Cannabis use for Sleep Disturbance Among Older Patients in a Geriatrics Clinic

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Abstract

Cannabis use is growing among older adults to manage medical concerns including poor sleep. In this study, we characterized how patients seen at a geriatrics clinic use cannabis to address sleep disturbance. Specifically, we conducted an anonymous survey of 568 adults, including 83 who reported cannabis use within the past 3 years, to inquire about such use. We compared cannabis use characteristics between those using it for sleep disturbance versus all other conditions. We considered a p-value <.10 to be statistically significant. Among the cannabis users in our sample, 29% reported using cannabis for sleep disturbance (N = 24). They were more likely than other users to be female (p = .07), consume cannabis more frequently (p = .01), use products containing tetrahydrocannabinol (THC) (vs. cannabidiol [CBD]-only; p < .01), and use cannabis to target more symptoms (p < .01). As cannabis use continues to grow in older populations, it is essential to delineate better how cannabis may be used safely and effectively to improve older adults' sleep health.

Keywords

sleep; older adults; cannabis; geriatrics; clinical care

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Background

Cannabis has therapeutic potential for common medical conditions experienced by older persons. Consequently, older adults are increasingly turning to cannabis to address their medical needs—between 2015 and 2018, in the United States, cannabis use among those aged 65 years or older increased from 2.4% to 4.2% (Han & Palamar, 2020). The public health implications of this trend are of importance because older users, as a group, may use cannabis in unique ways distinct from younger users (Baumbusch & Sloan Yip, 2020; Brown et al., 2020; Han & Palamar, 2020; Kaufmann et al., 2020; Lloyd & Striley, 2018; Reynolds et al., 2018; Yang et al., 2020). For example, in a survey of patients seen in our geriatrics clinic, we found that users of cannabis predominately used it medicinally for a variety of conditions including pain, mood/anxiety symptoms, and sleep disturbance, and notably many started using cannabis after the age of 60 years (Yang et al., 2020). Further, based on cannabis sales in a large dispensary in New York State, customers aged 65 years and older were more likely than younger age groups to use cannabis products as a sublingual tincture and with lower tetrahydrocannabinol (THC)-to-cannabidiol (CBD) ratios (Kaufmann et al., 2020).

Sleep disturbance is experienced by an estimated 40%–70% of older adults (Foley et al., 1995; Jaussent et al., 2011; Olson, 1996), and cannabis has long been documented to have sleep-promoting effects. Among cannabis users surveyed from a dispensary in 2017, 65.2% reported that medical cannabis use resulted in decreased use of their sleep medications (Piper et al., 2017). A study in a Colorado geriatrics clinic found that 30% of patients surveyed used cannabis to address sleep problems (Reynolds et al., 2018). Similarly, data from two dispensaries in Colorado found that 75% of customers used cannabis to promote sleep (Bachhuber et al., 2019). Improved sleep was the most commonly endorsed acute effect of cannabis in a survey of N = 2,905 cannabis users (82.1% overall; 17.5% of these responders > age 50), with medical users being more likely than recreational users to endorse that their cannabis use improved sleep (Sexton et al., 2019).

The exact mechanisms by which cannabis promotes sleep are unknown; however, the endocannabinoid system is known to be involved in the regulation of the circadian sleep-wake cycle (Vaughn et al., 2010). The THC compound from cannabis binds as a partial agonist to the cannabinoid receptor 1 (CB1) and thereby may be hypnogenic through inhibition of adenylyl cyclase, and act as a central zeitgeber (Kesner & Lovinger, 2020; Latek et al., 2012; Whitehurst et al., 2015). Of note, some studies suggest cannabis may improve a number of sleep parameters including sleep latency among others (Babson et al., 2017; Gates et al., 2014; Kuhathasan et al., 2019). A recent placebo-controlled study of a medical cannabis preparation for insomnia administered nightly one hour prior to sleep time for 2 weeks found significantly decreased insomnia severity, increased sleep duration, improved ratings of sleep quality, and increased sleep efficiency (Walsh et al., 2021). Indeed, in a comprehensive report by the National Academies of Sciences, Engineering, and Medicine on the health effects of cannabis (National Academies of Sciences, Engineering, and Medicine et al., 2017), the authors conclude that "there is moderate evidence that cannabinoids, primarily nabiximols, are an effective treatment to improve short-term sleep

outcomes in individuals with sleep disturbance associated with obstructive sleep apnea syndrome, fibromyalgia, chronic pain, and multiple sclerosis."

