

## Trend of Cannabis Use During the Covid-19 Pandemic

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### Abstract

The Covid-19 pandemic began in March 2020, and while the initial focus was on the physical consequences from contracting the disease, soon the negative effects on mental health as well as substance use became more evident. An estimated 45% of adults in the United States (U.S.) reported that the pandemic had negatively affected their mental health.

Even prior to the pandemic, cannabis use had been increasing over the last two decades, and unlike many other trends that came to a hold during the pandemic, the cannabis sales increased even further, not only the U.S. but also worldwide. Cannabis is currently the most used, federally illicit drug, in the U.S.

During the pandemic, several states proceeded towards the legalization of cannabis for recreational use, while others have established medical cannabis programs for debilitating medical or psychiatric conditions such as AIDS/HIV, Multiple Sclerosis, Amyotrophic Lateral Sclerosis, Alzheimer's, depression, anxiety, and Post-Traumatic Stress-Disorder. For most users, the main barrier for obtaining a legal card is the expense, leading to purchases from illicit sources. This exposes the users to the risk of legal consequences and increases the risk of intoxication with laced or high potency drugs.

The current trend of cannabis legalization and easier access to the drug instills people with a false perception of cannabis being a safe and natural substance. Even amongst medical professionals, the opinions on safety, benefit, and harm differ significantly. Especially vulnerable to start using cannabis are minorities as well as adolescents.

The lack of pharmacological understanding of cannabis is another concerning factor. Cannabis is a substance that contains more than 421 compounds and 60 pharmacologically active cannabinoids. The two best-described cannabinoids are THC and CBD. Most of the other compounds are not yet understood, their mental and physical effects are unknown.

Current studies available are limited by small sample sizes and short-term follow-ups and raise concerns regarding the toxicity of cannabis. Health risks associated with the use of cannabis range from physical diseases such as COPD (Chronic Obstructive Pulmonary Disease), cancer, hormonal changes to psychiatric disorders including mania, psychosis, ADHD (attention deficit hyperactivity disorder)- like symptoms, and impaired cognition.

Cannabis is experiencing a public push towards use and legalization, supported by economic interests from investors of a booming cannabis industry, despite lack of convincing data from research studies.

This article is a systematic review of literature on the current available data on cannabis use and associated risks and benefits during the Covid-19 pandemic. Utilized sources were PubMed, Cochrane, Ovid, Medline, Psych Info, EMBASE.

### Introduction

Since March 2020, the Covid-19 pandemic has caused an increasing demand for physical and mental health care, leading health care systems in various locations of the country to collapse [1].

In the beginning of the pandemic, the focus was given to the physical concerns and effects of Covid-19, ranging from severe illnesses sepsis and shock and respiratory failure to milder

symptoms including fatigue, lethargy, fevers and cold like symptoms. However, it did not take long until the psychiatric consequences of the pandemic became more evident, many of which are expected to persist way past the pandemic [2].

The uncertainties, lockdowns and fears of contagion were just some of the stressors for people in the United States (U.S.) and worldwide [3]. The changes occurred rapidly and without warning, leaving people limited time to adjust. The daily news

reports about death tolls and rising numbers of infected people were panic inducing. People went on shopping sprees, believing that food and supplies would run out or that the supply chain would be interrupted. Millions lost their jobs and financial security, causing a mix of boredom and fear to set in [4].

Social isolation and lack of support are known contributors to the development of depression and anxiety disorders requiring mental health treatment and triggering substance use [5]. An estimated 45% of the U.S. population have reported that the Covid-19 pandemic has negatively affected their physical and mental health [6].

With the increase in stress, psychiatric conditions, and substance use during the pandemic, suicidal behaviors have also risen [7]. Reported suicide cases were shocking news: A 66-year-old man with laryngeal cancer hung himself after testing positive for corona virus [8]. Another man from Illinois shot his girlfriend and then himself fearing they contracted Covid-19 [9]. An emergency physician from New York committed suicide after telling his family about his traumatic experience treating Covid patients [10]. Phone calls to local and national suicide hotlines increased exponentially [11].

