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Self-reported changes in cannabis use due to the COVID-19 pandemic among US adults

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Abstract

Cannabis use may confer high COVID-19 risk. This study examined self-reported changes in cannabis use that US adults attributed to the pandemic and factors associated with any changes. We conducted a national, cross-sectional survey among US adults in August 2020. The analytic sample included 957 past-year cannabis users ($M_{age}=43$ years old; 51% male). Weighted multinomial regression examined associations between forms and reasons of cannabis used, perceived addictiveness and safety, co-use of cannabis with tobacco/alcohol, state legalization, and the outcome (self-reported increase/decrease in cannabis use vs. no change). Overall, 14.8% reported decreasing cannabis use due to the pandemic, 16.1% reported increasing, and 65.4% reported not changing. Factors associated with increased cannabis use included past-year use of vaporized (AOR = 1.7, 95% CI = 1.0, 3.0) or edible cannabis (AOR = 2.4, CI = 1.3, 4.3), and simultaneous use of cannabis and tobacco (AOR = 2.6; CI = 1.4, 5.2). Young adults (18–29 years old) had higher odds of self-reporting both increased (AOR = 4.8; CI = 1.8, 13.1) and decreased use (AOR = 3.3; CI=1.5, 7.5). The pandemic has had a mixed impact on cannabis use, with participants reporting both increased and decreased use. Efforts may target users of vaporized and edible cannabis, co-users of cannabis and tobacco, and young adults to prevent increased cannabis use during the pandemic.

Keywords

marijuana; substance use; US adults; SARS-CoV-2; pandemic

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Introduction

Other than alcohol, cannabis (marijuana) is the most commonly used psychoactive substance worldwide. In the US, cannabis use is increasing amid expanding legalization and an evolving product landscape with a variety of combustible, vaporized, edible, dabbing, and topical cannabis products (Cerdá et al., 2020). Though smoking remains the most popular mode of cannabis consumption, emerging health problems are linked to increasing use of both smoking and non-smoking cannabis products (Hasin, 2021; Krishnasamy et al., 2020). As such, understanding cannabis use in all forms is of public health interest.

Cannabis use is particularly concerning given the current COVID-19 pandemic (Borgonhi et al., 2021). Use often involves sharing joints or vaporizers, placing people at risk of contracting the virus (Vidot et al., 2020). Furthermore, those infected with COVID-19 might be at greater risk of complications due to cannabis-related respiratory impairment (Borgonhi et al., 2021). However, little is known about the pandemic's impact on cannabis use in the US. An internet-based survey conducted early in the pandemic (March to April 2020) found that 38.4% of US medicinal cannabis users reported an increase in cannabis use, 8.8% reported a decrease, and 47.9% reported no change in use (Vidot et al., 2020). However, the impact in the broader population of US adults who use cannabis for medicinal and/or recreational purposes is not known. In addition, it is not clear whether changes in cannabis use differ in demographic subgroups or whether forms of cannabis used or perceptions of cannabis are associated with pandemic-related changes in use.

To address these gaps, we conducted a survey using a national, probability-based panel of US adults to examine changes in cannabis use that participants attributed to the pandemic. Based on the extant literature (Hasin, 2021), we further examined associations between a variety of risk factors for cannabis use (e.g., perceived addictiveness and safety of cannabis use, cannabis legalization, reasons for use, use of cannabis with tobacco or alcohol) and self-reported increased or decreased use of cannabis due to the pandemic to identify at-risk subgroups who may benefit from prevention efforts.

Methods

Design and participants

We conducted a cross-sectional survey in August 2020 using Ipsos KnowledgePanel, a probability-based, nationally representative online panel of civilian, noninstitutionalized US adults aged 18 years and older. The panel was created by random sampling of addresses covering 97% of the US and no one can volunteer to participate in the survey, avoiding the bias of opt-in surveys. Additional details of the panel have been described elsewhere (Keyhani et al., 2018). The survey was classified as exempt by the University of California San Francisco Institutional Review Board. Of 5979 people completing the survey (70% response rate), the 957 participants reporting past-year cannabis use were included in the analytic sample.

