenia later in life.

iii. Development of addiction

Seven participants (19.4%) feared that they might become addicted to cannabis and described related concerns, such as that CU could make them isolated from society and make them lonely.

iv. Positive effects on mood

4 (11.1%) participants believed cannabis to be a mood-elevating drug. Participants, for example, stated that cannabis could make them *“happy and giggly versus something that could make you angry”* or felt cannabis would bring them *“joy, euphoria and happy moments.”*

Continuation phase

Motivations and reasons to continue cannabis use

i. Euphoria/enhancement

Fourteen participants (38.9%) continued using cannabis because they enjoyed the euphoric feeling of cannabis and found it exciting and fun. They particularly described how cannabis made them feel. *“I just enjoyed how it made me feel. I liked being in a sort of altered mindset, and I just enjoyed how it made me feel.”*

ii. Coping with mental health symptoms/conditions

Fourteen participants (38.9%) reported continuing to self-medicate with cannabis to help with their symptoms of depression, anxiety, social anxiety, attention deficit hyperactivity disorder, and/or PTSD without medical advice. Among them, the two participants who were prescribed CBD oil for depression continued to take it as their physician advised them to continue using it consistently for a few weeks to witness the results. Participants reported it helped them to forget the worries that arose from adverse situations at home or at work and made them forget

about their problems temporarily. *“For social anxiety as well as depression, I do experience very severe lows sometimes. When I do smoke, it does take me out of my depressive state for some time, but that is also the reason why I smoke so much because I am always in a depressive state, and I don’t want to be in a depressive state,”* *“At first, it was just because I was trying something new, and then now I’m using it to see if it helps with my depression and anxiety. I feel like I really have no other option.”* Interestingly, participants with reported diagnosis of PTSD described using cannabis for introspection, enabling them to directly confront the source of trauma rather than avoiding intrusive symptoms/flashbacks.

iii. Social reasons

Fewer participants (n = 6, 16.7%) continued using cannabis for social reasons. It improved participation in situations such as parties and celebrations by making them more talkative, outgoing, and happier. They also reported it made social gatherings more fun and mentioned using cannabis to celebrate a special occasion with partners or friends. *“It would help with socializing and creating the right atmosphere.”*

iv. Other self-reported reasons

Two participants continued using cannabis for their sleep problems, which weren’t improved when using medications. Four other participants used cannabis to get relief from pain symptoms; some considered cannabis to be a safer alternative to pain medications. Two participants initially continued having cannabis out of peer pressure. They wanted to fit in with the group they liked without feeling left out. They reported that later, they started enjoying the euphoria associated with CU: *“I felt popular at school. I felt older. I felt more accepted by the older kids in school, absolutely peer pressure.”*

v. Dependence

Some participants (n = 3, 8.3%) also reported becoming dependent on cannabis for no specific reason. Participants reported getting addicted to cannabis, some reported liking the taste of cannabis, and others found the process of grinding the dried flower and rolling very relaxing. *“I believe it became an addiction. I would wake up in the morning, and the first thing I would do is smoke cannabis,”* *“I don’t know if marijuana contributes to it or helps. I have no idea. Long-term. I don’t know if it’s actually making it worse. I just don’t know, but I keep finding myself going back to it.”*

Effects of cannabis use after initiation

i. Enhancement and expansion

The majority of participants (n = 20, 55.6%) reported feelings of euphoria/high that they felt when using cannabis. *“I remember the time and it was really funny and mind-blowing and just like “woah,” and so I think I had a little bit of a different view of what reality is after doing that because I’ve never done anything like that before.”* *“It helped me to just laugh and enjoy laughing.”*

ii. Worsening of anxiety and paranoia

Five participants (13.9%) reported feeling paranoid after initially using cannabis. *“A couple of days after taking cannabis, I would just become really paranoid sometimes. I would see stuff, so I just would become more paranoid about things,”* *“I felt panicky and my anxiety went through the roof, and I was pretty scared.”*

iii. Positive effect on sleep

Five participants (13.9%) reported that cannabis helped them with sleep. *"It helped me get through the day or it helped me to sleep."*

iv. Improved memory and concentration

In contrast to their expectations earlier, 2 (5.6%) participants perceived CU did improve their memory. *"I thought I was going to lose my memory I thought I was going to completely forget what I did. I thought I was going to have a blackout drunk moment, but now I could remember everything pretty clearly, from what I did to what I said to people."*

v. Feelings of guilt

Two (5.6%) participants felt guilty when initially using cannabis. One of them reported: *"I was still worried that I was doing something wrong, I felt really bad. I had a huge wave of guilt."*