Epidemiological research has shown that most people struggling with mental health problems are either untreated or undertreated. This applies to a broad spectrum of psychiatric diagnoses spanning from mood and thought disorders to substance use disorders [12]. During the pandemic, access to mental health treatment became increasingly difficult and associated with long wait times, possibly leading to the increase or start of substance use in attempts from people to self-treat symptoms [13].

Cannabis is the most used drug in the U.S. while federally still classified as Schedule 1 substance which means that there is currently no accepted medical use and a high potential for abuse [14].

The current trend of legalization in many states is a factor contributing to the increase in use, but even in states without cannabis programs, the use of cannabis has been rising. About 48.2 million people used cannabis at least once in 2019, which is about 18% of the U.S. population [15].

The increase of substance use was not solely limited to cannabis but also occurred in alcohol, as the sales for alcoholic beverages rose by 55% in the week ending March 21, 2020, while online sales rose by 243% compared to the same period the year prior [16].

### **Differences in Cannabis use During the Pandemic**

The use of cannabis and cannabis-products has increased throughout the pandemic in the U.S. but also worldwide [17]. In the U.S., the increase in cannabis sales was even greater during the pandemic than in the years leading up it [18].

### **Geographical differences**

State policies regarding the legalization of marijuana have seen a shift since the early 2000's with an associated increase in cannabis use and cannabis use disorders. Marijuana is currently legalized in 36 states. During the pandemic only 23 of these states had marijuana dispensaries classified as essential businesses during the lock-down period which could be one reason

for the increase in illicitly purchased cannabis [19].

Studies looking at the cannabis use during the lockdown period, showed that the cannabis use decreased in states where cannabis was not yet legalized in the group of users who did not have a medical marijuana card due to limited access [20]. Other potential barriers for this group might have been fear of personal contact and contagion of the virus and financial constraints associated with the pandemic and job loss. Overall, night life and party activities that might have provided easier access, came to a hold in the beginning of the pandemic [21].

In states however, where cannabis was legalized, the sales and use increased throughout the pandemic, especially in the lockdown period [17]. Available data from Colorado, Alaska, Oregon, and Washington showed a three-year peak. The highest sales were reached in Washington in May 2020 and in Alaska, Colorado, and Oregon in July 2020 [17,22]. Initially, it was thought this sales increase was due to stockpiling and store-closings, but sales continued to rise into 2021 [23,24] and are projected to increase further in the following years past the pandemic [18].

The increase in cannabis use was not solely reported in the U.S. but internationally. A study from Netherlands showed an increase in cannabis use of 41% in the 1563 recruited survey participants [25]. One third of those became daily users through the lockdown period [26]. Other European countries reported increases in cannabis use as well: France, Germany, Spain [26-28].

### **Demographical differences**

All age groups were affected by the Covid-19 pandemic, but particularly for kids and adolescents, the limitations and restrictions were severely impacting [29,30].

The lack of social interaction with peers, inability to go to school in person, abrupt stop of sports or other extracurricular activities caused severe stress in these age groups. The transition to remote learning meant increased screen time and potentially childcare duties for older siblings. Any prior routine was disrupted, frequent asynchronous learning days meant less structure and more time to engage in potential substance use. These acute changes were contributing factors for the increased use of cannabis or other drugs during the pandemic [31].

The Center of Disease Control and Prevention questioned 5412 participants during the pandemic between the age of 18 and 24 about their substance use in the last month and found a reported increase in use by 10% of the participants while the greatest increases were seen in the younger ages [32].

The Monitoring for the Future Study identified additional changes in use pattern. Most adolescents used cannabis solitary (49%), with parents (42%) and with friends per technology (32%) while only 24% used face to face with a peer [31]. This is contrary to previous studies showing that adolescents are less likely to use cannabis alone.

A protective factor for cannabis or other substance use is the adolescent age is increased time that parents spent at home with their children [32]. On the other hand, 1:8 children live with at least one parent with a substance use disorder, which is a known risk factor to engage in substance use [33].

In general, most adolescent cannabis users show less insight into their mental health condition and need for treatment. Only 8.3% of adolescents are enrolled in substance use treatment [32].

Current available studies focus on the age group 18-35 years old. It would be interesting to see how the cannabis use changed in older populations [34].