To the best of our knowledge, no study has examined the means by which older cannabis users consume cannabis for sleep disturbance (e.g., consumption methods, use of THC/ CBD, etc.) and how this differs from those using cannabis for other conditions. Of note, the study our group conducted in our geriatrics clinic showed that approximately 30% of older cannabis users reported sleep disturbance as a reason for use (Yang et al., 2020). The overarching goal of this report is to compare the demographic characteristics and consumption patterns of older adults using cannabis for sleep disturbance to those using it for other conditions.

Methods

Survey Development and Administration

We conducted a survey of patients visiting a geriatrics clinic between June 28 and September 6, 2019. The questionnaire was adapted from previously developed cannabis use surveys (Reynolds et al., 2018; Sexton et al., 2016). Patients were provided the survey at check-in for their office visit. They were asked to complete and return the survey to a locked box to ensure anonymity. Patients were queried on their demographic characteristics (e.g., age, gender, etc.), whether they ever used cannabis, and if so, the most recent time of use. Those reporting cannabis use within the prior 3 years were asked additional questions about their cannabis use practices. Specifically, patients were queried about THC and/or CBD content, the purpose of use, where they obtained cannabis products, the frequency of use, and the types of consumption methods used (i.e., smoking, vaping concentrate, vaporization of flower, edibles, patches, tinctures, pills, lotion, dabbing, and suppository), who was aware of their cannabis use, side effects experienced, and conditions/symptoms that products were used to treat and their helpfulness. Full details of the survey can be found in Yang et al. (2020). In total, we distributed the survey to 601 patients, of whom 568 (95%) completed it. This study obtained review from the UCSD Institutional Review Board and was deemed exempt.

Participants

Eighty-three patients reported cannabis use within the past 3 years. Of note, one patient had missing data for reports of sleep disturbance as a reason for use, and we therefore excluded them from our analysis yielding a final analytical sample of N = 82. The majority were between the ages of 65 and 84 years (79%), 60% were female, almost all (91%) were non-Hispanic White, 57% were married or with a long-term partner, and 90% had at minimum some college education (Table 1). Patients were asked to indicate the conditions/symptoms for which cannabis was used to address and its helpfulness for the condition. We categorized patients as using cannabis for sleep disturbance (N = 24) and for all other conditions (N = 58). The other conditions included pain, anxiety/stress, loss of libido, arthritis/joint pain, depression, weight loss/low appetite, migraines/headaches, nausea/vomiting, glaucoma, dementia/memory loss, Parkinson's disease, seizures/epilepsy, multiple sclerosis, post-traumatic stress disorder, and any other conditions.

Cannabis use Characteristics

We compared groups on a select set of variables. Demographic variables included age (i.e., <65, 65–74, 75–84, and 85+years), gender (i.e., female, male), race/ethnicity (i.e., non-Hispanic White, non-Hispanic Black, Hispanic, and non-Hispanic Asian), marital status (i.e., married or long-term partner, widowed, divorced/separated, and single/never married), and education (i.e.,   high school graduate, some college/Bachelor's degree, and graduate and/or advanced degree). Cannabis use characteristics included use frequency (which we dichotomized as daily/weekly vs. monthly/yearly or less), type of cannabis consumed (i.e., CBD-only products, products containing THC, not sure), the purpose of use (i.e., medical purposes only, recreational only, both), administration methods used, side effects experienced (i.e., yes, no, unsure), total number of administration methods used (up to 10), and total number of symptoms targeted (up to 15). We categorized administration methods as inhaled methods (including smoking, vaping concentrate, dabbing, and vaporization of flower), orally ingested methods (including edibles, tinctures, and pills), and topical methods (including lotion, suppository, and patches).

Statistical Analyses

We compared groups (cannabis users for sleep disturbance vs. users for other conditions) using chi-squared tests (or when cell sizes were <4 observations, Fisher's exact tests) for categorical variables and Student's t-test for continuous variables. Statistical significance was set at $p < .10$. All analyses were conducted in Stata SE Version 15 (StataCorp, College Station, TX, USA).