Maintenance phase (ongoing and current cannabis use)

Reasons for ongoing and current cannabis use

i. Coping with and treatment of mental health symptoms

Most participants (n = 23, 63.9%) reported self-medicating with cannabis to ease symptoms of anxiety and depression and to ease tension or stress from work. Three participants reported relief from migraine headaches induced by stress. Five participants reported to specifically use cannabis to treat their diagnosed mood and/or anxiety disorder. Participants additionally mentioned how the COVID pandemic influenced their CU and indicated increased dependence on cannabis, stating that they required greater amounts of cannabis to relax and feel happy while they had to be at home. *"As the years progressed, it went from being more of a recreational use to more of an after-work, just to help relieve stress and anxiety from the workday."*

ii. Sleep problems

Another reason for ongoing CU and CU at present was sleep problems (n = 10, 27.8%). Some participants who had reported using cannabis for relaxation also used cannabis to improve sleep. One participant with sleep apnoea reported using CBD oil, which they found helpful. *"If I'm feeling depressed, I haven't really used marijuana then. It's usually if I'm physically exhausted or really sore or something like that from physical exercise; consuming a small amount of cannabis can help me get to sleep," "I would use it when I have sleeping problems and I can't sleep."*

iii. To improve use of or addiction to other drugs

3 participants (8.3%) described using cannabis to reduce addiction to other drugs. One participant with a history of substance use (heroin, crystal meth) continued using cannabis as they felt that cannabis "worked like medicine" in treating their substance use disorder and helped them stay away from other drugs. Another participant mentioned that they reached for cannabis when they wanted to cut down on alcohol use. Another participant, who reported hostile situations at home, revealed that they used cannabis to avoid using any other drugs for coping.

Effects of ongoing and current cannabis use

i. Negative effects on memory

More than half of participants (n = 19, 52.8%) reported that chronic CU has negatively impacted their memory and their daily functioning as it has interfered with their schoolwork, professional life, and personal life. Memory was reported to get "foggy," and they reported "trouble recalling the words for things." One participant described writing things down before using cannabis to be able to recall, stating, *"My short-term memory is gone completely."*

ii. Negative effects on anxiety and mood

Participants (n = 30, 83.3%) reported deterioration of depressive or anxiety symptoms after CU. They also reported feeling fatigued, having low concentration and energy, and that they failed to carry out responsibilities the next day. *"Nowadays, I get very anxious and jittery. Not jittery per se, but restless that's a better word. I get restless, I get anxious, I get moody, I get snippy and snappy and itchy and irritated definitely." "I would say that anxiety goes up, and I feel lethargic afterwards, probably a little bit paranoid. Anxiety high and probably depression as well."*

Two participants observed that their anxiety/depressive symptoms worsened, especially when cannabis was taken with medications like antidepressants.

iii. Positive effects on anxiety and mood

Interestingly, an equal number of participants (n = 30, 83.3%) reported positive effects on mood and anxiety symptoms. Participants reported effects such as feeling much calmer, relaxed, less anxious, and less depressed temporarily after having cannabis. They described that using cannabis lowered their inhibitions, raised their confidence level, and gave them greater motivation and energy to focus on daily activities after taking cannabis. Interestingly, 3 participants further described how cannabis has different effects depending on their current mood state. They described that if they use cannabis when in a relaxed mood, they would feel happy afterwards; however, if they are in a low mood at time of use, their mood would worsen. *"When I feel low, it impacts me differently. I notice it accentuates the bad feeling if I'm feeling really, really low." "Based on your mood or your feeling, it amplifies it. If you're having a good day, yeah, you're going to feel great; you're going to have a good day. If you're having a shitty day or a sad day, it will amplify that feeling; that's what I noticed."*