Measures

Outcome—The survey used the term “marijuana” and participants were advised this referred to cannabis, pot, weed, grass, and hash. Participants were asked “Has the coronavirus/COVID pandemic affected your use of marijuana?” with response options including “Decreased a lot”, “Decreased a little”, “Not changed”, “Increased a little”, “Increased a lot”, or “Not sure”. Based on the literature and to facilitate comparison of changes in cannabis use during the pandemic between our study and other studies (Chong et al., 2022; Leatherdale et al., 2021; Rolland et al., 2020; van Laar et al., 2020; Vidot et al., 2020), we categorized the outcome variable as “Decrease a lot/a little,” “No change,” and “Increase a lot/a little.”

Independent variables—Participants also reported forms of cannabis used in the past year, including smoking, vaporizing, edibles, dabbing, or topical cannabis. Simultaneous use of cannabis with other substances was assessed by asking “When using marijuana, how often did/do you use [tobacco, alcohol] at the same time?” Answer options included “Never,” “Rarely,” “Sometimes,” “Often,” and “Always”, and were dichotomized as “Sometimes or more” versus “Rarely or Never”. Perceived addictiveness of cannabis was measured as “Not at all,” “Somewhat addictive,” and “Very addictive.” Participants were also asked “How safe is [smoking, vaping, using edible marijuana] every day?” with answer options on a 4-point Likert scale (from “Completely safe” to “Completely unsafe”). Perceived safety for each cannabis form was then dichotomized as “Safe” versus “Unsafe”.

Covariates—Age, sex, race/ethnicity, and educational attainment were self-reported. State cannabis legalization status at the time of the survey was classified as “Not legal,” “Medical legal,” and “Recreational legal” based on state of residence.

Statistical Analysis

All analyses were conducted with STATA, version 15.0.0 (Stata Corp, 2017) and used sampling weights provided by Ipsos to weight the sample to represent the US adult population on the basis of age, sex, race, ethnicity, education, household income, home ownership, and metropolitan area. Frequency distributions and means were computed for demographic and cannabis-related factors, with missing/refused answers included in denominators. A multinomial logistic regression model examined factors associated with increased or decreased cannabis use (vs. no change). Based on the previous studies and to mitigate the chance of type 2 error, we did not make adjustment for multiple comparisons in the model (Rothman, 1990; Streiner & Norman, 2011). Given the low missingness on all variables, listwise deletion was used. All tests of hypotheses were two-tailed with a significance level of α less than 0.05.

Results

Participants’ characteristics and patterns of cannabis use

The sample had a mean age of 43.4 years ($SD=15.0$), and 51.1% were male (Table 1). The majority were non-Hispanic White (63.1%) and attained college or higher education (60.8%).

Among past-year cannabis users, 14.8% reported decreasing cannabis use due to the pandemic, 16.1% increasing use, and 65.4% not changing use. The most common forms of cannabis used were smoking (75.2%) followed by edibles (58.2%) and vaping (32.5%). The most common reason for use was recreational (49.9%). Simultaneous use of cannabis with alcohol (44.7%) was higher than with tobacco (15.3%). Most participants perceived cannabis as somewhat addictive (47.9%) and the majority perceived daily smoking or use of edible cannabis as safe.

Factors associated with increased and decreased cannabis use

Factors associated with increased cannabis use included past-year use of vaporized (Adjusted Odds Ratio [AOR] = 1.7; 95% CI = 1.0, 3.0) or edible cannabis (AOR = 2.4; CI = 1.3, 4.3) and simultaneous use of cannabis and tobacco (AOR = 2.6; CI=1.4, 5.2) (Table 1). Young adults (18–29 years old vs. 60 years or older) had greater odds of both increased (AOR = 4.8; CI = 1.8, 13.1) and decreased use of cannabis due to the pandemic (AOR = 3.3; CI = 1.5, 7.5).

Discussion

This national, online, cross-sectional survey is among the first to directly examine the COVID-19 pandemic's impact on cannabis use (medically and/or recreationally) among US adults. We found a mixed impact with past-year cannabis users self-reporting both increases and decreases in use. Notably, our observed difference between proportions of increases (16.1%) and decreases (14.8%) is much smaller than that found in surveys of US medicinal cannabis users (38.4% increase, 8.8% decrease) (Vidot et al., 2020) and Dutch adult cannabis users (41.3% increase, 9.4% decrease) (van Laar et al., 2020). However, our findings are more consistent with a survey of the French general population (31.2% increase, 29.3% decrease among cannabis users) (Rolland et al., 2020). Our data, collected in August 2020, may indicate more recent changes in cannabis use than the other studies conducted in March-April 2020, soon after the pandemic began when lockdown measures were newly instituted.

