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Prevalence and Correlates of Cannabis Use in an Outpatient VA Posttraumatic Stress Disorder Clinic

Emily L. Gentes, **Amie R. Schry**,
Veterans Affairs (VA) Mid-Atlantic Mental Illness Research, Education, and Clinical Center (MIRECC); Duke University; and Durham VA Medical Center

Terrell A. Hicks,
Duke University

Carolina P. Clancy,
Duke University and Durham VA Medical Center

Claire F. Collie,
Durham VA Medical Center

Angela C. Kirby,
VA Mid-Atlantic MIRECC and Durham VA Medical Center

Michelle F. Dennis,
VA Mid-Atlantic MIRECC, Duke University, and Durham VA Medical Center

Michael A. Hertzberg,
Duke University and Durham VA Medical Center

Jean C. Beckham, and
VA Mid-Atlantic MIRECC, Duke University, and Durham VA Medical Center

Patrick S. Calhoun
VA Mid-Atlantic MIRECC, Duke University, Durham VA Medical Center, and VA Center for Health Services Research in Primary Care

Abstract

Recent research has documented high rates of comorbidity between cannabis use disorders and posttraumatic stress disorder in veterans. However, despite possible links between PTSD and cannabis use, relatively little is known about cannabis use in veterans who present for PTSD treatment, particularly among samples not diagnosed with a substance use disorder. This study examined the prevalence of cannabis use and the psychological and functional correlates of cannabis use among a large sample of veterans seeking treatment at a VA PTSD specialty clinic. Male veterans (N = 719) who presented at a VA specialty outpatient PTSD clinic completed measures of demographic variables, combat exposure, alcohol, cannabis and other drug use, and PTSD and depressive symptoms. The associations between demographic, psychological, and functional variables were estimated using logistic regressions. Overall, 14.6% of participants reported using cannabis in the past six months. After controlling for age, race, service era, and

combat exposure, past six month cannabis use was associated with unmarried status, use of tobacco products, other drug use, hazardous alcohol use, PTSD severity, depressive symptom severity, and suicidality. The present findings show that cannabis use is quite prevalent among veterans seeking PTSD specialty treatment and is associated with poorer mental health and use of other substances. It may be possible to identify and treat individuals who use cannabis in specialty clinics (e.g., PTSD clinics) where they are likely to present for treatment of associated mental health issues.

Keywords

veterans; PTSD; cannabis; substance use; trauma

Cannabis is the most frequently used illicit substance in the United States (Substance Abuse and Mental Health Services Administration, 2014) and has been associated with a wide range of health issues, particularly related to cardiopulmonary and mental health (Goldman et al., 2010; Moussouttas, 2004). In particular, recent research has documented high rates of comorbidity between cannabis use disorders and posttraumatic stress disorder (PTSD; Agosti, Nunes, & Levin, 2002) across both civilian and veteran populations. Among US adults, PTSD is associated with increased odds of cannabis use, even when adjusting for sociodemographic variables, alcohol use disorders, nicotine dependence, co-occurring anxiety and mood disorders, and trauma type frequency (Cougle, Bonn-Miller, Vujanovic, Zvolensky, & Hopkins, 2011). Among veterans, rates of PTSD are higher in those with a cannabis use disorder compared to those with other substance use disorders (Bonn-Miller, Harris, & Trafton, 2012).

The veteran population may be at particular risk for elevated rates of cannabis use, as well as its negative effects on physical and mental health because veterans tend to report higher rates of the medical and psychological problems associated with problematic cannabis use (Hoerster, Levahot, Simpson, McFall, Reiber, & Nelson, 2012; Kessler et al., 2014). In particular, veterans who have been exposed to combat and have PTSD may use cannabis to cope with symptoms such as anxiety, insomnia, and depression (Boden, Babson, Vujanovic, Short, & Bonn-Miller, 2013) with attempts at self-medication resulting in high rates of cannabis use in this population. Overall, rates of cannabis use disorder within the VA Health Care System have increased more than 50% (from 0.66% to 1.05%) from 2002 to 2009 (Bonn-Miller et al., 2012). However, utilization of specialty treatments for substance use disorders has decreased among those with a cannabis use disorder (Bonn-Miller et al., 2012). It may therefore become important to identify individuals who seek treatment in other VA clinics and may also struggle with cannabis use. Despite possible links, relatively little is known about the prevalence of cannabis use and its demographic and psychiatric correlates in veterans who present for PTSD specialty treatment.

