Brief Reviews

Exploring The Contours: Navigating Cannabis Use Among Older Adults

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Abstract

Cannabis has been employed medicinally throughout history, with recent renewed interest for use due to media awareness and medical marijuana legislation. The geriatric population, identified as those 65 years of age and older, is increasingly using cannabis-derived products, has a higher likelihood of having multiple comorbidities, and is subject to polypharmacy. These individuals are at increased risk of psychiatric and other medical adverse events due to their decreased physical and cognitive reserve and changes in their physicality. Recreational use of cannabis in this population has not been well studied, but medical marijuana use has been investigated more frequently. Increased nonmedical use increases the risk of adverse health consequences. Heavy regular use can lead to cannabis use disorder (CUD), which is formerly known as cannabis abuse and dependence, and may also lead to impaired social functioning and psychiatric comorbidity. The pattern of patients admitted to hospitals has dramatically changed recently, with an increased number of elderly patients being frequently admitted. As such, due to the ease of accessing CBD, this vulnerable cohort is seen more frequently in the hospital, and we need to be more vigilant and inquire about cannabis use as we do, asking about routine medications and over-the-counter supplements. In the U.S., marijuana laws have been changing rapidly, and Americans increasingly favor legalizing cannabis for medical and recreational uses. Policymakers should ensure that training on cannabis screening and interventions for CUD are provided to clinicians to equip them better to monitor and treat patients with cannabis-related problems.

BACKGROUND

Throughout history, Cannabis has been employed medicinally. Writings about Cannabis started showing up over 5000 years ago in ancient China, Egypt, Eurasia, and Greece. The interest in medical Cannabis was well documented in the early 19th century when England started promoting Cannabis for use as an analgesic and antispasmodic.[1,2]

In the early 20th century, there was renewed interest in Cannabis, and marijuana is a commonly used nonmedical term for Cannabis. Medical Cannabis was marketed for its analgesic properties as well for sleep, paralysis agitans, and cough mixture. Around this time, the United States started regulating marijuana, and this resulted in the Tax Act of 1937. In 1970, medical Cannabis was banned with the Controlled Substance Act of 1970. This led to multiple court appeals in the United States and Canada, which culminated in California's Compassionate Use Act of 1996.[3] In 2001, Marijuana for Medical Purposes Regulations was passed by Health Canada.[4] After that, Cannabis became more widely accepted for medical use, with approval in the US in 31 states as well as in Europe, Australia, Israel, and multiple countries in South America.[5]

Cannabis is a complex plant with over 600 compounds. Cannabis generally refers to the plant product derived mainly from Cannabis sativa. Cannabinoids refer to the biologically active chemicals that have been identified as naturally occurring in cannabis plants.[6] The most researchable cannabinoids are delta-9-tetrahydrocannabinol (D-9-THC or THC) and cannabidiol (CBD). Cannabinoids work with the endocannabinoid system, a neurotransmitter system widely distributed in the body and the brain. This system is distributed in the same brain areas that are implicated in psychoses, particularly in schizophrenia. D-9-THC is the primary psychoactive ingredient. It causes hypoactivity, hypothermia, and spatial and verbal short-term memory impairment in a dose-dependent manner. High doses of CBD can potentiate the lower doses of D-9-THC by enhancing the level of CB1R expression in the hippocampus and hypothalamus.[6] D-9-THC causes transient psychotic symptoms, anxiety,

intoxication, and sedation, while CBD has no significant effect on behavior, intoxication, and sedation.[7]

In medical Cannabis, the ratio of D-9-THC to CBD is very important. Many states that have legalized medical marijuana mandate labels disclosing the content and quantity of each cannabinoid. There are three primary forms of Cannabis: marijuana, made from dried leaves and flowers of the female plant (with 0.5–5% THC); hashish, produced from resin pressed into blocks (with 2–20% THC); and hash oil, a thick liquid extracted from hashish (with 15–50% THC).[8]

Cannabis products are either inhaled by smoking a marijuana cigarette, known as a joint or taken orally in the form of baked foods or liquids. A typical joint contains 10–20 mg of THC, but the amount of THC can be much higher, up to 300 mg, if laced with hashish oil. After inhalation of smoke from marijuana cigarettes, THC is detectable in the blood after seconds, and it reaches peak plasma concentrations 3–10 minutes after the onset of smoking. Psychoactive effects last around 4 hours. Systemic bioavailability ranges between 10% and 35%. With oral use, absorption is slower, and bioavailability is lower, about 4–12%, due to first-pass liver metabolism.[9]

THC is the primary psychoactive component of Cannabis, working primarily as a weak partial agonist on CB1 and CB2 receptors with well-known effects on pain, appetite, digestion, emotions, and thought processes mediated through the endocannabinoid system, a homeostatic regulator of myriad physiological functions, found in all chordates.[10]