Results

Table 2 shows comparisons between those using cannabis for sleep disturbance and those using it for other conditions. Compared to patients using cannabis for other conditions, those using it for sleep disturbance were more likely to be female (75% vs. 53%, $p = .07$). While we saw no other significant demographic differences, we did observe differences in several cannabis use characteristics. Patients using cannabis for sleep disturbance used it more frequently compared to those using it for other reasons (76% vs. 43% consumed cannabis daily/weekly, $p = .01$). They also were more likely to report use of THC-containing products (62% vs. 32%, $p < .01$). Those using cannabis for sleep also reported using more administration methods (1.79 [$SD = 1.02$] vs. 1.45 [$SD = 0.73$], $p = .09$), and using it to target more conditions/symptoms (3.17 [$SD = 1.66$] vs. 1.12 [$SD = 0.68$], $p < .01$). Specifically, all but two of the patients using cannabis for sleep disturbance reported using cannabis to address   1 other conditions/symptoms. The vast majority of sleep users (83%) also used cannabis for pain, and 50% reported also using it for mental health conditions including anxiety and depression (data are not shown). The two study groups did not differ in other characteristics. Only three patients who used cannabis for sleep disturbance reported experiencing side effects—one reported experiencing anxiety, panic and paranoia, another reported dizziness, and finally another reported swollen gums. Seventy percent of those using cannabis for sleep disturbance found cannabis to be "somewhat" or "extremely" helpful for the condition (N = 4 did not report on helpfulness, data are not shown).

Discussion

This report examined the use of cannabis for sleep disturbances among older adult patients surveyed in a geriatrics clinic. Nearly a third of cannabis users who had used cannabis in the past 3 years reported using it to address sleep disturbance and, for the most part, found it helpful. These patients also reported using cannabis more frequently and more often including products containing THC than those consuming cannabis to address other conditions. Additionally, they reported using cannabis to address more conditions and symptoms.

Some of these differences are unsurprising since sleep problems are often chronic, and THC, the psychoactive component of cannabis, may be helpful for reducing sleep latency, improving sleep quality, and decreasing sleep disturbances (Babson et al., 2017; Gates et al., 2014; Kuhathasan et al., 2019; National Academies of Sciences, Engineering, and Medicine et al., 2017). Additionally, sleep disturbance is often comorbid with other conditions (such as pain), and cannabis may play a palliative role as part of an integrative treatment strategy, offering an explanation for why these sleep users indicated cannabis was used to address more health conditions.

There are currently efforts to discourage the use of common hypnotic sleep medications, especially in light of adverse outcomes associated with their use (e.g., falls, hip fractures, etc.) (Tom et al., 2016; Wang et al., 2001). For example, the Food and Drug Administration placed a black box warning on hypnotics including zolpidem, zaleplon, and eszopiclone based on reported side effects (Food and Drug Administration, 2019), and some reports have suggested potential adverse effects of long-term hypnotic therapy for insomnia particularly in older adults (2019 American Geriatrics Society Beers Criteria® Update Expert Panel, 2019). Nonetheless, there is some evidence that adding low-dose hypnotic therapy in the short term may garner additional benefits when added to other sleep treatments including behavioral therapy. For example, Morin et al. published in *JAMA* results from a randomized trial comparing the use of sleep medications versus cognitive behavioral therapy for insomnia (CBT-i) (Morin et al., 2009). CBT-i is a manualized treatment approach that targets anxiety-provoking beliefs about sleep and is considered to be the first-line treatment for chronic insomnia (Qaseem et al., 2016). Results suggested CBT-i is highly effective but that the addition of hypnotic medication, at least in the short term, has additional benefits. The risks versus benefits of cannabis products for the purposes of sleep disturbance treatment are less clear (Ramar et al., 2018; Suraev et al., 2020), but in theory, these products could have a more favorable risk/benefit profile compared to chronic hypnotic therapy. Future research may seek to identify if adding medicinal cannabis use in tandem with CBT-i yields lower risk for adverse events than hypnotics themselves.