iv. Introspection

Three of 5 participants with PTSD revealed how cannabis was helpful with introspection into the source of trauma, particularly when using cannabis during flashbacks. Two participants with MDD and GAD also shared a similar perception and experience that cannabis would help them decode what triggered them to feel depressed. *"It will connect me to the source of the flashback and enlighten me to that. I feel like my system is like, there's a lot that's battling itself in those moments because a large part of it doesn't want to introspect, and then the cannabis opens up a window for it to introspect."*

v. Positive effects on sleep

Nine participants (25%) reported improved sleep with cannabis. One participant also reported paranoia and stated tolerating this adverse effect for positive effects on sleep, *"good*

outweighs the bad," and "Although sure, it makes me paranoid, I enjoy the sleep I have when I'm high."

vi. Negative effects on sleep

Five participants (13.9%), on the other hand, reported having poor quality of sleep and feeling groggy the next morning after CU; some of them also described poor memory and heightened mental health symptoms.

vii. Difficulties with substance use/addiction

Ten participants (27.8%) reported becoming dependent on cannabis, indicating that recreational use transformed into more regular use. "I think it's a misconception to say it's not an addictive drug." Participants also reported that their tolerance of cannabis increased, requiring higher amounts of cannabis to get the same effects they got when they were younger.

viii. Other negative effects

Eleven participants (30.6%) complained of negative effects of CU, such as headaches, nagging cough, dry mouth, hallucinations, or problems with vision. In addition, two participants reported increased soreness in their body. One participant commented, "It feels like I've done something to my body that made me sore when I didn't. When I smoke, I find that any pain in my body becomes more intense."

Reported effects of cannabis depending on frequency of use

Participants with daily or almost daily use of cannabis (N = 10, 27.8%) overall reported dependence on cannabis effects; they reported enjoying the immediate effects of increased relaxation and/or euphoric feelings, explaining the frequent use up to multiple times daily. Frequent cannabis users identified mental health conditions and sleep problems as the most common reasons for using cannabis. Some participants with longer-term/chronic use described that paranoia and forgetfulness increased over time. Infrequent cannabis users (N = 6, 16.7%) with more sporadic or occasional use less than monthly expected reported greater negative impacts from cannabis, like inability to think critically, inability to carry out activities, aggravation of anxiety, impaired memory, and low motivation. Some infrequent users revealed that CU made them extremely dizzy, sleepy, and withdrawn even the next day after CU.

Consideration to discontinue cannabis use

Twelve participants (33.3%) expressed interest in discontinuing cannabis, nine (75%) of them due to the negative effects they were experiencing, and three (25%), due to personal reasons.

i. Negative effects

The negative effects contributing to the wish to discontinue cannabis included poor sleep quality, headaches when waking up, memory impairment, exaggeration of anxiety, increased appetite, dependence, and disruption of personal relationships due to CU. Some participants mentioned that their physicians advised them to refrain from using cannabis as it might affect their mood symptoms. "It's really the anxiety; my heart rate increases, and I get nauseous, so it's really not an enjoyable experience anymore." "I feel like I am way too dependent on it. I just don't like the fact that I can't go without it. When I'm without it, it's very detrimental to my mental health and really and pretty much my physical health."

ii. Personal reasons

Three participants wished to discontinue cannabis due to personal reasons. One participant described wanting to be a role model for their child, who was also using cannabis. Two other participants had stopped CU for 2 years during pregnancy and breastfeeding.

Sources of cannabis products and Sources of information on cannabis

Reported sources of cannabis products and sources of information on cannabis are presented in ► **Table 2**.

Preferences for cannabis products and cannabinoids

Reported preferences for cannabis products and cannabinoids are presented in ► **Table 3**.