We also examined factors associated with changes in cannabis use, finding those who used vaporized and edible cannabis were more likely to report increasing use. Another study in the US also indicated people switched from smoking to non-smoking products, with edible cannabis being the most commonly used after the pandemic (Vidot et al., 2020). Our finding of higher odds of increase among vaporized cannabis users is concerning given that vaping cannabis has been linked to lung injuries (Krishnasamy et al., 2020) and could increase susceptibility to COVID-19 infection and complications (Volkow, 2020). We also found simultaneous use of cannabis and tobacco was associated with increased cannabis use. Co-use of tobacco and cannabis may increase the risk of COVID-19 complications given that cigarette smoking is associated with higher odds of COVID progression (Patanavanich & Glantz, 2020). Interestingly, young adults were more likely to both increase and decrease cannabis use. This could be explained by variations in the pandemic's impact on behavior. Young adults might reduce the use of cannabis due to concerns about increased susceptibility to COVID-19, disruptions in access to cannabis products, or less social

engagements (Bochicchio et al., 2021; Nguyen et al., 2021). In addition, perceptions about cannabis use may also contribute to bidirectional changes in use. Indeed, a study found that young adults' perception that vaping cannabis can cause lung injuries was associated with lower odds of increased cannabis vaping during the pandemic, while the perception of vaping as safer than cigarette smoking was associated with higher odds of increased cannabis vaping (Nguyen et al., 2021). Furthermore, disruptions to daily lives (e.g., closures of schools and workplaces, social isolation and loneliness) might exacerbate stress and anxiety among young people, which in turn may increase their cannabis use (Bartel et al., 2020; Chong et al., 2022).

Collectively, our study has important implications. Cannabis use may confer higher COVID-19 risk through sharing practices or respiratory toxicity. Therefore, the current pandemic provides a timely opportunity for healthcare providers to discuss cannabis use and encourage reduction or cessation for individuals at high risk for COVID-19. In addition, public health efforts may target users of vaporized and edible cannabis, co-users of cannabis and tobacco, and young adults to reduce cannabis use during times of national stress, economic hardship, and isolation such as that experienced during the pandemic. Finally, systematic surveillance efforts to measure cannabis use and co-use of tobacco and cannabis would improve our understanding of the incidence and course of COVID-19 infection among cannabis users.

Our study has several limitations. Though our use of an online survey facilitated data collection during the pandemic, it may limit the findings' generalizability and self-report data may not reflect objective changes in use. In addition, this cross-sectional study is unable to establish a causal direction between associated factors and changes in cannabis use. The categorical measure of changes in cannabis use did not allow us to further determine actual changes in intensity and frequency of cannabis use. Future research should obtain this information to more accurately capture changes in amount of cannabis use since an individual may reduce frequency of use (numbers of using days) but increase intensity of use (numbers of using times within a day).

In conclusion, the pandemic has had mixed impacts on cannabis use among US adults, with similar proportions reporting increasing and decreasing use. Those who used vaporized or edible cannabis, those who simultaneously used cannabis and tobacco, and young adults were more likely to increase cannabis use in response to the pandemic. Public health efforts should prioritize high-risk users to prevent increased cannabis use and promote well-being during times of national stress, economic hardship, and isolation such as that experienced during the pandemic.

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Table 1:

Factors associated with change in cannabis use due to the COVID-19 pandemic among US adult past-year cannabis users (N=957)

