Cannabis Use Among Military Veterans After Residential Treatment for Posttraumatic Stress Disorder

Marcel O. Bonn-Miller
National Center for PTSD & Center for Health Care Evaluation, VA Palo Alto Health Care System

Anka A. Vujanovic
National Center for PTSD – Behavioral Science Division, VA Boston Healthcare System & Boston University School of Medicine

Kent D. Drescher
National Center for PTSD, VA Palo Alto Health Care System

The present investigation prospectively evaluated whether treatment changes in PTSD symptom severity, among military Veterans in residential PTSD treatment, were related to cannabis use 4 months after discharge from residential rehabilitation. The sample was comprised of 432 male military Veteran patients ($M_{age} = 51.06$ years, $SD = 4.17$), who had a primary diagnosis of PTSD and were admitted to a VA residential rehabilitation program for PTSD. Results demonstrated that lower levels of change in PCL-M scores between treatment intake and discharge were significantly predictive of greater frequency of cannabis use at 4-month follow-up ($p < .05$), even after accounting for the effects of length of treatment stay and frequency of cannabis use during the 2 months before treatment intake. Furthermore, post hoc analyses revealed that less change in PTSD avoidance/numbing and hyperarousal symptom severity during treatment was significantly predictive of a greater frequency of cannabis use at 4-month follow-up, after controlling for relevant covariates. Notably, these effects were specific to cannabis and were not found for the other substances examined among this sample, including alcohol and opiates. Implications of the findings are discussed with regard to the extant literature and future directions.

Keywords: posttraumatic stress disorder, trauma, cannabis, marijuana, relapse, treatment

The prevalence of both posttraumatic stress disorder (PTSD) and cannabis use is high among military Veterans (Bremner, Southwick, Darnell, & Charney, 1996; Calhoun et al., 2000; Institute of Medicine [IOM], 2010; Rosen, Greenbaum, & Fitt, 2008), possibly because of the generally high rates of trauma exposure among this vulnerable population. Indeed, trauma exposure has been identified as a significant predictor of frequent and problematic cannabis use (Kilpatrick et al., 2000; Vlahov et al., 2002). Exposure to multiple types of trauma, furthermore, has been associated with higher rates of cannabis use (Bremner et al., 1996; Kilpatrick et al., 2000; Vlahov et al., 2002); and high prevalence rates have been established for the co-occurrence between PTSD and cannabis use and its disorders (Bonn-Miller, McKellar, Harris, & Trafton, 2010; Bremner et al., 1996; Calhoun et al., 2000).

Although various forms of substance use disorders have been studied among military Veterans (e.g., alcohol use disorder; Finney, Moos, & Timko, 1999), far less attention has been focused on cannabis use and its disorders. This neglect is unfortunate, as cannabis is the most commonly used illicit substance in the United States (SAMHSA, 2009); and it accounts for as much as 25% of primary presenting drug problems (Didcott, Flaherty, & Muir, 1988). Furthermore, increasing rates of cannabis use disorder diagnoses have been documented among military Veterans (Bonn-Miller, McKellar et al., 2010), who also endorse high rates of trauma exposure and PTSD (Hoge et al., 2004; IOM, 2010; McFall, Mackay, & Donovan, 1992; Reifman & Windle, 1996; Rosen et al., 2008). These findings underscore the clinical relevance of broadening our understanding of the nature of cannabis use among PTSD populations so as to better inform interventions for individuals with these co-occurring problems.

Indeed, trauma-exposed individuals (both those with and without PTSD) have been identified as a particularly vulnerable population in terms of relapse to cannabis use after a period of discontinuation (Bonn-Miller, Babson, Vujanovic, & Feldner, 2010; Bonn-Miller, Vujanovic, Feldner, Bernstein, & Zvolensky, 2007; Bonn-Miller et al., 1996). Furthermore, extant empirical work...
on (clinical and subclinical) posttraumatic stress and cannabis use has suggested that: (1) higher levels of PTSD symptoms are associated with greater frequency of cannabis use (Bremner et al., 1996), (2) greater (subclinical) posttraumatic stress symptom severity is significantly related to increased cannabis use for coping reasons (Bonn-Miller et al., 2007), and (3) hyperarousal symptoms, as well as sleep problems, among those with PTSD, may be primary mechanisms driving coping-oriented cannabis use (Bonn-Miller, Babson et al., 2010; Bremner et al., 1996). Theoretically, cannabis may be used by individuals with PTSD in an attempt to cope with or control PTSD symptoms (i.e., self-medication, Khantzian, 1985, 1997); thus, cannabis discontinuation may be especially difficult for these individuals because of the potentially short-term anxiolytic effects of cannabis in attenuating PTSD-relevant symptoms, such as anxious arousal or sleep disturbance.