Cannabis is the most frequently used substance in older adults, aside from alcohol.[11,12] The growth of cannabis use is more prevalent amongst older adults than in the younger populations.[13] In 2012, 4.6 million adults reported using marijuana in the past year. In the same period, less than one million adults reported using other substances, including methamphetamine, cocaine, hallucinogens, inhalants, or heroin.[12]

An analysis of data from the United States National Survey on Drug Use and Health data revealed an increase in cannabis use in adults 65 years of age and older from 2.4% in 2015 to 4.2% in 2018. These increases were more significant in people with mental health problems, women, people from racial and ethnic minority groups, families with higher incomes, adults who use alcohol, and older adults with diabetes.[14] Subbaraman et al. found that after the legalization of Cannabis use in Washington state, the use of marijuana and alcohol significantly increased amongst people who are fifty years and older.[15]

On December 20, 2018, President Trump signed the Farm Bill into law. This law legalized cannabidiol (CBD) products containing less than 0.3% of delta-9-tetrahydrocannabinol (THC). With the legalization of cannabis use on the state level, multiple products that have marijuana, such as cakes, cookies, and even candies, have been decriminalized and are made readily available. A rise in availability and decriminalization of use has caused a rise in unintentional and intentional consumption of these products.[15-18]

As Cannabis gained popularity amongst adults, many began considering cannabis products for managing conditions they felt were inadequately treated with existing medications or where they perceived the side effects of current medications to outweigh benefits.[19]The use of medical Cannabis in recent years has grown substantially with varied indications that include chronic pain, chemotherapy-induced nausea and vomiting, chronic neurologic conditions like multiple sclerosis, epilepsy, dementia, dystonia, Huntington's, and Parkinson's disease, in addition to psychiatric condition like post-traumatic stress disorder (PTSD), psychosis, anxiety, anorexia nervosa and more.[20]

Cannabinoid products are available at state-licensed dispensaries (not FDA-approved). Medical Cannabis has varied routes of administration available to patients depending on the state in which they live. The state medical cannabis programs regulate these products. Medical cannabis products are different from the FDA-approved products. FDA-approved products are synthetic, whereas medical Cannabis is derived directly from the cannabis plant.

TYPES OF CANNABIS PRODUCTS

Inhaled: This is the most used route. Inhaled products are either smoked as cigarettes, smoked in a pipe or vaporized. Cigarettes or pipes are more commonly combusted dried whole cannabis flower whereas vaporized cannabis products may also be oil-based concentrate of specific doses of THC and CBD. It is not uncommon to find tobacco products mixed and smoked with cannabis. In unregulated use, dried cannabis flower is sometimes mixed with tobacco or rolled in cigar papers, exposing individuals to nicotine.[21,22]

Ingested: These are either capsules, candies, oils, or baked goods. Whole cannabis flowers are usually mixed into the baked goods, whereas the capsules and candies usually contain cannabinoids extracts.

Sublingual/oral mucosal: The oral products are usually solutions, sprays, or dissolvable tablets. These solutions contain extracted cannabinoids.

Suppository: These are oil-based cannabinoid extract administered as suppositories.

Topical: These are topical lotions, gels, patches with a reach amount of extracted cannabinoids

Dabs and waxes: These are concentrated cannabinoid containing more than 60% of THC. They are applied on

a hot platform and inhaled. This gives up to 15mg of THC in one inhalation. This form is most used by very heavy users.[23]

EFFICACY AND USE OF MEDICAL CANNABIS IN OLDER ADULTS

Older adults may use cannabis for the treatment of a variety of symptoms, such as chronic non cancer pain, cancer pain, sleep disturbances, neurologic symptoms, and for palliative care and end of life symptoms. But the evidence in this patient population is still scarce at best.

CANCER PAIN

Cancer pain is a prevalent issue for cancer patients and cancer survivors alike. Cancer pain has been reported in 30 to 90% of patients with cancer, depending on the diagnosis, type of cancer, and stage of cancer.[24,25] Pain may result from the cancer treatment (surgery, radiation therapy, chemotherapy) or the cancer itself. Cancer-related pain is multimodal and may be associated with social and psychological aspects, making the pain more responsive to pharmacological treatment as compared to chronic non-cancer pain.[26] Cancer is more prevalent in older patients, so it is not too surprising that cancer-related chronic pain is more common in this age group. The evidence supporting the use of cannabis products to treat cancer pain is scarce. The few studies found do not have subgroup analyses for adults older than 60.