Further, research examining the consequences of cannabis use among veterans has focused almost exclusively on individuals who meet diagnostic criteria for a cannabis use disorder. However, individuals may experience negative physical health, mental health, psychosocial, and/or legal effects resulting from cannabis use without meeting full criteria for cannabis use

disorder (Calhoun, Malesky, Bosworth, & Beckham, 2004; Fergusson, Horwood, & Beautrais, 2003; Goldman et al., 2010; Moussouttas, 2004), highlighting the importance of studying cannabis use among a broader veteran population. One recent study found that 11.5% of veterans being referred from primary care for initial behavioral health assessment reported past year cannabis use. Age, gender, other past year drug use, presence of alcohol use disorders, smoking status, depressive disorders, PTSD, anxiety disorders, and psychotic symptoms were each found to independently predict veterans' cannabis use over the past year. After adjusting for demographic variables (age, race, and gender), only other substance use including past year drug use, alcohol use disorders, and cigarette use remained associated with past year cannabis use (Goldman et al., 2010).

The purpose of the present study was to extend Goldman and colleagues' (2010) findings by examining the prevalence of cannabis use and its psychological and functional correlates among a large sample of veterans seeking treatment at a VA PTSD specialty clinic.

Method

Participants and Procedures

Archival data were analyzed from 719 male veterans who presented at a specialty outpatient PTSD clinic at a VA hospital in the southeastern United States. Patients presenting to this clinic completed a diagnostic evaluation to assess the presence and severity of *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (*DSM-IV*; American Psychiatric Association [APA], 2000) PTSD symptoms. Participants completed all measures as part of their standard clinic evaluation. Participants who completed an evaluation between 1998 and 2008 were included in the current study. The study was determined by the Institutional Review Board to be exempt from review because data were collected as part of standard clinic evaluation and did not include any identifying information. Demographic data are presented in Table 1. Only male veterans were included in the present study because only 23 females had available data in the sample, which limited the ability to examine possible gender differences.

Measures

As part of clinic procedures, demographic data including age, race, marital status (married vs. unmarried), employment status (employed vs. unemployed), and number of health problems experienced over the past year were collected. Additional self-report data were collected on difficulty controlling violent behavior in the past month (yes or no).

The presence of PTSD symptoms was assessed using the Clinician-Administered PTSD Scale (CAPS; Blake et al., 1995), a structured clinical interview that evaluates the frequency and intensity of the 17 symptoms of PTSD as defined in the *DSM-IV* (APA, 2000). Scores from the CAPS interview have been shown to demonstrate excellent reliability and validity within multiple trauma populations, and it is widely accepted as gold-standard for PTSD assessment (Weathers, Keane, & Davidson, 2001; Weathers, Ruscio, & Keane, 1999). A clinical psychologist supervised all evaluations. Inter-rater agreement among clinicians for PTSD diagnosis was excellent (κ = .92). The CAPS total score both overall and in each

cluster (i.e., Cluster B reexperiencing symptoms, Cluster C avoidance symptoms, Cluster D hyperarousal symptoms) was computed by summing the frequency and intensity ratings for all items in each cluster. Clinicians also rated the global severity of the patient's PTSD symptoms on the following 5-point scale: 0 (*none*); 1 (*mild*); 2 (*moderate*); 3 (*severe*); 4 (*extreme*). Inter-rater reliability for global severity ratings was high (κ = .82).

Self-report data on cannabis and other drug use were collected through the use of a questionnaire that asked about the frequency of use of specific drugs (e.g., cannabis, amphetamines, cocaine, heroin) during the past 6 months. Response options for each drug included: no use, daily use, weekly use, use once every two weeks, use once every three weeks, use once every month, use once every three months, and use once every six months. There were no negative consequences directly attached to reporting substance use, although patients were instructed that all information collected during their evaluations would be made part of their medical record. Drug use self-reports have been demonstrated to be highly valid in veterans seeking help for PTSD (Calhoun et al., 2000).

The Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, de la Puente, & Grant, 1993) is a ten-item measure assessing three factors: alcohol consumption, alcohol dependence, and adverse consequences of alcohol use. The range of possible scores is 0–40 with higher scores indicating increased probability of an alcohol use disorder. The AUDIT has been found to have a high level of agreement with other measures of alcohol use disorders (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001). The internal consistency (i.e., Cronbach's α) of the AUDIT in the current sample was .92.

The Combat Exposure Scale (CES; Keane, Fairbank, Caddell, Zimmering, Taylor, & Mora, 1989) was used to assess combat exposure. The CES is a widely used 7-item, Likert-type scale designed to measure wartime trauma exposure. The total score ranges from 0-41 and is a sum of weighted scores. Cronbach's α of the CES in the current sample was .89.

The Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996) was used to assess current depression symptoms. The BDI-II is a 21-item measure with total scores ranging from 0 to 63, where higher scores are indicative of more severe depression symptoms. Suicidality was measured using an item from the BDI-II, which participants rated on a scale from 0 to 3 where higher scores are indicative of greater suicidality. Scores from the BDI-II have been shown to be valid and reliable (Beck et al., 1996). The internal consistency of the BDI-II in the current sample was excellent (α = .91).

The Quality of Life Inventory (QOLI; Frisch, 1994; 1998) includes 32 items that assess satisfaction across 16 important life areas including health, self-esteem, goals and values, money, work, play, learning, creativity, helping, love, friends, children, relatives, home, neighborhood, and community. Participants first rate the importance of each domain on a 3-point scale from 0 ("not important") to 2 ("extremely important'). Then they rate their satisfaction on a 7-point scale from -3 ("extremely dissatisfied") to 3 ("extremely satisfied"). Scores range from -6 to 6, with higher scores indicative of greater quality of life. The internal consistency (i.e., Cronbach's α) of the QOLI in the current sample was .89.

Statistical Analyses

All variables were screened for outliers. Descriptive statistics were calculated to characterize demographic, substance use, and psychological attributes of participants. In order to facilitate interpretation of results from logistic regression, *z*-scores were calculated for continuous variables including combat exposure (CES), hazardous alcohol use (AUDIT total score), PTSD symptom severity (CAPS total score, CAPS reexperiencing, CAPS avoidance, CAPS hyperarousal, CAPS clinician-rated global severity score), depression (BDI-II), suicidality (BDI-II item 9), and quality of life (QOLI).

Unadjusted and adjusted logistic regression analyses were used to examine the association between marijuana use and demographic, substance use, and psychological variables. No past six month cannabis use served as the reference category in each model. Adjusted models examined the association of marijuana use with each variable after adjusting for age, race, service era, and combat exposure.

Results

Participant Characteristics

The majority of participants (n = 658, 91.5%) in the present sample met *DSM-IV* diagnostic criteria for PTSD at the time of assessment. One hundred five participants (14.6%) reported using cannabis at least once during the past six months. Among those who reported use of cannabis in the past six months, 27.6% reported daily use, 35.2% reported weekly use, 8.6% reported biweekly use, 3.8% reported use every three weeks, 9.5% reported monthly use, 3.8% reported use every three months, and 11.4% reported use every six months.

Predictors for Past Six Months Cannabis Use

Descriptive statistics are presented in Table 1. Bivariate analyses were used to examine the relationship between demographic, substance use, and psychological variables and cannabis use (see unadjusted results in Table 2). There were no significant associations between age, race, service era, employment status, violent behavior, or number of self-reported health problems and cannabis use. Veterans who were unmarried and those who smoked cigarettes or used at least one other drug were more likely to report use of cannabis in the past six months. Higher levels of combat exposure, lower quality of life, and more symptoms of hazardous alcohol use, depression, and suicidal ideation were also associated with increased likelihood of using cannabis. Higher clinician-rated global PTSD severity ratings and higher levels of PTSD Cluster C avoidance symptoms were associated with increased likelihood of using cannabis, but CAPS total score, re-experiencing, and hyperarousal symptoms were not associated with cannabis use.