Together, extant work shows promise in terms of advancing our understanding of the association between PTSD and cannabis use, but this literature is limited in at least four key ways. First, there has yet to be an a priori prospective, longitudinal examination of the relation between PTSD symptoms and cannabis use. Although the literature suggests that decreased PTSD symptoms might be related to decreased substance use (e.g., Stewart, Conrad, Pihl, & Dongier, 1999), no studies have examined these associations prospectively with a specific focus on cannabis use. Second, the available literature has neglected to examine cannabis use among more difficult-to-treat inpatient/residential PTSD populations, as it has focused moreso upon community and outpatient clinical samples. Third, recent investigations have documented associations between lower levels of PTSD symptoms and improved substance use outcomes (e.g., abstinence), broadly (Ouimette, Read, Wade, & Tirone, 2010; Read, Brown, & Kahler, 2004), but no investigation to date has examined associations between PTSD symptoms and cannabis use, specifically. Finally, no studies to date have conducted an a priori examination of the associations between PTSD and cannabis use among samples of military Veterans, a particularly vulnerable population worthy of increased clinical research efforts to drive improvement and refinement in mental health services, including treatments of PTSD and substance use disorders (IOM, 2010; U.S. Government Accountability Office [GAO], 2010).

The overarching aim of the present investigation was to address these noted gaps in the literature and prospectively evaluate whether treatment changes in PTSD symptom severity, among military Veterans seeking residential PTSD treatment at a Department of Veterans Affairs (VA) Medical Center, were related to cannabis use 3 months after discharge from residential treatment. Specifically, it was hypothesized that lower levels of change in PTSD symptom severity between treatment intake and discharge would significantly predict higher frequency of cannabis use at 4-month posttreatment follow-up. Second, to examine patterns of substance use specificity, relations between changes in PTSD symptom severity and posttreatment substance use rates (i.e., 4-month follow-up) were examined for two additional substance use classes (alcohol and opiates) identified to co-occur with PTSD at high rates (Chilcoat & Menard, 2003; Cottler, Compton, Mager, Spitznagel, & Janca, 1992; Kessler, Sonnega, Bromet & Hughes, 1995; McFall et al., 1992; Stewart, 1996).

Method

Participants

The current study sample was comprised of 432 male military Veteran patients (M_age = 51.06 years, SD = 4.17) admitted to a male-only VA residential rehabilitation program for PTSD, between 1994 and 2000. The average length of stay for an individual in the program was 69.86 (SD = 22.48) days. All Veterans had a primary diagnosis of PTSD, as determined by program staff. In cases where individuals had more than one admission, data from the first consenting admission were used. With regard to the racial/ethnic composition of the sample, slightly more than half of the patients identified as White (56.9%); and the remaining patients identified as Hispanic/Latino American (14.1%), African American (13.9%), Mixed Ethnicity (6.9%), Native American (5.3%), Asian/Pacific Islander (1.6%), and “Other” (1.2%).

This PTSD residential rehabilitation program admits clinician-referred military Veterans with severe PTSD symptoms that have not been successfully ameliorated with outpatient treatment. Exclusion criteria for enrollment in the residential program included current psychotic symptoms, substance use within 15 days of start of treatment, and medical conditions with high probability of significantly interfering with or preventing psychological treatment (i.e., those unable to move about independently). Information regarding Axis-I diagnoses co-occurring with PTSD was not collected for the entire sample. A previous study that published data from this residential PTSD program (Drescher, Rosen, Burling, & Foy, 2003) noted a high lifetime prevalence of co-occurring psychological conditions among patients, such as depression (81.2%), alcohol dependence (67.2%), and drug dependence (49.9%).

