Trends over time in adult cannabis use: A review of recent findings

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Abstract

In the United States, policies regarding the medical and nonmedical use of cannabis are changing rapidly. In 2021, a total of 34 US states have legalized cannabis for adult medical use, and 15 of these states have legalized adult non-medical use. These changing policies have raised questions about increasing prevalences of cannabis use, changing perceptions regarding frequent use, and potentially related outcomes such as comorbid psychiatric illness or driving under the influence of cannabis. Research regarding the correlates of any and frequent cannabis use is also developing quickly. This article reviews recent empirical studies concerning (1) adult trends in cannabis use, (2) state cannabis laws and related outcomes, and (3) emerging evidence regarding how the global coronavirus 19 pandemic may impact cannabis use patterns. We summarize recent findings and conclude with suggestions to address unanticipated effects of rapidly changing cannabis laws and policies.

Keywords

Cannabis; Cannabis use; MML; RML; Cannabis use disorder; Adult trends

Introduction

Cannabis is one of the most commonly used psychoactive substances in the United States, with over 48 million people age 12 or older reporting past-year cannabis use in 2019 [1]. The legal status of cannabis in the United States has changed substantially over the last 25 years. Up to 1995, no state had legalized use of cannabis for any purpose. However, in 1996, California became the first US state to legalize cannabis use for medical purposes, and a total of 33 US states (encompassing over two-thirds of the US population [2]) have now legalized adult use of cannabis for medical purposes. In addition, 11 states have legalized

adult recreational use [3], and a total of 4 additional states voted to enact legalization of recreational use in the November, 2020 US election [4]. By signaling that cannabis use is acceptable and safe [5,6], passage of state laws legalizing cannabis use for medical or recreational purposes may reduce disapproval and perceived harmfulness of use [5–10], while actual enactment of these laws (often delayed after initial passage) can increase cannabis availability through dispensaries or other retail outlets [6,9–13].

The pros and cons of the changes in the legal status of cannabis have been debated. Potential benefits seen are reduction or elimination of unfair policing practices targeting disadvantaged minorities when enforcing laws that prohibit cannabis use, and generation of jobs and business opportunities [14–17]. Potential cons involve increased nonmedical use due to reduced perceptions of harmfulness and increased availability [11,18,19]. Increased nonmedical use increases the risk of adverse health consequences [14,20,21]. In addition, although occasional adult use may not cause health problems, early adolescent cannabis use is associated with later academic and occupational failures [22,23], and heavy regular adult use can lead to cannabis use disorder [24] (formerly known as cannabis abuse and dependence [25]) and may also lead to impaired driving [26,27], impaired social functioning [9,28], and psychiatric comorbidity [2,19]. Therefore, national trends must be taken into account to properly understand the context of the changing medical and recreational cannabis laws. This brief review therefore provides an overview of trends over time in nonmedical cannabis use and cannabis use disorder (CUD) in the United States as reflected in findings from large, nationally representative surveys. We primarily present information from two series of US national surveys of household residents: the National Survey on Drug Use and Health (NSDUH), and the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). Sponsored by the Substance Abuse and Mental Health Services Administration (SAMHSA), the yearly NSDUH surveys provide national prevalences of substance use [29], and the consistent annual survey measures from 2002 to the present allow for analysis of time trends in use. Similarly, NESARC surveys involve nationally representative samples of household residents who were assessed for patterns of lifetime and current alcohol use, illicit drug use, alcohol use disorders, drug use disorders, and many psychiatric disorders [30,31], and therefore allow for detailed analysis of substance use patterns and disorders. Thus, these surveys are an important source of epidemiologic data on changes in cannabis use and CUD in the US general population over time. Next, this review provides a brief summary of recent studies of the effects of state medical marijuana laws (MML) and state recreational marijuana laws (RML). Finally, given the current global pandemic caused by the respiratory illness coronavirus disease 2019 (COVID-19), which has infected over 92 million individuals as of writing [32], we discuss emerging evidence of cannabis use within the context of COVID-19 risk and prognosis, and also potential impacts on social functioning and the cannabis industry. Owing to the damaging effect that COVID-19 can have on respiratory health [33], and the potential association between cannabis smoking and lung health [9,34], we explore emerging evidence of a link between cannabis use and added risks associated with COVID-19.

Adult trends in cannabis use: a brief overview of national data

NSDUH findings

Studies using NSDUH data show that from 2002 to 2015, among adults aged 18 years and older, past-year nonmedical cannabis use in the general population increased from 10.4% to 13.3% [18,35,36]. NSDUH findings also show that perceived risk of using cannabis once or twice a week decreased considerably, while perception that cannabis was fairly easy or very easy to obtain increased [35]. The prevalence of nonmedical cannabis use increased for both men and women, but the increase was greater in men [36]. Furthermore, cannabis use prevalence increased significantly across adult age groups (young adults aged 18–25, and adults aged 26+), all race/ethnicity groups, and all income and education groups [35].