Next, logistic regression models controlling for age, race, service era, and combat exposure were run (see adjusted results in Table 2). After accounting for these variables, marital status, smoking, other drug use, hazardous alcohol use, PTSD clinician-rated global severity, depressive symptoms, and suicidality remained associated with past six month cannabis use. [1] Specifically, veterans who were unmarried, those who smoked, and those who used drugs other than cannabis were more likely to report use of cannabis in the past six months.

Greater hazardous alcohol use, greater clinician-rated global PTSD severity, more severe depressive symptoms, and higher levels of suicidality were also all associated with increased likelihood of using cannabis.

Post hoc analyses were done to further examine the correlates of daily cannabis use compared to less frequent use among participants who reported using cannabis in the past six months (n = 105). In this series of logistic regression analyses, less than weekly cannabis use served as the reference category. In unadjusted models, younger veterans and those who served in OEF/OIF (compared to Vietnam) were more likely to report daily use. Veterans who smoked cigarettes were less likely to report daily cannabis use. The association between cigarette smoking and daily cannabis use remained when controlling for age, race, service era, and combat exposure.

Discussion

The purpose of this study was to examine the prevalence of cannabis use and its psychological and functional correlates among a large sample of veterans seeking treatment at a VA PTSD specialty clinic. Overall, 14.6% of participants reported using cannabis in the past six months. After controlling for age, race, service era, and combat exposure, past six month cannabis use was associated with marital status, smoking, other drug use, hazardous alcohol use, clinician-rated global PTSD severity, depressive symptoms, and suicidality. While multiple studies have documented associations between cannabis use disorders and trauma-related symptoms (Boden et al., 2013; Bonn-Miller et al., 2012), relatively few have examined the prevalence and correlates of cannabis use outside of samples with a diagnosed substance use disorder, particularly in veteran populations. Results from the present study showed that cannabis use among veterans seeking specialty treatment for PTSD was associated with severity of mood and trauma-related symptoms, as well as with use of other substances.

These results are consistent with a self-medication theory (Boden et al., 2013) in which cannabis use may serve an avoidance function for veterans struggling with symptoms of PTSD. In addition, the association between cannabis use and Cluster C avoidance is consistent with research showing an association between substance use history and avoidance coping, which may put individuals at greater risk of PTSD (Hruska, Fallon, Spoonster, Sledjeski, & Delahanty, 2011). These findings underscore the importance of identifying individuals whose cannabis use may be serving to self-medicate, and perhaps inadvertently to perpetuate symptoms of PTSD (Bonn-Miller, Boden, Vujanovic, & Drescher, 2013).

Previous research has consistently found associations between hyperarousal symptoms and cannabis use (Bonn-Miller et al., 2013; Bremner, Southwick, Darnell, & Charney, 2006), which was not replicated in the present study. This discrepancy may reflect differences in the sample used in the present study (i.e., individuals seeking PTSD specialty treatment),

[1]Additional analyses were conducted to test whether marital status, smoking, other drug use, hazardous alcohol use, depressive symptoms, and suicidality remained associated with marijuana use after adjusting for clinician-rated global PTSD severity. All findings remained significant.

compared to previous studies that have primarily included individuals diagnosed with a cannabis use disorder. Further, it is notable that cannabis use in the present study was associated with clinician-rated global PTSD severity, but not with CAPS total score. This may indicate that clinicians took into account other comorbid conditions (e.g., depression, substance use) in rating global PTSD severity, which may have artificially increased its association with cannabis use.

This study extends previous research documenting past year prevalence and correlates of cannabis use among veterans referred from primary care for behavioral health assessment. Past six month prevalence rates in the current study (14.6%) were slightly higher than the past year prevalence found in previous research (11.5%; Goldman et al., 2010), which may be attributable to differences in the sample composition, including the exclusion of female participants, as well as the possibility that individuals presenting to a PTSD specialty clinic may show more severe anxiety and mood symptoms than those being referred from primary care. Further, a large percentage (27.6%) of participants who reported cannabis use in the present study reported daily use. However, the sample size for daily cannabis users was relatively small and differences between daily and other users should continue be examined in future studies.