Effects of pure cannabidiol or cannabidiol -dominant products on symptoms

Positive effects of CBD reported by participants included reduced pain, improved mood, alleviation of anxiety, and improved sleep. Six participants perceived cannabis with greater CBD content than

► **Table 2** Sources of cannabis products and sources of information on cannabis.

| Sources of cannabis products | N (%) |
|---|------------|
| Licensed cannabis stores | 30 (83.3%) |
| Online websites | 2 (6.67%) |
| Self-growing cannabis plants | 2 (5.56%) |
| Illicit/non-regulated sources | 6 (16.7%) |
| Sources of information | N (%) |
| Websites of producers/sellers, social media | 18 (50%) |
| Cannabis store sales personnel | 8 (22.2%) |
| Friends/family members | 7 (19.4%) |
| Medical professionals | 3 (8.33%) |

► **Table 3** Preferences of cannabis products and cannabinoids.

| Preferences of cannabis products | N (%) |
|--|--|
| Dried flower | 21 (58.3%) |
| Edibles (drinks, sweets, candies, brownies) | 18 (50%) |
| Cannabis oil | 9 (25%) |
| Vaping/vape cartridges | 5 (13.9%) |
| Preferences of cannabinoids | N (%) |
| Hybrid products (CBD and THC) | 6 (16.7%) (CBD dominant: 4, THC dominant: 2) |
| CBD only products | 9 (25%) |
| THC only products | 8 (22.2%) |
| Referred to Sativa and Indica strains | 11 (30.6%) |
| Not aware of cannabis product composition | 2 (5.6%) |
| CBD = cannabidiol; THC = Δ^9 -tetrahydrocannabinol. | |

THC as “medicinal” or with “no side effects.” Four participants, however, reported that they didn’t feel anything after taking CBD-dominant cannabis products. One participant revealed, “It didn’t really help at all. I didn’t feel anything.” This resonated with another participant stating, “I didn’t get any effects from that, like zero effects.”

i. Reduction of pain

Eight participants (61.5%) used CBD-rich cannabis products for Irritable Bowel Syndrome (IBS), muscle aches, headaches, or radiotherapy-induced pain in cancer treatment. “You get stiff muscles, take a drop, and by the next day, my sore is gone.”

ii. Improvement of sleep

Five participants (38.5%) described improvement in sleep with CBD-rich cannabis strains and improvement in concentration as a result of a good night’s sleep the next day.

iii. Improvement of anxiety

Three participants (23.1%) reported a positive effect of CBD-dominant products on anxiety symptoms. They commented on how they could engage in their responsibilities without feeling high or drowsy when comparing effects to cannabis products containing THC. “I just feel a sense of completion. I don’t feel anxious or nervous. I can just carry out my daily tasks and I don’t really feel like I have done a drug.”

Negative effects of CBD-dominant products were reported by three participants (23.1%).

i. Worsening of anxiety

Two participants (reported negative effects on anxiety if taken in high doses or over longer periods. One participant commented that “pure CBD makes things so much worse for me.” referring to exaggeration of anxiety symptoms.

ii. Worsening of sleep

One participant reported sleep difficulties associated with the use of CBD-dominant products: “Sleeping is so bad; feels like my brain is getting heavy. It makes me confused, groggy, and unaware the next day.”

Effects of pure $\Delta 9$ -tetrahydrocannabinol or $\Delta 9$ -tetrahydrocannabinol-dominant products on symptoms

Positive effects of high THC products reported by participants:

i. Positive effect on mood

Nine participants (90%) reported a positive effect on mood and reduction of depressive symptoms with THC-dominant products; in this context, participants mentioned, for example, enhancement of creativity, focus, and sexual drive, and improvement with overcoming inhibitions and being more extroverted in social situations. “It helps with the depression. If I’m in an episode, then it does help me with my mood.”

ii. Increased appetite

Four participants (40%) reported increased appetite or “munchies.” Some participants experienced this as having positive effects, for example, that it was a “big factor in the appetite,” enabling them to “taste the food again,”

iii. Improvement of sleep

Two participants (20%) reported a positive effect on sleep for high THC products.

Negative effects of high THC products reported by participants:

i. Worsening of depressive and anxiety symptoms

All participants using THC-only or THC-dominant strains reported worsening depressive and/or anxiety symptoms when taken in higher doses. It was observed that the dosage or tolerance levels varied among participants. For example, one participant claimed that doses above 1 mg THC make them “anxious and paranoid.” Similarly, another participant reported that a THC dosage above 2.5 mg feels “more like an intoxication.” For another participant, doses above 30 mg THC induced “real anxiety.” One participant stated, “The higher the THC content, the more panic, tremors, and paranoia.”

