



Full length article

Prevalence and correlates of sleep-related problems in adults receiving medical cannabis for chronic pain



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ABSTRACT

Purpose: To examine the prevalence and correlates of sleep problems in a sample of medical cannabis patients.
Procedures: Adults ages 21 and older ($N = 801$, M age = 45.8) who were seeking medical cannabis certification (either for the first time or as a renewal) for chronic pain at medical cannabis clinics in southern Michigan completed baseline measures of cannabis use, sleep, pain, and other related constructs.

Findings: Over half of the sample (59%) met criteria for past 1-month sleep disturbance, defined as at least one sleep problem occurring on 15 or more nights in the past month. Most participants (86%) reported that sleep problems were due to their current pain. Approximately 80% of participants reported using cannabis in the past 6 months to improve sleep and, among these participants, cannabis was rated as helpful for improving sleep. Sleep-related cannabis side effects were rare (35%), but sleep-related cannabis withdrawal symptoms were relatively common (65%). Statistically significant correlates of past 1-month sleep disturbance included a) being female, b) being white, c) being on disability, d) not having a medical cannabis card, and e) frequency of using cannabis to help sleep.

Conclusions: Sleep problems are highly prevalent and frequent in medical cannabis patients and are closely tied to pain. Sleep-related cannabis withdrawal symptoms are relatively common but their clinical relevance is unknown. The association between frequency of cannabis use to help sleep with higher odds of sleep problems will need to be clarified by longitudinal studies.

1. Introduction

As of July 2017, twenty-nine US states and the District of Columbia have passed legislation legalizing cannabis for medicinal purposes (National Conference of State Legislatures, 2017). Epidemiological evidence has indicated that, among past-year cannabis users, about 10% reported using cannabis for medical reasons (Compton et al., 2017); among past-year cannabis users living in states where medical cannabis has been legalized, 17% reported using for medical reasons (Lin et al., 2016). The rapidly changing epidemiology of medical cannabis highlights the importance of research on the potential beneficial and adverse effects of cannabis use (Volkow et al., 2017). Although a long line of research has established associations between recreational cannabis use and adverse health outcomes (Wilkinson et al., 2016), the relationship between cannabis use and sleep appears to vary as a function of dose and timing of administration (Babson and Bonn-Miller, 2014; Conroy and Arnedt, 2014). Evidence indicated that cannabis has

sedative and excitatory effects (Babson and Bonn-Miller, 2014), and cannabis withdrawal is associated with sleep disruptions (Bolla et al., 2010; Gates et al., 2016). One study showed that heavy (but not occasional) cannabis use was associated with sleep disturbance (Conroy et al., 2016).

Despite these potential adverse effects, emerging evidence indicated that cannabis is commonly sought as a sleep aid (Ferguson and Ware, 2015). For example, Bohnert et al. (under review) found that, among a sample of adult medical cannabis patients, sleep was the most highly endorsed motive for use on the Comprehensive Marijuana Motives Questionnaire (CMMQ). About 48% of participants recruited from a dispensary in California sought medical cannabis for insomnia (Bonn-Miller et al., 2014a), and a recent meta-analysis found low-quality evidence that medical cannabinoids were associated with better sleep outcomes (Whiting et al., 2015). Similarly, a recent report from the National Academies of Sciences concluded that there is “moderate” evidence to support that “cannabinoids...are an effective treatment to

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improve short-term sleep outcomes in individuals with sleep disturbance associated with obstructive sleep apnea syndrome, fibromyalgia, chronic pain, and multiple sclerosis” (NAS, 2017, p. 115). Some evidence from polysomnography (PSG) studies also showed that cannabis was associated with shorter sleep latency and increases in slow-wave sleep (Angarita et al., 2016).

These encouraging findings are tempered by concerns that chronic cannabis use could lead to increases in cannabis use disorders (Babson et al., 2017; Benbadis et al., 2014), exacerbation of sleep problems (Babson and Bonn-Miller, 2014), and other adverse outcomes (D'Souza and Ranganathan, 2015). For example, using marijuana for sleep-related motives was correlated to greater frequency of use and marijuana-related problems among nonmedical cannabis users (Lee et al., 2009), and using cannabis to improve sleep was associated with higher frequency of cannabis use among medical users with probable PTSD (Bonn-Miller et al., 2014b). There is also evidence that cannabis withdrawal has negative effects on self-reported and PSG measures of sleep (Angarita et al., 2016; Babson et al., 2017; Benbadis et al., 2014).

Although a growing body of evidence indicates strong bidirectional associations between substance use and sleep (Conroy and Arnedt, 2014; Arnedt et al., 2007), those who are seeking medical cannabis are an understudied and distinct group of individuals, and little is known about their sleep and patterns of cannabis use. In the state of Michigan, where the current research was conducted, the Michigan Medical Marihuana Act passed in 2008 legalized the use of cannabis for the treatment of debilitating medical conditions (e.g., cancer, glaucoma, severe or chronic pain). Qualifying patients or primary caregivers are required to obtain a registry identification card through a state registry program. As of January 2016, 182,091 patients and 34,269 caregivers have been approved for medical cannabis registry identification cards in Michigan (Gaedeke, 2016). In this research, we aimed to extend our knowledge about sleep-related problems among medical cannabis users with chronic pain. The two primary aims of this work were to 1) determine the prevalence of sleep-related problems and sleep-related cannabis use in medical cannabis users with chronic pain, and 2) identify the demographic and cannabis use correlates of sleep-related problems in medical cannabis users with chronic pain.