In addition, the prevalence of frequent cannabis use (daily or near-daily) increased from 1.9% in 2002 to 3.5% in 2014 among adults aged 18 years and older, with one study reporting that the year this trend began as 2007 [18]. Another study found while trends increased overall for adults, both past-year cannabis use and frequent use decreased among adolescents [35]. Furthermore, NSDUH did not report significant increases in CUD among the general population over time [18].

The increase in cannabis use prevalences from 2005 to 2017 was more rapid among those with a major depressive episode within the past year than those without, and in 2017, cannabis use prevalences were significantly higher among individuals with depression than those without (18.94% vs 8.67%) [37]. In addition, perception of risk associated with using cannabis use once or twice a week decreased more rapidly in individuals with depression than in those without from 2005 to 2017 [37]. Similarly, the increase in cannabis use prevalences from 2008 to 2017 was more rapid in individuals with anxiety (aOR = 2.14 vs 1.38) [38].

Recent reports also show that between 2015 and 2018, the prevalence of past-year cannabis use continued to increase in older adults (65 years), from 2.4% to 4.2% [39]. This study also reported a marked increase of cannabis use in older adults who use alcohol (2.9%–6.3%), consistent with other surveys showing an increase in adult co-use of cannabis and alcohol [40].

NESARC findings

NESARC data indicate a significant increase in cannabis use between the NESARC survey in 2001–2002 and the NESARC-III in 2012–2013 (4.1%–9.5%) [41]. Similarly, NESARC findings show a significant increase in the prevalence of CUD between 2001–2002 and 2012–2013 (1.2%–2.9%), and significant increases in use persisted across all sociodemographic groups, including age, race/ethnicity, socioeconomic status, marital status, and geographic region [41]. While the substantial increases in cannabis use and cannabis use disorder shown by the NESARC and NESARC-III surveys have been questioned [42], the validity of the NESARC/NESARC-III findings was supported by the consistency of the findings with results from other large-scale surveys that did not rely on self-report methods [26,43–46]. Additional analysis of NESARC data show that from 2001 to 2001 to 2012–2013, the prevalence of nonmedical cannabis use and of CUD increased at

a greater rate in states that legalized medical cannabis use than in states that did not [19] (see below).

NESARC results also suggest that individuals with pain may be vulnerable to high-risk cannabis use. In the 2012–2013 NESARC-III, any nonmedical cannabis use was more frequent in those with pain than in those without pain (12.42% vs 9.02%). This difference was greater than the difference between those with and without pain in the 2001–2002 NESARC (5.15% vs 3.74%) [47]. Similarly, individuals with pain had greater prevalences of frequent (3 times per week) nonmedical cannabis use and CUD in the 2012–2013 NESARC-III than in the 2001–2002 NESARC [47].

State cannabis laws and related outcomes

Cannabis desirability and availability could increase as a result of both MML [5,6,10] and RML [48,49], and consistent with this, initial studies showed an association of residing in a state with MML with cannabis use and CUD [50,51]. However, as other authors have pointed out [52], association does not necessarily indicate causality, and a causal relationship between MML/RML and cannabis use patterns or outcomes cannot be assumed without the appropriate statistical methodology. Thus, studies have used difference-in-difference methods that assess for pre vs. post state ML change in risk for cannabis outcomes compared with contemporaneous change in risk in states that did not change their ML.

Several studies have addressed the effects of MML on cannabis use and CUD in adults. These studies have found an effect of MML in increasing risk for cannabis use and CUD, as well as an increased perception of availability of cannabis among adults aged 26+ post-MML [11,19]. Emerging evidence also shows that MML have increased the odds of driving under the influence of cannabis (DUIC) [27].

Fewer years of data are available to address the effects of RML on adult cannabis outcomes. However, one recent study found that RML increased both the prevalence of CUD and past-month frequent use (>20 days in the month) in adults aged 26+ [53]. Further studies are needed that address the relationship of RML to additional outcomes in adults, for example, perceived harm of use and DUIC.

In adolescents, meta-analysis of numerous studies indicates that MML have not significantly affected the likelihood of cannabis use post-MML [54]. In a study of RML effects on adolescents, RML did not affect the odds of cannabis use or frequent use, but appeared to increase the risk of CUD [53]. However, additional analyses indicated that this apparent risk was likely due to unmeasured confounding. Thus, to date, MML and RML appear not to have increased cannabis use or associated problems in adolescents. However, owing to serious potential consequences of early cannabis use for later development, studies monitoring the effects of state cannabis legalization on adolescents continue to be needed.