Effects of hybrid cannabis products with balanced cannabidiol and $\Delta 9$ -tetrahydrocannabinol content

Six participants reported using hybrid products containing equal proportions of CBD and THC. They reported hybrid strains, e. g., give them a “high with the relaxation benefits.” The participants shared the belief that 1:1 hybrid strains created euphoria that is less long-lasting and/or less intense as with high THC strains. Three participants mentioned that using hybrid products to improve sleep was a recommendation by their family physician.

Effects of cannabis products from Indica and Sativa strains

Eleven participants (30.6%) referred to the differential effects of “sativa” and “indica” cannabis products rather than levels of THC and CBD. Participants overall reported more relaxing effects associated with indica strains and more energizing effects with sativa strains, describing that they feel more productive and euphoric. Six participants taking indica strain products reported no negative effects from it and/or consumed indica strain products when they wanted to feel relaxed. Four participants specifically used indica for the improvement of sleep problems. While five participants reported a positive effect on mood/depressive symptoms from sativa strain products (“increased energy and concentration, creativity”, helpful to “stay focused” and “stay functional.” Four participants reported negative effects on mood and anxiety (“increased palpitations,” restlessness, “makes me fidgety”).

Discussion

In this qualitative study, we completed in-depth interviews with 36 participants diagnosed with mood and anxiety disorders, including PTSD and OCD with current CU. Interviews focused on individual perceptions, motivations, experiences, and patterns of CU from the time of initiation of CU to date. Notably, this study was conducted in Canada, where a program to access cannabis for medical reasons was implemented more than 20 years ago, and cannabis was legalized in 2018.

At the initiation of CU, various motivations and factors, such as peer pressure, desire to fit in, dissatisfaction with standard mental health treatments (e. g., pharmacotherapy), and perceiving cannabis to be a healthier alternative to other substances, were reported. The reasons and motivations for the initial continuation of CU most commonly reported were coping with mental health symptoms and the typical psychotropic effects of cannabis/THC, such

as euphoria and enhancement. The main conditions participants used cannabis for in our sample are similar to those reported in previous studies, such as psychological/mental health problems (depression, anxiety), sleep problems and pain [35, 40–42, 45–47], or 92% to 99% of cannabis users with diagnosed mood disorders endorsing CU to relieve mental health symptoms [35]. The reasons for initiation of cannabis before age 18 in our study overlap with findings in young adults without comorbidities/health conditions, i. e., enjoyment, boredom, experimentation, altered perception, and relaxation [48, 49]. Findings from this study also resonated with results from a survey where cannabis use was reported as a substitute for alcohol or as a treatment for misuse or withdrawal related to other drugs [47, 50].

It is of note that half the number of participants in our study initiated cannabis before 18 years of age, with 12 years reported as the youngest age. This finding is concerning as existing evidence indicates a higher risk of developing cannabis use disorder in individuals starting CU in their youth or adolescence [51]. Adverse effects on neurological development, as well as increased susceptibility, for substance use disorders and mental health conditions, such as psychosis, depression, and anxiety, have also been associated with early initiation of CU [52–58]. In addition, chronic CU during adolescence has been linked to cognitive impairment [58, 59]. Information from this study on motivations and reasons for initiating CU at a young age could contribute to targeted education, awareness, and prevention programs focusing on potential risks of early onset of CU for this age group.

Interestingly, CU was initiated by participants despite many of them expecting negative effects on memory, cognition, or anxiety and being concerned about developing cannabis dependence. This was similarly observed in a study where cannabis users with a history of depression had negative expectations of CU, e. g., less perceptual enhancement compared to non-depressed participants [38]. However, common negative thought content and negative future expectations specific to depression may have contributed to this finding. However, positive expectations of cannabis to be helpful with activation, engagement in life, and mood were reported in other studies of adolescents with depression [60] and veterans with depression [61].

