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A cross-sectional examination of choice and behavior of veterans with access to free medicinal cannabis

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Abstract

Background: With a rise in public pressure to increase veteran access to medicinal cannabis, free cannabis collectives for military veterans are proliferating across the US.

Objectives: The aim of the current study was to document which cannabis formulations and routes of administration are chosen by veterans with increased access to cannabis, and to determine whether cannabis is being used as a substitute for other licit and illicit drugs.

Method: The current study collected cross-sectional self-report data on cannabis use, cannabinoid constituent composition, primary indication of use, and substitution practices among a sample of 93 US military veterans (84.9% male) with access to free cannabis.

Result: Most of the sample reported using cannabinoids as a substitute for either alcohol, tobacco, prescription medications, or illicit substances, reported that they use cannabis frequently (Modal frequency >4x/day, Modal quantity = 5 to 8 grams/week), and primarily select higher-risk cannabis formulations (i.e., high THC/low CBD, smoked). The majority of the sample reported that they use cannabis to self-treat multiple physical and mental health conditions/symptoms.

Conclusions: Results of the current study suggest that military Veterans with reduced barriers to access cannabis could be making both helpful and harmful choices regarding their cannabis use. These findings suggest that more guidance on the selection of cannabis-based products in this population is warranted, particularly as barriers to medicinal cannabis access are reduced.

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Potential Conflicts of Interest

Author Bonn-Miller works for Canopy Growth Corporation. Author Loflin has received consulting fees in the past two years from Tilray Inc and Zynerva Pharmaceuticals.

Keywords

Cannabis; marijuana; veterans; medicinal cannabis; therapeutics; substitution

Introduction

There is a growing public demand to increase access to medicinal cannabis for US military veterans. Meanwhile, there is limited scientific evidence specifying which of the multitude of cannabinoid products offer the greatest therapeutic benefit and/or lowest risk of harm. Self-report studies that attempt to capture which products cannabis users choose and for what purpose are inherently biased by differences in ease of access to different products and preparations across US states and counties. Understanding how reducing barriers to access might impact cannabinoid choice and behavior among military veterans is of paramount importance.

Emerging evidence suggests the therapeutic potential of cannabinoids for a range of conditions relevant to military veteran health (1), including chronic pain (2–4), traumatic brain injury (TBI) (5–8), substance use disorder (SUD) (9–15), and posttraumatic stress disorder (PTSD) (16–22). Likely stemming from its actual or perceived therapeutic efficacy for many physical and psychological symptoms, many individuals are using cannabis as a substitute for more traditional pharmaceuticals (23), as well as licit and illicit substances (24). Epidemiological findings highlight this trend, documenting decreased opioid use within states that have transitioned to allow access to medicinal cannabis (25,26). Likewise, preliminary analysis from one longitudinal study found reductions in the use of prescription medications including opiates, antidepressants, mood stabilizers, and benzodiazepines three months after initiation of medical cannabis (27).

Cannabis use, however, is also associated with a variety of negative effects, including risk of cannabis use disorder CUD (28). Relevant to veterans, CUD diagnoses have increased substantially in the past decade (29), specifically among veterans with PTSD (30). The contrast between therapeutic potential and increased problems may be attributable to the fact that “cannabis” represents a heterogeneous drug containing hundreds of cannabinoids, flavonoids, and terpenoids (31), which are associated with differential risk and potential therapeutic utility. For example, cannabis with higher delta-9-tetrahydrocannabinol (THC) relative to cannabidiol (CBD) can be intoxicating and increase the risk of CUD (32), while cannabis with higher CBD relative to THC appears to have fewer of these properties (12,13). Preliminary evidence suggests that THC may be helpful for some physical conditions, such as neuropathic pain and spasticity due to multiple sclerosis (2), but may exacerbate mental health symptoms, such as PTSD (33) and depression (34). In contrast, CBD could be helpful for anxiety-related symptoms (35), such as PTSD (36), social anxiety (37), and insomnia (38).