2. Methods

2.1. Participants

This paper is based on a larger project that is designed to identify patterns of cannabis use in medical cannabis patients with chronic pain in the state of Michigan. Adult patients (≥ 21 years old) attending a medical appointment for certification or recertification for a state medical cannabis card were eligible for screening. Patients were approached by trained research assistants (RAs) in clinic waiting areas. RAs provided a brief overview of the study and obtained written informed consent for screening. Consenting participants completed a 15–30-minute self-administered screening survey, and their responses were used to determine study eligibility. Inclusion criteria were: self-report of pain in the past month, of at least “usual pain” 5 or greater on a 0–10 numeric rating scale (NRS; Farrar et al., 2001), and self-reported chronic pain as a medical reason for seeking medical marijuana. Additional exclusion criteria were: seeking medical cannabis for Alzheimer's disease or cancer, and women who reported that they were pregnant. Of the 2569 patients who presented to the study sites during the recruitment period, a total of 1485 participants (58%) completed the screening survey. Of the 1485 participants who completed the screening survey, a total of 801 participants (54%) met eligibility criteria, agreed to participate in the study, and completed the baseline questionnaire. Participants were financially compensated for completing the screening and baseline surveys. A previous report based on this project (Cranford et al., 2016) used data from the larger screening sample ($N = 1485$). The current paper focuses on the baseline sample

($N = 801$) because that survey included expanded assessments related to sleep.

2.2. Measures

2.2.1. Demographics

Demographics included questions about sex, race/ethnicity, education (highest grade completed in school), current marital status, and current employment status, whether the participant was a first-time or returning patient (assessed with an item asking if the participant currently had a medical marijuana card), and reasons for seeking medical marijuana.

2.2.2. Sleep disturbance in the past month

Sleep Disturbance in the Past Month was assessed with the Jenkins Sleep Problems Questionnaire (Jenkins et al., 1988), which includes four items asking about frequency of a) trouble falling asleep; b) waking up several times per night; c) trouble staying asleep; and d) waking up feeling tired and worn out. A sample item is “How often in the past month did you wake up several times per night?” Response options for each item were: 0 = *Not at all*, 1 = *1–3 days*, 2 = *4–7 days*, 3 = *8–14 days*, 4 = *15–21 days*, 5 = *22–31 days*. Based on previous research (Lallukka et al., 2011), we classified participants who reported any of the four sleep problems occurring on 15 or more nights during the past 1 month as having a sleep disturbance.

2.2.3. Frequency of past 6-month medical cannabis use

Frequency of Past 6-Month Medical Cannabis Use was assessed with the question “In the past 6 months, how often have you used marijuana for a medical reason?” Response options were: 0 = *I have not used marijuana for a medical reason in the past 6 months*, 1 = *Very seldom*, 2 = *Less than weekly*, 3 = *1–2 days/week*, 4 = *3–7 days/week*, 5 = *Several times a day*.

2.2.4. Average quantity of weekly cannabis use in the past month

Average Quantity of Weekly Cannabis Use in the Past Month was assessed with the question “During the past month, on average, how much marijuana (for medical or non-medical use) did you use per week?” Response options were: 0 = *None*, 1 = *Less than an eighth of an ounce*, 2 = *An eighth to slightly less than a quarter of an ounce*, 3 = *A quarter to slightly less than a half of an ounce*, 4 = *A half to slightly less than one ounce*, 5 = *One or more ounces*.

2.2.5. Duration of cannabis intoxication on an average day in the past month

Duration of Cannabis Intoxication on an Average Day in the Past Month was assessed with the question “During the past month, how many hours, on an average day, do you feel high or stoned?” Response options were: 1) 0 h, 2) 1–2 h, 3) 3–4 h, 4) 5–6 h, 5) 7–8 h, 6) 9 or more hours.

2.2.6. Pain-related sleep problems

Pain-Related Sleep Problems were measured with items adapted from Hendler et al. (1979; also see Hendler et al., 1988). “These items ask about your current pain condition. Do you ever have trouble falling asleep or awoken from sleep?” Response options were: 0 = *No* and 1 = *Yes*. An affirmative response to this item led to two more questions: “How often do you have trouble falling asleep due to your pain?” Response options were 0 = *I do not have trouble falling asleep*, 1 = *I have trouble falling asleep which is not related to pain*, 2 = *Rarely*, 3 = *More than 3 times per week*, 4 = *Every night*, 5 = *Multiple times a night*. “How often do you awaken from sleep due to your pain?” This question had the same response options with the exceptions: 0 = *Never*, and 1 = *I have restless sleep or early morning awakenings with or without being able to return to sleep that are not related to pain*. In addition, an item from the Back Pain Functional Scale (BPFS; Stratford et al., 2000) asked “Today,

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