Another vulnerable group for substance use disorders are minorities. This includes people identifying Lesbian, Gay, Bisexual, Transgender, and gender and sexuality Questioning (LGBTQ) but also homeless people and migrant workers. The increased vulnerability of these groups to physical as well as sexual abuse was even more severe during the pandemic and at its peak during the stay-at-home-period, possibly triggering substance use as well [35,36].

From review of the studies, it is not clear whether education is a factor correlating with cannabis use. There are studies showing a higher rate of cannabis users with lower level of education but also studies showing cannabis users to have bachelor's degrees versus only high school diploma [37].

### Associated Triggers for Cannabis Use

Cannabis, medical or non-medical, is advertised and used for mental health conditions as well as substance use disorders. According to current studies, cannabis is the most used drug for mood and stress symptoms as well as pain conditions [38]. It has gained popularity to self-treat psychiatric disorders and substitute for medications [39]. A survey of pre-pandemic cannabis users with co-occurring psychiatric diagnosis showed that the cannabis use increased by 90% (40). People who used cannabis frequently or heavily prior to the pandemic reported a more severe increase in use during the pandemic compared to people who used cannabis only occasionally or lightly [40]. A study by Laar et al found an 53% increase in the frequency of cannabis use in a population of non-daily users prior to the pandemic [26].

Anxiety is a common trigger to use cannabis and mentioned in numerous studies [40,41-43]. A study interviewing 353 U.S. based participants via Amazon Mechanical Turk via cloud research assessed about their cannabis use pattern during the Covid-19 pandemic revealed that more than half of the participants either used or increased their use because of the Covid-19 pandemic. The majority (75%) of participants reported to be using cannabis medically as well as recreationally. Main reported reasons for the increase in use were anxiety about Covid-19 (68%), boredom (47%) and increased symptom burden (42%) [28].

Even though many users claim anxiety for the main reason to use cannabis, there is no scientific evidence available to support the drug to be beneficial [44-46]. The data is more promising for CBD products, but current available studies lack cohort sizes and duration of follow-up [47-50]. A study by Rogers et al showed that people who initiated cannabis use during the pandemic reported a greater degree of worry and fear than people who abstained or used cannabis prior to the pandemic [34].

The pandemic forced drastic lifestyle changes on the population [40]. Bartel et al found a 20% increase in cannabis use related to the stay-at-home measures [51]. In individuals with

pre-pandemic cannabis use, the increase was noted to be even higher, showing a 35% increase of cannabis use with implementing of the stay-at home orders in [52].

Depression was another commonly verbalized reason for cannabis use [53,54]. The self-isolation during the pandemic leading to worsening of depressive symptoms and consecutively an increase in cannabis use, was reported in different surveys [41,55]. Furthermore, a frequently reported trigger to use cannabis showed in surveys, was the increasing boredom related to acute lifestyle changes [56].

Adolescents are particularly susceptible to cannabis use and associate cannabis use as socially acceptable to show a particular status amongst their peers [57]. The changes in learning format and challenging adaptation from isolation back to in person, lack of sport activities, and entertainment options were stressors that particularly affect this age group [58].

Another possible trigger for cannabis uses during the pandemic could have been the need for opioid withdrawal treatment [59]. People with opioid use disorder had to face barriers during the pandemic to acquire illicit opioids or follow-up with associated medication assisted treatment programs due to lack of transportation or access to telehealth care. Cannabis has been discussed to have some beneficial properties in opioid withdrawal treatment from results in pre-clinical studies, but no evidence is available in human studies yet [60].

Social media and public propaganda claimed that cannabis might have medicinal properties to treat or protect against the Covid-19 infection [61]. A cross-sectional survey of tweets in social media platforms among cannabis users showed this content of disinformation. There is no scientific evidence showing any medicinal benefit for the clinical treatment or long-term outcome of Covid-19. In fact, cannabis users have an increased susceptibility to Covid-19 due the link of cannabis smoking and the onset of COPD and other respiratory diseases. Cases of shared drug paraphernalia (joints, bongs, pipes, and vaporizers) bear a risk of exchange of droplets carrying the virus [62].

From the post-lockdown-period, studies identified that the fear of job insecurity, change in daily routine as well as difficulties feared in social interactions were main verbalized triggers for cannabis use [17,63].