Likewise, route of administration could impact both therapeutic potential and risk of problematic use. Bioavailability is directly impacted by whether cannabis products are smoked/vaporized, swallowed, absorbed sublingually, or administered topically (39–41), onset and duration of effects (42,43), and subjective experience of effects (43,44). Likewise,

delivery of cannabis products that contain higher concentrations of THC is associated with greater risk of negative side effects (45,46), tolerance and withdrawal (47,48).

In this complex cannabis landscape, patient guidance and oversight is desperately needed, yet seriously lacking. Owing to the designation of cannabis as a schedule I controlled substance, health-care providers do not have sufficient evidence from well-controlled studies to make recommendations to patients on choice of product, best method of administration, or cannabinoid profile. Moreover, most health-care providers, including those working through the Veteran Affairs (VA) Healthcare System, are prohibited from offering specific advice on choosing cannabinoid-based products to their patients. Veterans who choose to self-medicate with cannabis must “go it on their own” in choosing cannabinoid preparations. Moreover, the cost of cannabis must be entirely shouldered by the consumer, as no insurance reimbursement is available. This creates substantial barriers for most veterans in accessing cannabis to self-treat symptoms.

To circumvent at least some of these barriers, veteran-focused cannabis collectives have begun to emerge across the US, offering free cannabis products to veterans with state-approved cannabis cards. While a number of studies have documented characteristics of veteran cannabis users (49–52), these investigations have failed to address cannabis heterogeneity or the selection bias inherent in an environment with so many barriers to access. Findings may not generalize to the broader population of veterans who would initiate use if legal and financial barriers to access were reduced. The current study aimed to address some of these existing limitations by collecting data on cannabis preparation and administration preferences and potential substitution behavior in a sample of veterans with limited barriers to cannabis access.

Methods

The local institutional review board approved the study protocol. Participants were recruited in-person during the monthly meetings of a local cannabis collective for military veterans. Interested participants were consented and then were asked to complete all assessment questionnaires. Study coordinators visually checked all questionnaires for completeness.

Participants

Participants were 93 US military veterans and members of the Santa Cruz Veterans’ Alliance (SCVA). The SCVA is a cannabis collective operating in Santa Cruz, California that offers free cannabis to veterans with a California state medicinal cannabis card. The SCVA operates on a donation basis, with cannabis products often donated by cultivators and dispensaries.

Measures

The current study included questionnaires assessing demographics, frequency/quantity of cannabis use, substitution of cannabis for other substances, primary method of administration, preferred cannabinoid composition (e.g., high THC) and primary indication of use.

Demographic assessments included age, gender, ethnicity, highest educational attainment, and whether the veteran currently receives some form of disability payment.

Frequency of cannabis use was assessed using a Likert-style scale ranging from 1 to 9 with the following scale responses: 1 'less than 1x/month', 2 '1–2x/month', 3 '1x/week', 4 '2–3x/week', 5 '1x/day', 6 '2x/day', 7 '3x/day', 8 '4x/day', 9 'more than 4x/day'. Quantity of past week cannabis use was assessed using a Likert-style scale ranging from 1 to 7 with the following scale responses: 1 'less than 1 gram', 2 '1 gram', 3 '2 grams', 4 '3 to 5 grams', 5 '6 to 8 grams', 6 '9 to 12 grams', 7 'greater than 12 grams'.

Substitution of cannabis for alcohol, tobacco, illegal drugs, and prescription drugs was assessed by asking participants (Yes or No) "Have you ever used cannabis as a substitute for [substance category here]?"

Primary method of administration was assessed by asking participants to report which method of cannabis intake they most often use: smoked, vaporized, edible (oral), oil/tincture/extract, or other.

Participants were asked to list the name of the cannabis product that they most often use (prefer) in order to assess preferred constituent composition. Listed products were then coded into categories by the average relative ratio of primary cannabinoids in those products (THC:CBD) (1) >2:1 THC:CBD 'high THC/low CBD,' (2) <1:1 THC:CBD 'high CBD/low THC,' or (3) 1:1 to 2:1 THC:CBD. Two additional categories were included to capture participants who reported that they "use anything," or did not know what type of cannabis they use.