Some literature suggests THC may improve symptoms of sleep disturbance associated with sleep apnea (Carley et al., 2002; Carley et al., 2018; Farabi et al., 2014; Prasad et al., 2013), a common sleep disorder estimated to impact up to one billion people globally (Benjafield et al., 2019). A cardinal symptom of sleep apnea is daytime sleepiness (Javaheri & Javaheri, 2020), and there is evidence that some patients experience comorbid insomnia symptoms as well (Ragnoli et al., 2021). It is less understood how to address these symptoms,

especially since the use of hypnotics is strongly discouraged in those with sleep apnea, which may suppress breathing at night and inadvertently worsen sleep apnea symptoms. While the risk–benefit profile of cannabis in treating these comorbid symptoms is yet to be determined, it could be considered that adding cannabis, rather than hypnotics, may be a useful harm-reduction tool for managing sleep disturbance in this population. However, it should be noted that the American Academy of Sleep Medicine's position statement strongly discouraged the use of cannabis to treat sleep disturbances attributed to sleep apnea, stating that "it is the position of the American Academy of Sleep Medicine (AASM) that medical cannabis and/or its synthetic extracts should not be used for the treatment of OSA due to unreliable delivery methods and insufficient evidence of effectiveness, tolerability, and safety" (Ramar et al., 2018).

While no differences between groups were observed based on administration methods used, we did see that over half of those reporting use of cannabis for sleep disturbance used inhaled (e.g., smoking, vaping concentrate, etc.) and three-fourths reported orally ingested (e.g., pills and tinctures, etc.) methods. Both approaches may have utility when it comes to sleep promotion. The time it takes for maximum concentration after administration of oral THC is reported as around 4 hr compared to 10 min for inhaled cannabis (Fabritius et al., 2013; Vandrey et al., 2017; Walsh et al., 2021). Rapid onset of effects of inhaled cannabis may be more successful at improving sleep onset latency while oral administration may better modulate total sleep time or sleep efficiency. It will be important for future research to better understand the strategy patients use to address their individual needs for sleep health.

Most respondents in our sample reported no side effects from their cannabis use. However, the increasing potency of THC over time has raised some safety concerns, and this is particularly salient for older adults who may be more vulnerable to potential adverse effects (ElSohly et al., 2016). A cannabis use survey of nearly 3,000 responders parsed by age groups found that older participants (>50 years) significantly reported reduced psychological, and cognitive and physiological acute effects compared to younger age groups (Sexton et al., 2019). The potential impacts of cannabis on cognitive function, fall risk, drug interactions, and behavioral health all point to the need for risk assessment in older patients reporting cannabis use. In light of our findings, cannabis products are clearly used for sleep disturbance despite a paucity of safety data, and we urge future research investigating the safety and efficacy of cannabis use for sleep disturbance, especially in rigorous randomized trials.

This study had limitations. First, our sample size was small. Nevertheless, our findings show that users of cannabis for sleep disturbance have unique profiles and use patterns that distinguish them from those using cannabis for other conditions, which can inform future research in this domain. Second, while we asked about the helpfulness of cannabis for sleep disturbance, we did not collect any quantitative measures on actual sleep quality; thus, we cannot objectively determine efficacy. Relatedly, we did not have data on the diagnosis of sleep disorders, and we are uncertain whether reports for sleep disturbance were for specific disorders such as insomnia or transient sleep difficulties. Third, as our sample was highly educated and predominantly Caucasian, our results may not generalize to patients in more diverse populations. Finally, the survey did not ask participants about the use of another

cannabinoid, cannabinol (CBN—a degradation product of THC). This compound is being widely marketed for its' utility for promoting sleep, but a recent review found that there was insufficient evidence to support such claims (Corroon, 2021).

There is currently no standard for using cannabis as a treatment for sleep disturbance. Given the diversity of products available (e.g., THC:CBD ratios, strains, and administration forms such as inhalation via vaporization of flower or concentrates, tinctures, and edibles), more research is needed to identify whether and how older adult patients can safely and efficaciously use cannabis to treat sleep disturbance. Specifically, there is a need to define the optimal dosing and administration methods for individual sleep disorders (e.g., insomnia or sleep apnea) and determine how best to tailor treatment strategies based on older patients' needs. It will be essential to take into consideration current medications and associated drug/drug interactions, concurrent substance use (e.g., use of alcohol, benzodiazepines, or opioids), functional status (e.g., gait and balance disorders), and impacts on potential comorbidities (e.g., cognitive impairment and pain). As cannabis use continues to grow among older adults, it is important to determine optimal use for improving older patients' sleep health and promoting their quality of life.