| Independent variables | Weighted % of the total sample | Increased cannabis use (vs. No change) | Decreased cannabis use (vs. No change) |
|--|--------------------------------|--|--|
| Demographic factors | % | Adjusted OR (95%CI) | Adjusted OR (95%CI) |
| Age, Mean (SD) | 43.4 (15.0) | | |
| 18–29 years old | 22.1 | 4.8 (1.8–13.1) ** | 3.3 (1.5–7.5) ** |
| 30–44 years old | 35.9 | 1.8 (0.7–4.2) | 1.1 (0.5–2.2) |
| 45–59 years old | 23.0 | 2.3 (0.9–6.0) | 1.3 (0.6–2.5) |
| 60 years old or more | 19.0 | 1.0 [Ref] | 1.0 [Ref] |
| Gender | | | |
| Male | 51.1 | 1.0 [Ref] | 1.0 [Ref] |
| Female | 48.9 | 1.1 (0.6–1.9) | 1.7 (1.0–2.9) |
| Race/Ethnicity | | | |
| Non-Hispanic White | 63.1 | 1.0 [Ref] | 1.0 [Ref] |
| Non-Hispanic Black | 15.2 | 0.6 (0.2–1.7) | 1.0 (0.4–2.4) |
| Non-Hispanic Other/Multiracial | 6.1 | 1.7 (0.4–7.4) | 1.8 (0.5–5.9) |
| Hispanic | 15.6 | 1.3 (0.6–2.5) | 1.1 (0.6–2.3) |
| Education | | | |
| Highschool or less | 39.3 | 1.0 [Ref] | 1.0 [Ref] |
| College or higher | 60.7 | 1.2 (0.6–2.1) | 1.2 (0.7–2.2) |
| State cannabis legalization status | | | |
| Not legal | 30.1 | 1.0 [Ref] | 1.0 [Ref] |
| Recreational legal | 34.7 | 1.0 (0.5–1.7) | 0.9 (0.5–1.8) |
| Medical legal | 35.2 | 0.6 (0.3–1.3) | 1.1 (0.6–2.2) |
| Cannabis-related factors | | | |
| Change in cannabis use due to the pandemic ^a | | | |
| Increase | 16.1 | | |
| Decrease | 14.8 | NA | NA |
| No change | 65.4 | | |
| Cannabis products used in the past year | | | |
| Smoking (Yes vs. No) | 75.2 | 0.9 (0.5–1.9) | 1.7 (0.9–3.2) |
| Vaping (Yes vs. No) | 32.5 | 1.7 (1.0–3.0) * | 1.7 (0.9–3.1) |
| Edible (Yes vs. No) | 58.2 | 2.4 (1.3–4.3) ** | 1.2 (0.7–2.1) |
| Dabbing (Yes vs. No) | 12.8 | 1.6 (0.8–3.4) | 0.8 (0.3–2.3) |
| Topical (Yes vs. No) | 9.8 | 1.4 (0.6–3.2) | 2.00 (0.8–4.9) |
| Reason for cannabis use | | | |
| Medical only | 13.0 | 1.0 [Ref] | 1.0 [Ref] |
| Recreational | 49.9 | 1.6 (0.5–4.7) | 1.7 (0.7–4.3) |
| Both recreational and medical | 36.3 | 1.7 (0.6–5.2) | 0.8 (0.3–2.2) |
| Perceived addictiveness of cannabis | | | |

| Independent variables | Weighted % of the total sample | Increased cannabis use (vs. No change) | Decreased cannabis use (vs. No change) |
|---|--------------------------------|---|---|
| Not at all | 45.1 | 1.0 [Ref] | 1.0 [Ref] |
| Somewhat addictive | 47.9 | 0.9 (0.6–1.6) | 0.9 (0.5–1.5) |
| Very addictive | 6.8 | 1.6 (0.5–4.8) | 2.6 (1.0–6.7) |
| Perceiving daily use of each product as safe | | | |
| Smoking cannabis (Safe vs. Unsafe) | 61.8 | 1.2 (0.6–2.4) | 0.6 (0.3–1.1) |
| Vaping cannabis (Safe vs. Unsafe) | 47.6 | 0.6 (0.3–1.2) | 0.8 (0.4–1.6) |
| Edible cannabis (Safe vs. Unsafe) | 76.0 | 1.9 (0.8–4.3) | 0.7 (0.3–1.3) |
| Simultaneous use of cannabis and tobacco^b | | | |
| Rarely or never | 84.5 | 1.0 [Ref] | 1.0 [Ref] |
| Sometimes or more | 15.3 | 2.6 (1.4–5.2)** | 1.6 (0.8–3.5) |
| Simultaneous use of cannabis and alcohol^b | | | |
| Rarely or never | 55.3 | 1.0 [Ref] | 1.0 [Ref] |
| Sometimes or more | 44.7 | 1.4 (0.8–2.3) | 0.8 (0.5–1.4) |

Note:

p < 0.001;

**
p < 0.01;

*
p < 0.05; NA: Not applicable; Ref: Reference.

The multinomial regression model included all variables in the table simultaneously.

^aSelf-reported change in cannabis use due to the pandemic was originally measured as “Decreased a lot”, “Decreased a little”, “Not changed”, “Increased a little”, “Increased a lot”, and “Not sure” among past-year cannabis users.

^bSimultaneous use of cannabis with tobacco or alcohol was originally measured as “Never”, “Rarely”, “Sometimes”, “Often”, and “Always”.

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