Only a small number of survey participants reported a decrease in their use, claiming financial barriers due to unemployment and lack of welfare as reasons [64,65].

It was noted that towards the later part of the pandemic, the triggers for cannabis use had changed. New psychosocial stressors, increasing mental health concerns in the population and lack of access to treatment or long wait times were common reasons reported for the use [25,66].

### Adverse Medical and Psychiatric Effects from Cannabis Use

Most adverse health effects caused by cannabis, psychiatric or medical, are dose dependent. The use of higher potency products and more frequent use increases the risk of toxicity and adverse effects [67].

### Medical adverse effects

Unlike users frequently believe, cannabis use is even more

toxic for the lungs than nicotine. Regular cannabis smoking is associated with risk for diffuse alveolar lung damage, COPD and increases the rate of respiratory infections.

During the pandemic, cannabis smoking was associated with a higher susceptibility and worse clinical outcome of Covid-19 infection [68]. Cannabis users frequently had more severe clinical symptoms and had a higher rate of hospital admissions [67-69]. Also, cannabis users receiving treatment for Covid-19 were found to have a higher rate of adverse reactions to the Covid-19 medications such as nausea, diarrhea, or liver toxicity [70]. Behaviors associated with cannabis smoking were another factor contributing to the increased rate of transmission of Covid-19 in cannabis users but also the immunocompromising effect of cannabis as a drug [71]. The use of paraphernalia increased the risk of Covid-19 transmission even further. Commonly shared paraphernalia include joints, bongs, pipes, and vaporizers. Also, illegally acquired cannabis required social interaction and increased risk of direct transmission [66,67].

Cannabis use is known to cause cardiovascular disease with potentially fatal acute cardiac events due to acute myocardial infarction, cardiac arrhythmia, or stroke [72]. Long-term cannabis use is associated with higher mortality rates compared to non-users [73].

Another high-risk group for cannabis toxicity includes people with HIV/AIDS. As studies have shown, cannabis leads to an increased incidence of fungal and bacterial opportunistic infections in this group of users [71].

Cannabis is due to its lipophilic properties very easily transmitted through the placenta as well as breast milk [72]. Therefore, based on current available data and knowledge, cannabis use during pregnancy and breast feeding should be discouraged. Infants have been shown to tremble more, be more irritable and show other behavior abnormalities [74].

While marijuana is commonly used in people with cancer diagnosis as an appetite enhancer, to alleviate nausea or to treat pain, marijuana as a substance is carcinogenic by itself and linked to increase incidences of leukemia, rhabdomyosarcoma, and astrocytoma. Cancer associated with cannabis use are increasingly found in regular and heavy users [75,76].

### Psychiatric Adverse Effects

Cannabis use is associated with numerous psychiatric effects ranging from worsening depressive symptoms to anxiety and panic symptoms as well as mania, aggression, and psychosis [77,78].

Cannabis users frequently claim anxiety as a trigger to use the substance. Clinical research studies however have not demonstrated any benefit for treatment of this condition but instead linking cannabis use to acute exacerbations of anxiety [43-46].

In patients who have a hereditary predisposition to develop bipolar disorder or psychosis, the use of cannabis may cause an earlier or more severe onset of the psychiatric symptoms [79]. Mania as well as paranoia with agitation and erratic behaviors are common clinical presentations following cannabis use [78,79].

In patients with dual diagnosis including mood or thought dis-

orders, the use of cannabis, especially with increasing potencies nowadays, causes frequently destabilization and recurrent hospitalizations despite patients being prescribed psychiatric medications [78].

Also, the regular use of cannabis is associated with a decline in concentration and cognitive performance. In the adolescents, the use of cannabis leads to higher drop-out rates from school and a decline in IQ over time with regular use. A large, long-term study in New Zealand had shown that teenagers smoking marijuana heavily had an average of 8-point decrease in their IQ at age 13 and 38 compared to non-users [80].

Cannabis is negatively affecting the user's comprehension as well as coordination and perception of time and surroundings. These effects might in some cases be permanent [81]. Cannabis users are a safety hazard for themselves and others when driving under the influence as higher incidents of traffic accidents and associated fatalities have been reported [82].