With ongoing CU, participants reported a shift from these initial motivations and effects towards CU for coping with mental health symptoms and sleep problems while concurrently reporting and acknowledging more or increased negative effects on cognitive functioning, mood, and anxiety symptoms, and reduced sleep quality. The shift towards CU as a coping strategy, as well as worsening of mood, anxiety, and sleep – symptoms for which cannabis was particularly used to cope with – raises concerns about these perceptions potentially contributing to the continuation of maladaptive CU despite experiencing initial and/or ongoing aspects of problematic use and CUD. This finding also aligns with previous reports on the habit-forming potential of cannabis [62–64].

CU for insomnia and sleep problems was another common theme, with mixed effects reported by participants indicating potential short-term benefits for sleep/insomnia, but also potential disruptions of sleep with higher doses of cannabis. These experiences appear to be congruent with previous studies indicating potential positive effects of short-term CU sleep via a decrease of

sleep onset latency as well as disruptions at higher cannabis amounts with decreased REM and slow wave sleep and increased sleep onset latency [65].

The study also revealed preferences for cannabinoid content of cannabis products. CBD-dominant products were reported to be helpful for pain, insomnia, and anxiety, while a small proportion of participants reported negative effects on anxiety and sleep. Some participants in our study had reported that using CBD-dominant products over longer periods was linked with worsening of anxiety symptoms, suggesting the possibility of an optimal CBD dose range and duration of use [66–68]. Mood regulation, anxiety reduction, and improved sleep were also linked with CBD-dominant cannabis in previous studies [45, 69, 70]. Participants in our study reported worsening of anxiety symptoms with THC-dominant products as observed in other studies, indicating greater anxiety and depression scores in individuals using predominant THC cannabis products compared to low THC cannabis products [69], reduction of depressive symptoms with cannabis products with high CBD:THC ratio [45], and fewer psychotic symptoms with high CBD compared to high THC cannabis [70].

The interviews revealed another interesting, though concerning aspect: The limited involvement of participants' healthcare providers. Although participants commonly reported using cannabis for coping or self-treatment of mental health or other health symptoms, the vast majority of participants obtained information on cannabis products and effects as well as recommendations from non-medical sources, e. g., websites such as cannabis store websites, social media platforms, friends or family members, or cannabis store staff. Staff at cannabis stores are commonly not medical professionals and may not be able to provide balanced, objective, and evidence-based information on potential risks and benefits of CU for individuals with mental health conditions and thus may provide subjective advice and recommendations based on their own experiences. Based on the findings from our interviews, individuals with mood and anxiety disorders seek information on CU from these sources, education and information of the public and staff at cannabis stores, as well as information that has undergone medical expert review, could be potential approaches for providing adequate and evidence-based information to individuals seeking advice for cannabis as medical treatment to increase awareness and reduce potential risks [71, 72]. It is further notable that the majority of participants purchased cannabis products from approved cannabis stores, which provides them with the opportunity to understand better and monitor the content and amount of CU and reduces the risk of using products from non-legal sources with unknown content and potential admixtures. On the other hand, individuals may purchase their cannabis products predominately from cannabis stores due to improved, easier, and faster access to cannabis products associated with legalization compared to procedures of medical cannabis programs. This is reflected in findings from other studies, e. g., a US survey indicated that 67% of 345 older adults (65 years or older) from Colorado (where cannabis is legalized), purchased cannabis without a prescription [43].

Only very few participants in the study reported seeking advice/information from medical professionals. Not involving care providers in decisions on CU and not sharing information on CU could contribute to underestimating the potential risks and negative ef-

fects of cannabis and potential risks of interactions with other treatments for their mental health conditions, such as pharmacotherapy or psychotherapy, in particular of care providers are not made aware of CU. In this context, dissatisfaction with pharmacotherapy was a factor reported to contribute to the initiation of CU in our study. This has also been reported in other studies where cannabis was perceived as an alternative to medications and as having fewer side effects [35, 46]. It was also previously reported that cannabis helped decrease the use of other medications, such as opioids [42]. The perception of cannabis as an alternative approach for the treatment/management of mental health conditions or substance use in relation to conventional and evidence-based treatments indicates a challenging situation for care providers and patient-care provider relationships. Open and inclusive communication between patients and their care providers acknowledging individual preferences and information on potential risks and negative effects appear to be crucial aspects to facilitate informed decision-making by patients in this landscape of increased access to and availability of cannabis. Results from our study indicate the importance of raising awareness of care providers and patients and supporting open discussion to mitigate potential risks.