OTHER CHRONIC PAIN

Pain relief is very often cited as a reason for medical cannabis use among older individuals. Chronic pain is one of the most common indications for prescribing medical cannabis. A systematic review by Nugent et al. found Limited evidence that cannabis improves neuropathic pain but insufficient evidence on the relief of other types of chronic pain.[27] According to the National Academies of Sciences, cannabis is effective for the treatment of chronic pain in adults.[28]

SLEEP DISTURBANCE

Multiple individuals have reported using exogenous cannabinoids for sleep-related problems. The evidence on the effect of exogenous cannabinoids on sleep is scarce. A review completed by Babson et al. found that CBD may have some effect on insomnia, REM sleep disturbances, and daytime sleepiness.[29] Evidence on the effect of sleep on chronic pain is poor. If CBD is discontinued after prolonged use, it may lead to withdrawal syndrome and interruption of sleep. THC may negatively impact the quality of sleep in the long term.[30]

NEUROLOGICAL DISEASE

Patients with spinal cord injuries and multiple sclerosis perceived an improvement in their symptoms, but physician-administered measures did not reciprocate these findings.[31-33] These conclusions are consistent with reports from the American Academy of Neurology's guidelines on complementary and alternative medicine in multiple sclerosis. They issued a level 1A recommendation for cannabis extracts to be used for short-term relief of spasticity and pain. In a meta-analysis by Whiting et al., they found that CBD showed a tendency towards improving spasticity in patients with spinal cord injuries and multiple sclerosis, but these findings were not statistically significant.[34] Ten small studies on Parkinson's disease revealed that some motor symptoms, such as dyskinesia induced by levodopa, may respond to treatment with cannabis therapies, even though the results are conflicting.[35,36]

PALLIATIVE CARE AND END-OF-LIFE CARE

There is little evidence that cannabis helps with end-of-life symptoms such as pain, nausea, vomiting, sleep disturbances, and loss of appetite. Mucke et al. conducted a systemic review, which included nine studies and 1561 patients who were terminally ill with Cancer and HIV.[37] They did not find any statistically significant difference between treating these patients with placebo versus cannabis products with regards to major symptoms like nausea, vomiting, loss of appetite, or pain control. Additionally, the tolerability and safety of carbenoids were not better than those of placebos for the treatment of symptoms in patients terminally ill with HIV and Cancer.[37] Note that these studies were low-powered, with 3 of the 9 studies in this paper being low to moderate quality.

However, we can infer that non-inhaled medical cannabis may be tried for patients who value small improvements in pain intensity to help them function better physically and have a better quality of sleep and who are willing to accept some risk of harm which may be tolerable and self-limited. Avoid trying cannabinoids on patients who value avoiding treatment-related toxicity.[38]

DEMENTIA

Dronabinol was used in some small studies in the management of dementia, and they found that it improved neuropsychiatric symptoms, sleep duration, nocturnal motor activity, agitation, and appetite, with a few serious adverse events.[39-41]

MAJOR ADVERSE EFFECTS OF CANNABINOIDS IN THE ELDERLY

ADVERSE EVENTS DUE TO CANNABIS USE

Cannabis is widely used for medical and recreation purposes or both. Studies conducted in the United States revealed that about 25 million reported using cannabis over the previous month, and people who use cannabis for medical purposes are often similar to those who use it recreationally.[42,43] The potential adverse effects in older adults include cognitive, psychomotor, cardiovascular, mental health, gait, and effects on stability.[44]

COGNITION, EXECUTIVE AND PSYCHOMOTOR FUNCTION

The most common side effect of cannabinoids is due to THC. Most cannabinoid products contain some THC. THC accounts for the adverse effects of cannabinoids on executive, cognitive, and psychomotor function. THC impairs short-term memory and emotional processing, while synthetic cannabinoids impair executive function.[45,46] Also, Cannabinoids have psychomotor effects, which may predispose older adults to the risk of falling. Older adults who use cannabis products are more likely to visit emergency departments due to injuries. Falls may be further enhanced by instability, which is already more common in adults and when associated with other medicines such as sleeping pills, pain medications, or antihypertensives.[47]

CARDIOVASCULAR RISKS

THC increases heart rate and blood pressure, leading to an increase in myocardial oxygen demand. Cannabis use may, therefore, worsen stable angina or trigger an ischemic event of the heart. Multiple case reports have shown a link between smoking cannabis and acute cardiovascular and cerebrovascular complications such as sudden cardiac death, arrhythmia, myocardial infarctions, strokes, or transient ischemic attacks.[48-50] Smoking marijuana has been associated with over 2 million admissions for acute myocardial infarctions.[51] Unfortunately, most of the available data are short-term, observational, retrospective in nature, and lack exposure determination.