Cannabis is a known gateway drug, leading to a higher rate of co-occurring substance use disorders [63]. Many cannabis users are also smoking tobacco which might intensify the toxicity.

Overall, cannabis users have a lower quality of life and life-satisfaction, a greater welfare dependence, higher rate of engagement in criminal behaviors [84].

### Discussion

The Covid-19 pandemic has caused the mental health system to collapse and created enormous barriers for people to receive appropriate mental health treatment. The demand for treatment of psychiatric conditions, particularly depression and anxiety disorders, has increased compared to pre-pandemic times and contributed to the increase in substance use, particularly cannabis.

Cannabis is gaining popularity and perceived by the public as a safe and a "natural" drug to self-treat various psychiatric and medical conditions. Contrary to that perception, scientific evidence for those claims and benefits are lacking and studies are showing that cannabis worsens depression and anxiety rather than alleviates it. From the current standpoint of knowledge and evidence, cannabis cannot be recommended as a treatment for those conditions. Also, the precipitation of manic episodes or psychotic first breaks in persons with bipolar disorder or schizophrenia are established risks that users face.

In substance use disorder populations, cannabis bears a particular risk. First, it is a gateway drug and frequently leads to other substance use. Second, the use for withdrawal treatment in opioid use disorder persons is difficult at the least due to lacking dosing recommendations and varying THC- contents in products resulting in unpredictable effects.

Cannabis is a fascinating substance yet to be pharmacologically entirely understood. Lack of identification and knowledge of its active components and metabolites bear challenges and risks for the users. Also, the interaction with enzymes that are metabolizing other medications is not clear and might potentially lead to toxic levels of a previously at therapeutic level prescribed medication.

Prevention and protection strategies should be developed for

vulnerable populations, people of color, LGBTQ, or low-income populations. Early identification of a substance use disorder with immediate intervention and referral to treatment should become an achievable goal.

Access and referral resources require expansion to meet current needs. Dual Diagnosis treatment centers are equipped and educated to access the proper treatment and to answer the commonly puzzling question whether the mood disorder is a genuine, separate condition or a substance induced presentation. Yet only a small fraction of users with cannabis use disorder or dual diagnosis disorder are enrolled in treatment.

### Conclusion

The Covid-19 pandemic had negative effects on mental health, the mental health system and substance use, especially cannabis use.

Cannabis appears to be the “go-to-solution” for physical and mental disorders that are difficult to treat with available FDA-approved medications. Also, the access to treatment has been associated with extensive wait-times since the pandemic started. The treatment of psychiatric disorders with conventional medications does not immediately bring improvement in psychiatric symptoms as cognitive behavioral therapy and conventional antidepressants require time to show an effect.

Research studies show, the use of cannabis is not without risks. The list of toxic effects of cannabis use is alarming and concerning. More education needs to occur for the public, users, and physicians regarding the possible risks associated with cannabis use. Minorities and other vulnerable groups should be regularly screened for mental health disorders as well as cannabis use.

The current trend of marijuana legalization bears a lot of risks for the population with mostly subjective reported benefit without scientific evidence. Is a medical marijuana card a useful barrier to select patients that are appropriate for marijuana? Should physicians support the medical marijuana program? Some providers recommend the marijuana card under the harm reduction aspect that prohibits illegal activity and the patient obtained laced substance but does not prohibit the intoxication and ongoing use of marijuana.

But we also cannot blame all the mental health problems on cannabis or cannabis use. The access to mental health treatment must be improved and grown to current patient demands. The expansion of tele-health visits might be one feasible solution or even phone counseling.

The Covid-19 pandemic remains ongoing with new variants potentially evolving and the acute and long-term effects are yet to be determined. It is even more important to identify triggers for cannabis use and expand the education about the substance and broadcast research and scientific data rather than street mouth-to-mouth propaganda.

Marijuana laws and regulations need to be improved because of the confusing land of medical marijuana cards and questionable physician recommendation processes. Is medical marijuana a harm reduction? The opinions around marijuana and its use are showing a lot of controversy amongst medical professionals and shows the need for education as well as further research.

Physicians need to be educated about screening and treatment for cannabis use disorder.

It is not possible to fully predict the long-term effect of the pandemic on cannabis or other use disorders as well as mental health consequences.

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