Cannabis in the COVID era

The respiratory disease COVID-19 caused by the novel coronavirus SARS-CoV-2 is currently a global pandemic, which as of this writing, has been the cause of over half a

million fatalities in the United States [55]. While the severity of symptoms among those infected, serious COVID-19 cases can experience known damage to the lungs [33]. While the direct effect of cannabis smoking on lung health is unclear [56,57], some evidence points to an increased risk of symptoms of chronic bronchitis among frequent cannabis smokers [34,58]. Furthermore, one preliminary study identified cannabis use as a factor elevating risk of developing COVID-19 [59]. Monitoring the relationship of cannabis use and likelihood of COVID-19 infection, and among those infected, of COVID-19 outcomes is warranted to understand the role of cannabis in the course and prognosis of the illness.

Aside from the direct effects of COVID-19 on respiratory health, the psychosocial stresses of the COVID-19 pandemic and the social isolation engendered by mitigation efforts such as lockdowns and social distancing policies have created considerable anxiety and loneliness in sectors of the population. Previous research has established an association between feelings of loneliness and more frequent cannabis use [60]. Research on the effects of the pandemic on mental health and substance use is in its early phases. In 2020, one study showed that individuals who engaged in self-isolation during the COVID-19 pandemic used cannabis, on average, 20% more frequently than individuals who did not practice the recommended stay-at-home mandates [61]. However, a different study reported no significant change in cannabis use patterns during the pandemic lockdown period [62]. We can expect that the many studies now ongoing will be published soon, and more will become known about these issues.

The COVID-19 pandemic may also have an impact on the cannabis industry. An increasing demand among consumers for home delivery services could potentially increase availability of products [63]. Furthermore, cannabis dispensaries have been deemed an 'essential' service in over 12 states during the stay-at-home mandates [64], indicating consumer attitudes toward cannabis products as a necessary commodity in the United States

Finally, prior research has shown increases in cannabis use frequency to be linked to times of economic recession [36]. Economic reports show that the pandemic has caused what is potentially the greatest global recession since World War II [65], warranting careful monitoring of current cannabis use prevalences in future trends research.

Conclusion

In 2019, 5.76 million dollars was spent on lobbying by the cannabis industry, more than twice the amount spent in 2018 [66], suggesting that further legalization is on the horizon and that the cannabis industry will make efforts to influence public opinion regarding the safety of cannabis use to increase business revenues. Considering this and the recent changes in the legal status of medical and recreational cannabis use along-side the rapid increases in cannabis use prevalences and changing attitudes, educational efforts are needed to inform the public about the effects of cannabis use. Recreational cannabis legalization comes with pros, such as allowing states to reform drug policy and decrease racial bias in the criminal justice system by eliminating racially disproportionate cannabis possession convictions [67]. However, when enacting medical and recreational use laws, policymakers should ensure that the public is also provided with knowledge of potential harms or adverse

health outcomes of cannabis use so that consumers can make informed decisions about their own use habits. While cannabis does not carry the risk for fatal adverse effects that is found with other substances such as opioids, the increasing perception that cannabis is a harmless substance shows that consumers should be made aware that adverse effects of frequent use can occur. For example, there is high comorbidity between CUD and other mental illnesses [5,68], and also significant overlap between cannabis withdrawal syndrome and depressive symptoms (e.g., sleep difficulty, depressed mood, irritability) [69]. Frequent consumers may be unaware of this overlap, and therefore attempt to self-medicate cannabis withdrawal in the mistaken belief that cannabis is helping ameliorate depression without realizing that the continued cannabis use is perpetuating the symptoms.

One way to address the potential unanticipated effects of the rapidly changing cannabis laws and attitudes is to provide more widely available cannabis screening and treatment services, including in primary care and mental health settings. As cannabis increasingly becomes a legal substance, screenings for cannabis exposure and related harms would enable clinicians to more easily identify problematic use behaviors. Policymakers should ensure that training on cannabis screening and interventions for CUD are provided to clinicians to better equip them to monitor and treat patients with cannabis-related problems. In addition, this would encourage further awareness of adverse effects related to frequent use of which consumers may be currently unaware.

In summary, recent studies have provided important information indicating increased cannabis use prevalence, frequency, and CUD over time in the United States, and how MML and RML enactment have impacted patterns of use, particularly among adults. As cannabis use increasingly becomes more frequent and perceived as less harmful in the general population, increased awareness regarding potential health effects of cannabis use is needed to inform the public and guide public health policy.

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