Participants were asked to endorse if they used cannabis to treat any of the following symptoms and/or conditions: chronic pain, anxiety, PTSD, depression, nightmares, appetite problems, nausea, insomnia, epilepsy, headaches, seizures, multiple sclerosis, cancer, glaucoma, muscle spasms, HIV/AIDS, or another condition not listed. Two binary variables were coded to indicate whether participants reported that they used cannabis to treat physical health symptoms (e.g., HIV/AIDS, muscle spasms, glaucoma) and/or mental health symptoms (e.g., anxiety, depression, PTSD). These two variables were collapsed into one and recoded to indicate whether participants used cannabis to treat: 1) primarily physical health symptoms, 2) primarily mental health symptoms, or 3) both physical and mental health symptoms.

Descriptive analyses, including frequencies, mean scores, and standard deviations, were computed using SPSS version 24 software. Ninety-five percent confidence intervals, calculated as $\rho \pm 1.96\sqrt{\frac{\rho(1-\rho)}{n}}$, were computed for all frequency scores, where ρ = the obtained proportion endorsing each item.

Results

Demographics

Demographics of the sample appear in Table 1.

Cannabis use

The modal frequency of cannabis use in the sample was 9, corresponding to ‘more than 4x/day,’ while the modal quantity of cannabis used during the past week was 5, corresponding to ‘6 to 8 grams.’ The majority of participants reported that they use cannabis as a substitute for other licit and illicit substances (63.3%; CI: 51.4–71.2%). The overwhelming majority of participants reported that they primarily choose high THC/low CBD preparations (48.4%; CI: 38.2–58.5%), prefer to smoke their cannabis product (54.4%; CI: 44.1–64.7%) and that they use cannabis to treat both physical and mental health symptoms (78.5%; CI: 70.1–86.8%). Frequency of endorsement for self-treatment of each symptom/condition with cannabis appears in Figure 1. Results of all other analyses appear in Table 2.

Discussion

The current study collected data on cannabis preparation and administration preferences and drug substitution behavior in a sample of veterans with few barriers to cannabis access. There were several notable findings. First, participants reported a high degree of substitution behavior, particularly for alcohol. This finding is consistent with results of other surveys assessing medicinal cannabis use in veterans (53). Given that cannabis use is associated with a much lower dependency potential and risk of overdose compared to other substances with a risk of misuse (54), this finding could suggest a positive impact of reduced barriers to medicinal cannabis access among veterans. Meanwhile, nearly half the sample reported substituting cannabis for prescription medications. Cannabinoids tend to carry a significantly higher safety profile compared to opioids and several other controlled prescription medications (55). However, given the nature of this survey-based study, we do not know which specific medications these veterans were substituting cannabis for.

The overwhelming majority of this sample reported using cannabis to treat multiple health conditions. This result is unsurprising given increased cultural attention to the wide range of conditions for which cannabinoids may be therapeutic. However, panacea-like use may prove problematic. The same cannabinoid preparation that might be helpful for one condition [e.g., high THC and neuropathic pain (3)] could exacerbate symptoms of another [e.g., high THC and anxiety (56)]. Indeed, the current study found limited variability in choice of cannabinoid content; the overwhelming majority of veterans preferred cannabis with high THC relative to CBD. These veterans also reported using THC-rich products frequently (i.e., multiple times daily) and in high doses (i.e., 6–8 grams per week). This quantity and frequency of use are consistent with other populations of medicinal cannabis users. For example, Bonn-Miller et al. (57) documented average rates of cannabis use of 2–3 times per day, consuming between 6 and 12 grams of cannabis per week, in a general sample of medicinal cannabis users.