MENTAL HEALTH

Cannabis has been shown to increase the risk of any psychotic events in a dose–response manner except for outcomes related to depression, suicidal thoughts and anxiety.[52] The prevalence of suicidal ideation and attempts increases with age.[53] Patients with substance use disorder and dependence, and patients with psychosis should be discouraged from using cannabis as these are relative contraindications for use. With continued long-term use, tolerance will develop due to reduced availability of the cannabinoid receptors, principally the CB1 receptor. Long-term users may experience a withdrawal syndrome when cannabis is suddenly stopped, the dose is decreased, or the formulation is changed. Signs and symptoms of cannabis withdrawal consist of anger, anxiety, restlessness, irritability, depressed mood, disturbed sleep, strange dreams, decreased appetite, weight loss, headache, and night sweats. These symptoms typically begin a few days after cannabis cessation or a reduction in use or dose, with symptoms peaking after approximately 10 days and ending after 30 days. Long-term, heavy (THC-predominant) cannabis use is associated with an increased risk of hyperemesis syndrome characterized by prodromal symptoms of abdominal discomfort and nausea leading to intractable vomiting.[28]

DRUG INTERACTIONS

Drug interactions with cannabis can be expected to vary considerably in clinical significance given the wide variability in products, potencies, ratios of THC and CBD, doses, routes of administration, and populations using cannabinoids. THC has the potential to inhibit CYP (cytochrome P450) 3A4/4, CYP2C9, CYP2C19, and CYP2D6, whereas CBD also has the potential to inhibit CYP3A4/5, CYP2C19, CP2D6, and CYP1A2.5 Tetrahydrocannabinol can induce CYP1A2, particularly with smoked cannabis.[54,55] Unfortunately, dosing thresholds for cannabinoids is variable amongst patients. CBD has been shown to interact with various epilepsy medications, including diazepam, lamotrigine, and phenytoin. Additionally, it affects sedatives like phenobarbital and hexobarbital, as well as narcotics such as codeine and morphine.[56] CBD enhances the effects of topiramate, oxcarbazepine, pregabalin, tiagabine, and gabapentin, but it does not alter the anticonvulsant properties of lamotrigine and lacosamide.[57] A case study highlighted a patient treated with CBD for epilepsy, which required a 30% reduction in the warfarin dose to maintain the desired therapeutic international normalized ratio (INR) and avoid excessive bleeding.[58] When using CBD alongside medications that may cause liver damage, such as acetaminophen, caution is necessary. For patients with liver impairment, it is recommended to use lower doses of CBD.[59] A study by Abuhasira et al. with 153 adult participants who were mostly 75 years of age and older, noted that the commonly reported adverse effects were dizziness, sleepiness and fatigue, dry mouth, and psychoactive sensation.[60]

CONCLUSION

According to the World Health Organization, by 2030, the number of people 60 years and older will increase from 1 billion in 2020 to 1.4 billion in 2030. That means a sixth of the world's population will be 60 and older. By 2050, this population will double to about 2.1 billion older adults. Data shows that the older population constitutes a growing segment of medical cannabis users, ranging from approximately 7% to more than 30%, depending on the country. According to a 2022 federal survey, 8 percent of people 65 and older reported having used marijuana in the past year. The rate has roughly doubled in seven years, according to estimates.[61]

Despite the overwhelming evidence that cannabis use in the elderly is growing significantly, current clinical evidence to support its effects in the elderly population is scarce or limited at best.[62] There is a pressing need for clinicians to understand the effects of cannabis in this population and how to manage any dangerous effects that may harm them. Some studies are reporting that older adults are more vulnerable to the potential harmful effects of cannabis.[44]

The myth that substance use is a problem only in the younger populations no longer holds. The effects of cannabis use in older adults may present differently as compared to younger individuals, and it may be more challenging to diagnose these effects. Treatment options for adults using cannabis for recreational purposes are still generally limited. As health professionals, we must be aware of the increasing prevalence in the use of cannabis, both for recreational and medicinal reasons. Patients must be thoroughly evaluated to ensure diagnosis and appropriate management of problems associated with cannabis use.[12]

Older adults must be strongly considered in any research or advancements in the care for patients using cannabis or cannabis-related products, as this is no longer a problem for younger adults only. There is a need for studies to identify better the characteristics that make someone more vulnerable to the adverse effects of cannabis.[12]

Author Contributions

All Authors have reviewed the final manuscript prior to submission. All the authors have contributed significantly to the manuscript, per the ICJME criteria of authorship.

- Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND
- Drafting the work or revising it critically for important intellectual content; AND
- Final approval of the version to be published; AND
- Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Disclosures/Conflicts of Interest

The authors have no conflicts of interest to disclose.

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