Another common aspect reported by participants is the perception of cannabis for medical reasons, i. e., improvement of or coping with symptoms, in parallel with recreational use. Interestingly, this overlap and blending of CU for medical and recreational purposes was overall not commonly perceived as concerning. The presence of the medical cannabis program, legalization and availability of cannabis, presentation of cannabis products by industry and cannabis stores, and a societal shift towards acceptance and normalization may have contributed to these perceptions. It is, however, concerning if a substance or medication is used for treatment and for recreational aspects at the same time, in particular, a substance comprising risk for dependence and problematic use.

While our study provides initial insight into individual perceptions, experiences, patterns, and effects of CU from individuals with mood and anxiety disorder, limitations of this study include the absence of a control group to act as a point of reference and that participants with different diagnoses in the mood and anxiety disorder spectrum were included limiting interpretation of findings with respect to a specific mental health condition. Moreover, it is of note that some of the participants were diagnosed with more than one mood or anxiety spectrum disorder and that various common aspects and responses were observed among participants with different diagnoses. Due to the scope and qualitative nature of this study, information on diagnostic criteria of cannabis use disorder or other substance use disorders, as well as medication history or current pharmacological treatment, was not systematically assessed or collected. As results from this study indicate that motivations for initiating cannabis use in individuals with mood and anxiety disorders include experiences of limited or negative effects of pharmacotherapy or mitigation of use of other substances, future studies are warranted to comprehensively evaluate these potential associations. In addition, participants in our study initiated CU prior to actual legalization, though some of them initiated CU when legalization was expected. Thus, results from our study cannot address potential changes in the perception of CU pre- and post-legalization. As interviews were conducted after cannabis legislation

in Canada, results from this study provide insights into specific cannabis products purchased and used by participants, e. g., cannabis strain or THC/CBD content, and sources participants commonly use for information on cannabis effects and use of cannabis for medical reasons.

Conclusion

Our study provides valuable insights into individual perceptions, motivations, patterns, and effects of CU in individuals with mood and anxiety disorders. Findings that raise concerns and indicate potential risks include common initiation of CU before age 18, adverse effects of CU over time, including aspects of a substance use disorder, reported blending of recreational and medical use of cannabis products and seeking information on CU from non-medical sources. Notably, a substantial group of participants considered discontinuing CU, while others reported that the positive effects continue to outweigh the adverse effects. In addition, CBD-dominant strains were commonly perceived as helpful for pain and mood or anxiety regulation. Our findings also point towards an important need to raise awareness among healthcare providers about patients' potential CU and support open and respectful patient-care provider dialogue to improve informed decision-making and mitigate potential risks. Results from our study indicate a need for information and education of the public and, in particular, individuals with mood and anxiety disorders as well as youth and adolescents, providing balanced and evidence-based information on potential risks associated with CU. Findings from our study can also inform the development of education/information material, risk prevention strategies, or treatment programs.

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Conflict of Interest

MIH has provided consultancy to Mindset Pharma, PsychEd Therapeutics, and Wake Network. SK has received honorarium for past consultation for EmpowerPharm. BLF has obtained funding from Pfizer Inc. (GRAND Awards, including salary support) for investigator-initiated projects. BLF has obtained funding from Indivior for a clinical trial sponsored by Indivior. BLF has in-kind donations of cannabis products from Aurora Cannabis Enterprises Inc. and study medication donations from Pfizer Inc. (varenicline for smoking cessation) and Bioprojet Pharma. BLF was also provided a coil for a Transcranial magnetic stimulation (TMS) study from Brainsway. BLF has obtained industry funding from Canopy Growth Corporation (through research grants handled by the Centre for Addiction and Mental Health and the University of Toronto), Bioprojet Pharma, Alcohol Countermeasure Systems (ACS), Alkermes and Universal Ibogaine. BLF has received in-kind donations of nabiximols from GW Pharmaceuticals for past studies funded by CIHR and NIH. BLF has participated in a session of a National Advisory Board Meeting (Emerging Trends BUP-XR) for Indivior Canada and is part of Steering Board for a clinical trial for Indivior. BLF has been consultant for Shinogi.

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