The sample’s strong preference for frequent use of high THC-containing cannabis raises concerns for long-term outcomes of self-medication. While THC-rich cannabis may provide acute relief for symptoms often experienced by veterans [e.g., nightmares (17)], it is also more likely to cause intoxication and associated with increased risk of developing symptoms of CUD relative to CBD-rich cannabis (58). Indeed, CBD may reduce anxiety (37), depression (59), and inflammation (60), as well as improve cognition (61) and extinction

learning (20). This dichotomy could explain why veterans who use cannabis to self-treat mental health symptoms, like PTSD, often show worse long-term outcomes and report higher rates of problematic use (34), despite preclinical and human experimental evidence of potential therapeutic utility of certain cannabinoids. Likewise, while the majority of participants preferred using an inhalation method for administration of cannabinoids, a non-trivial number reported that they prefer highly concentrated “dabs” (16.1%), which is associated with greater risk of tolerance and withdrawal (48). Moreover, those who typically chose an inhalation method of administration reported a strong preference for smoking cannabis over vaporization. Smoking cannabis carries significantly greater health risks compared to vaporization (62,63).

Perhaps more troubling is the finding that over 40% of the sample either didn't know or didn't care what type of cannabis they were using. This may be a function of the lack of sufficient science and education within this space. Given the historic barriers to conducting well-controlled trials with cannabinoids, even savvy patients have limited information to inform their choice of cannabinoid product, which might lead patients to choose at random. Moreover, while it is likely that many providers are rightly hesitant to make recommendations without the results of well-controlled clinical trials, there is also an enormous gap in the knowledge and training of those who interface with patients in terms of best practices given the current evidence base (64).

The primary limitation of the current study is that it assessed cannabis use and related behaviors entirely using self-report with no ability to verify cannabinoid constituents in products typically used. This is a major limitation of the current study because there is large variability in cannabinoid content within “strains” (65). Oversight of non-FDA approved cannabinoid products is lacking, and recent reports suggest that many of these products are often mislabeled (66,67). However, current legal prohibitions made collection and objective testing of participants' products impossible. While using product names to assess preferred cannabinoid ratio provides only a gross approximation of possible cannabinoid content, the results of the current study offer more information on choice of cannabinoid products among veterans than exist in the literature to date.

Substitution behavior was also assessed through self-report and was assessed broadly by asking participants if they had ever substituted cannabis for other substances. Substitution, however, can occur in a multitude of ways. It is unclear whether veterans who endorsed substitution were completely abstaining from the substance that they endorsed substituting cannabis for, or whether they interpreted substitution as reduction of quantity or frequency of use. Likewise, retrospective recall of substance use is often inaccurate (68). Substitution data collected via self-report might not reflect these veterans' true behavior.

Finally, the current study did not collect data on age of first initiation of use of these other substances. It is unclear whether these participants started using these substances before or after initiation of cannabis use, and whether substitution behaviors co-varied with combat exposure or other military-related experiences.

Despite these limitations, the current study's findings highlight an ongoing issue among veterans, namely the possible gravitation toward addictive substances that provide acute relief yet potential long-term exacerbation of symptoms (15,31,32). Coupled with the need for improved science in this domain, findings highlight the importance of training providers in the nuances and differential effects of specific cannabinoids, as well as steering patients toward cannabinoid-based products that, while less rewarding in the short term, may be associated with reduced risk and long-term therapeutic gains. Future research might focus on the development of interventions that disseminate information on cannabis and cannabinoids to providers and patients. For example, vaporization of flower cannabis is associated with significantly lower risks of bronchial symptoms compared to combusted (smoked) cannabis (62,63), but a very small proportion of this sample noted that they preferred vaporization to other inhalation methods. This suggests one specific target for possible intervention.

The current study also confirms the findings of previous studies that have documented a trend in substitution behavior, where cannabis is substituted for other drugs, which, if associated with reduced harm, could be beneficial for overall health. Future studies might attempt to categorize which specific medications veterans who use medicinal cannabis are substituting cannabinoids for and whether those changes are associated with improvements in functioning.