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Table 1.

Demographic Characteristics of Patients.

Characteristic	Total n (%) or mean (*SD*)
	N = 82
Age	
<65	2 (2)
65–74	31 (38)
75–84	34 (41)
85 +	15 (18)
Gender	
Female	49 (60)
Male	33 (40)
Race/Ethnicity	
Non-Hispanic White	75 (91)
Non-Hispanic Black	1 (1)
Hispanic	5 (6)
Non-Hispanic Asian	1 (1)
Marital status	
Married or long-term partner	47 (57)
Widowed	20 (24)
Divorced/separated	12 (15)
Single, never married	3 (4)
Education	
High school graduate	8 (10)
Some college/bachelor's degree	35 (44)
Graduate and/or advanced degree	37 (46)

Table 2.

Comparison of Demographic Characteristics and Cannabis use Practices Between Those Reporting Cannabis use for Sleep Disturbance and Those Reporting use for Other Conditions.

Characteristic	Use for other conditions n (%) or mean (*SD*)	Use for sleep disturbance n (%) or mean (*SD*)	*P*-value
	N = 58	N = 24	
Demographics			
Age			.45
<65	2 (3)	0 (0)	
65–74	23 (40)	8 (33)	
75–84	21 (36)	13 (54)	
85 +	12 (21)	3 (12)	
Gender			**.07**
Female	31 (53)	18 (75)	
Male	27 (47)	6 (25)	
Race/Ethnicity			.82
Non-Hispanic White	53 (91)	22 (92)	
Non-Hispanic Black	1 (2)	0 (0)	
Hispanic	3 (5)	2 (8)	
Non-Hispanic Asian	1 (2)	0 (0)	
Marital status			.59
Married or long-term partner	34 (59)	13 (54)	
Widowed	12 (21)	8 (33)	
Divorced/separated	9 (16)	3 (12)	
Single/never married	3 (5)	0 (0)	
Education			.83
High school graduate	6 (11)	2 (8)	
Some college/ bachelor's degree	23 (41)	12 (50)	
Graduate and/or advanced degree	27 (48)	10 (42)	
Cannabis use patterns Use frequency			**.01**
Daily/weekly	22 (43)	16 (76)	
Monthly/yearly or less	29 (57)	5 (24)	
CBD versus THC			**<.01**
CBD-only products	27 (48)	9 (38)	
Products containing THC	18 (32)	15 (62)	
Not sure	11 (20)	0 (0)	
Use type			.62
Medical purposes only	44 (79)	18 (75)	
Recreational purposes only	5 (9)	1 (4)	
Both	7 (12)	5 (21)	
Administration methods used			
Inhaled methods			.23

Characteristic	Use for other conditions n (%) or mean (*SD*)	Use for sleep disturbance n (%) or mean (*SD*)	*P*-value
	N = 58	**N = 24**	
No	35 (60)	11 (46)	
Yes	23 (40)	13 (54)	
Orally ingested methods			.12
No	25 (43)	6 (25)	
Yes	33 (57)	18 (75)	
Topical methods			.45
No	36 (62)	17 (71)	
Yes	22 (38)	7 (29)	
Side effects experienced			.38
No	44 (76)	21 (88)	
Yes	9 (16)	3 (12)	
Unsure	5 (9)	0 (0)	
No. of administration methods used	1.45 (0.73)	1.79 (1.02)	**.09**
No. of conditions/symptoms targeted	1.12 (0.68)	3.17 (1.66)	**<.01**

Note: *P*-value are obtained from chi-squared or Fisher's exact tests for categorical outcomes and Student's *t*-tests for continuous outcomes. Inhaled administration methods include smoking, vaping concentrate, dabbing, and vaporization of flower; orally ingested administration methods include edibles, tinctures, and pills; topical administration methods include lotion, suppository, and patches. Conditions/symptoms targeted include pain, insomnia/sleep difficulty, anxiety/stress, loss of libido, arthritis/joint pain, depression, weight loss/low appetite, migraines/headaches, nausea/vomiting, glaucoma, dementia/memory loss, Parkinson's disease, seizures/epilepsy, multiple sclerosis, post-traumatic stress disorder, and any other conditions.

All bolded values are statistically significant at $p < .10$.

CBD = cannabidiol; THC = tetrahydrocannabinol.