Findings from the present study may have important implications for treatment of cannabis use and associated problems within the VA system, particularly in light of recent research showing that utilization of specialty substance use treatments has decreased even as use of cannabis has increased (Bonn-Miller et al., 2012). Given that many cannabis users may not present in substance use clinics, perhaps cannabis use disorder can be identified and treated in other clinics (e.g., PTSD clinics) where these individuals are likely to present for treatment of associated mental health issues. Results from this study may also have policy implications, in an era when marijuana has been suggested as a potential treatment for PTSD and other mental health conditions, and when at least one state has PTSD as an approved condition for the use of medical marijuana. Although results from the present study are correlational and cannot imply a causal relationship, the data presented here suggest that veterans who are using marijuana may be doing more poorly across several important life domains (e.g., marital status, mental health symptoms) compared with those who report no cannabis use.

Several limitations of the present study deserve mention. First, analyses were restricted to male participants because of the small number of female veterans in the sample. In addition, data were not available to determine how many individuals in the current sample met criteria for a substance use disorder. Further, additional research on the validity of veteran self-reports is needed, as prior research in this area (e.g., Calhoun et al., 2000) may not apply given the current military and VA climate surrounding substance use. Although many veterans in the present study reported on their substance use, it remains possible that the observed prevalence is an underestimate. In addition, there is a risk of Type I error. Effect sizes (odds ratios) are included to indicate the magnitude of each effect and it is encouraging that results are largely consistent with those found in previous studies. Nevertheless, associations should be replicated in future study.

Despite these limitations, the present study extends previous work by examining the prevalence and correlates of cannabis use among individuals seeking specialty PTSD treatment. It provides some of the first data on cannabis use in this patient group. More work is needed to determine the causes and consequences of cannabis use in this population.

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Table 1

Demographic, Substance Use, and Clinical Characteristics of Cannabis Users and Non-Users

	Full Sample *N* = 719		No Cannabis Use *n* = 614		Past 6-Month Cannabis Use *n* = 105	
Characteristic	***n***	**(%)**	***n***	**(%)**	***N***	**(%)**
Race						
Caucasian	298	(41.4)	253	(41.2)	45	(42.9)
African-American	387	(53.8)	332	(54.1)	55	(52.4)
Other	34	(4.7)	29	(4.7)	5	(4.8)
Era						
Vietnam	526	(73.2)	440	(71.7)	86	(81.9)
Gulf War	76	(10.6)	70	(11.4)	6	(5.7)
OEF/OIF	117	(16.3)	104	(16.9)	13	(12.4)
Marital Status						
Unmarried	307	(42.7)	238	(38.8)	69	(65.7)
Married	412	(57.3)	376	(61.2)	36	(34.3)
Employment						
No	366	(50.9)	307	(50.0)	59	(56.2)
Yes	353	(49.1)	307	(50.0)	46	(43.8)
Smoking Status						
Nonsmoker	420	(58.4)	383	(62.4)	37	(35.2)
Smoker	273	(38.0)	208	(33.9)	65	(61.9)
Other Drug Use						
No	666	(92.6)	589	(95.9)	77	(73.3)
Yes	50	(7.0)	25	(4.1)	25	(23.8)
Violence						
No	431	(59.9)	374	(60.9)	57	(54.3)
Yes	286	(39.8)	238	(38.8)	48	(45.7)

Characteristic	***N***	***M***	**(*SD*)**	***M***	**(*SD*)**	***M***	**(*SD*)**
Age	719	49.99	(10.49)	50.01	(10.49)	49.83	(10.53)
AUDIT Total Score	675	8.11	(9.63)	7.10	(8.89)	14.12	(11.54)