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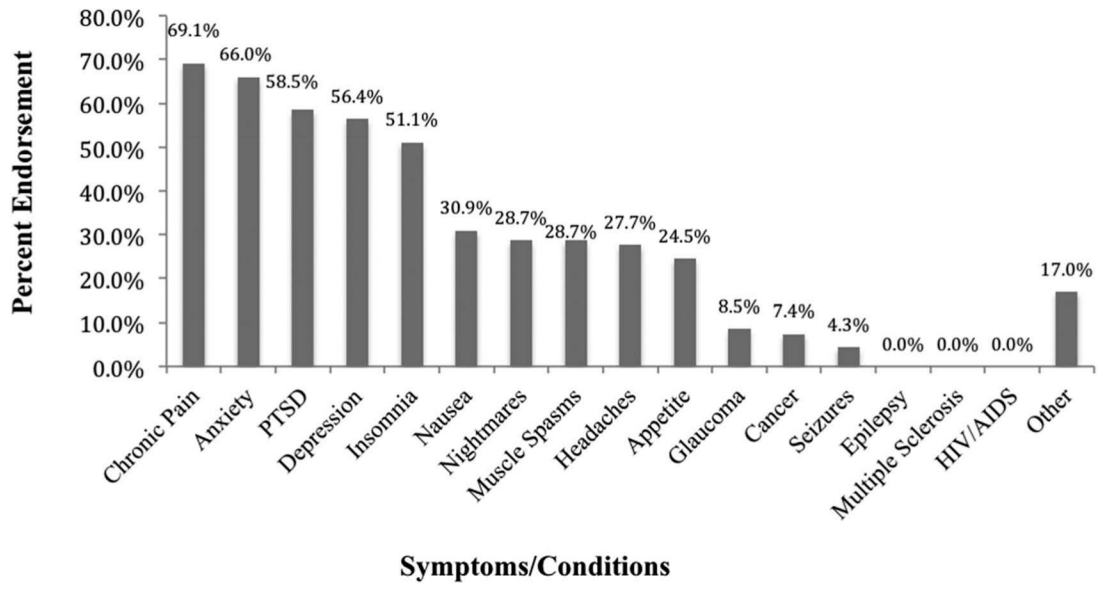


Figure 1.
Endorsement of symptoms/conditions being treated with cannabis.

Table 1.Demographics of sample ($N = 93$).

	Range	M (SD)
Age	22–91	51.31 (15.45)
Frequency (%)		
Gender		
Male	84.0%	
Female	9.6%	
Did not disclose	6.4%	
Ethnicity		
Caucasian	54.3%	
Latino	9.6%	
African American	18.1%	
Asian	3.2%	
Multiple ethnicities	9.6%	
Did not disclose	5.3%	
Education		
Some high school	1.1%	
High school diploma	9.6%	
Some college	36.2%	
Two year degree	23.4%	
Four year degree	9.6%	
Some graduate/professional	6.4%	
Advanced degree	7.5%	
Did not disclose	6.4%	
Disability payments		
Yes	45.7%	
No	50.0%	
Did not disclose	4.3%	

Table 2.

Cannabis preferences and behavior among sample of veterans self-medicating with cannabinoid products ($N=93$).

	Frequency (%)	95% CI
Preferred cannabis type		
High THC/low CBD	45 (48.4%)	38.2–58.5%
High CBD/low THC	5 (5.4%)	.8–10.0%
1:1–2:1 THC:CBD	1 (1.1%)	0.0–3.2%
No preference	10 (10.8%)	4.5–17.0%
Don't know	32 (34.4%)	24.8–44.1%
Method of administration		
Smoked	49 (54.4%)	44.1–64.7%
Vaporized	7 (7.8%)	2.3–13.3%
Edible	11 (12.2%)	5.5–19.0%
Oil extract/tincture	7 (7.5%)	2.2–13.3%
Dabs	15 (16.1%)	9.0–24.4%
Other	1 (1.1%)	0.0–3.3%
Substituting behavior		
Alcohol	27 (30.0%)	20.5–39.5%
Tobacco	22 (24.4%)	15.6–33.3%
Illicit drugs	11 (12.2%)	5.5–19.0%
Prescription medications	42 (46.7%)	36.4–57.0%
Any substance	57 (63.3%)	51.4–71.2%
Type of symptoms being treated		
Only physical symptoms	13 (14.0%)	6.9–21.0%
Only mental health symptoms	4 (4.3%)	.2–8.4%
Both physical and mental health symptoms	73 (78.5%)	70.1–86.8%
None	3 (3.2%)	0.0–6.8%