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	Full Sample *N* = 719		No Cannabis Use *n* = 614		Past 6-Month Cannabis Use *n* = 105	
Characteristic	***n***	**(%)**	***n***	**(%)**	***N***	**(%)**
Combat Exposure	703	20.79 (11.16)	20.23	(11.30)	24.10	(9.70)
CAPS Total Score	686	77.13 23.47	76.91	23.46	78.45	23.59
CAPS Reexperiencing	690	19.84 (8.93)	19.87	(8.96)	19.64	(8.77)
CAPS Avoidance	687	31.57 (11.04)	31.19	(11.09)	33.81	(10.49)
CAPS Hyperarousal	687	25.62 (7.17)	25.72	(7.08)	24.99	(7.70)
CAPS Global Severity	588	2.80 (0.75)	2.76	(0.75)	3.02	(0.75)
BDI Total Score	717	30.38 (11.57)	29.78	(11.41)	33.86	(11.91)
Quality of Life	626	−0.07 (2.04)	0.00	(2.06)	−0.47	(1.85)
Suicidality (BDI item 9)	714	0.62 (0.63)	0.60	(0.62)	0.76	(0.66)
Health Problems	652	3.99 (2.82)	4.01	(2.84)	3.86	(2.69)

Note. CAPS = Clinician Administered PTSD Scale

Table 2

Association of Demographic, Substance Use, and Clinical Characteristics with Cannabis Use among Veterans Seeking Help for PTSD

	Unadjusted OR			Adjusted OR		
Characteristic	**OR**	**Wald**	**95% CI**	**OR**	**Wald**	**95% CI**
Age	1.00	0.03	(0.98 – 1.02)	--	--	--
Race						
African-American	0.93	0.11	(0.61 – 1.43)	--	--	--
Other	0.97	0.00	(0.36 – 2.64)	--	--	--
Caucasian	--	--	--	--	--	--
Era						
Gulf War	0.44	3.49	(0.19 – 1.04)	--	--	--
OEF/OIF	0.64	1.99	(0.34 – 1.19)	--	--	--
Vietnam	--	--	--	--	--	--
Combat Exposure[a]	1.44	10.31**	(1.15 – 1.80)	--	--	--
Married	0.33	24.98***	(0.21 – 0.51)	0.32	23.63***	(0.20 – 0.51)
Employed	0.78	1.37	(0.51 – 1.18)	0.74	1.83	(0.48 – 1.15)
Current Smoker	3.24	27.66***	(2.09 – 5.01)	2.98	21.94***	(1.89 – 4.71)
Other Drug Use	7.65	43.72***	(4.19 – 13.98)	8.34	41.58***	(4.38 – 15.89)
AUDIT Total Score[a]	1.84	39.38***	(1.52 – 2.23)	1.88	37.86***	(1.54 – 2.30)
CAPS Total Score[a]	1.07	0.36	(0.86 – 1.33)	0.98	0.02	(0.78 – 1.24)
CAPS Reexperiencing[a]	0.97	0.06	(0.79 – 1.21)	0.89	0.93	(0.71 – 1.13)
CAPS Avoidance[a]	1.29	4.71*	(1.03 – 1.62)	1.19	1.91	(0.93 – 1.51)
CAPS Hyperarousal[a]	0.91	0.87	(0.74 – 1.12)	0.87	1.49	(0.69 – 1.09)
CAPS Global Severity[a]	1.44	9.04**	(1.14 – 1.82)	1.30	4.20*	(1.01 – 1.66)
BDI Total Score[a]	1.43	10.93**	(1.16 – 1.76)	1.41	9.25**	(1.13 – 1.75)
Suicidality (BDI item 9)[a]	1.27	5.84*	(1.05 – 1.55)	1.25	4.63*	(1.02 – 1.54)
Violence	1.32	1.73	(0.87 – 2.01)	1.30	1.40	(0.84 – 2.02)
Health Problems	0.98	0.24	(0.91 – 1.06)	0.98	0.23	(0.90 – 1.06)
Quality of Life[a]	0.80	3.91*	(0.63 – 1.00)	0.82	2.83	(0.65 – 1.03)

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Note. OR = Odds ratio; AOR = Adjusted odds ratio; OEF = Operation Enduring Freedom; OIF = Operation Iraqi Freedom. AOR for each predictor is adjusted for age, race, service era, and combat exposure.

[a] *z*-score

* $p < .05$;

** $p < .01$;

*** $p < .001$.