Measures

Demographic information (i.e., patient age, gender, and ethnicity) as well as war zone trauma exposure data were collected at treatment intake. Questions about war zone trauma exposure included whether patients had (1) witnessed incoming fire, (2) witnessed or participated in atrocities, or (3) been held as prisoners of war.

The PTSD Checklist – Military Version (PCL-M; Weathers et al., 1993) was used to measure PTSD symptom severity at two time points: treatment intake and treatment discharge. The PCL-M includes 17 items that correspond to the 17 DSM-IV (American Psychiatric Association [APA], 1994) symptoms of PTSD. Respondents are asked to indicate the degree to which they have been bothered by each of the 17 symptoms, within the past month, using a 5-point Likert-type scale (1 = not at all bothered to 5 = extremely bothered). The PCL-M is most frequently scored as a continuous measure with the total score (sum of 17 items) reflective of global PTSD symptom severity. Additionally, the three subscales of the PCL-M, corresponding to the three identified DSM-IV PTSD symptom clusters (Re-experiencing, Avoidance/Numbing, and Hyperarousal), were calculated by summing the PCL-M item scores corresponding to each symptom cluster. The PCL-M has excellent psychometric properties, including high internal consistency, good test–retest reliability, and strong convergent validity (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996; Ruggiero, Del Ben, Scotti, & Rabalais, 2003). In the current...
study, the variable indexing change in PTSD symptom severity was calculated as the difference in PCL-M scores (treatment intake minus treatment discharge).

The Northeast Program Evaluation Center (NEPEC) survey was used to assess substance use at intake and follow-up (Fontana and Rosenheck, 1997; Hartl, Rosen, Drescher, Lee, & Gusman, 2005; McFall et al., 1999). Here, NEPEC survey items pertaining to substance use were drawn from the Addiction Severity Index (McLellan et al., 1992). The use of the following substances was measured with the NEPEC survey: cannabis, alcohol, cocaine, opiates, and amphetamines. Patients reported on the number of days that they used up to 5 different substances in the (1) 2 months before their intake assessment as well as (2) 1 month before their follow-up assessment. A 2-month window was used for their intake assessment because substance use abstinence was required 15 days before intake (see Participants section above).

Procedure

All participants completed study measures at three time-points: (1) treatment intake (i.e., during the first week of treatment), (2) treatment discharge (i.e., during the final week of treatment), and (3) 4-month follow-up (i.e., during the 30 days before the 4-month posttreatment discharge date). Patients completed the PCL-M at treatment intake and treatment discharge. Patients completed the NEPEC survey at treatment intake and at the 4-month follow-up assessment. The participants sampled by this protocol were male Veterans admitted for PTSD treatment at the residential rehabilitation programs of the VA Palo Alto Healthcare System. In the context of the residential rehabilitation program, PTSD treatment was provided exclusively in group format, mostly using a cognitive behavioral framework. Though no specific substance abuse treatment was provided within the residential rehabilitation program, relapse prevention groups were embedded into the program, and patients with substance abuse histories were encouraged to attend regular 12-step self-help group meetings outside of the treatment program. The 4-month follow-up assessment was administered by mail. Mailings were sent to patients 3 months posttreatment discharge and received by program staff by the month before their intake assessment as well as (2) 1 month before their follow-up assessment. A 2-month window was used for their intake assessment because substance use abstinence was required 15 days before intake (see Participants section above).

Data Analytic Approach

First, descriptive frequency analyses were conducted to determine prevalence rates of follow-up cannabis use among pretreatment cannabis users (i.e., rates of relapse; n = 35), as well as prevalence rates of follow-up cannabis use among non-pretreatment cannabis users (i.e., rates of ‘initiation,’ defined as cannabis use among those who did not report using cannabis during the 2 months before treatment intake; n = 397). Second, among the entire sample (n = 432), correlations among the predictor (i.e., PCL-M change score between treatment intake and discharge) and criterion variables (i.e., substance use frequencies at 4-month follow-up) were examined. Third, among the entire sample (n = 432), three hierarchical linear regression analyses were conducted to evaluate associations between change in PTSD symptom severity (i.e., computed as the symptom severity difference between treatment intake and discharge) and substance use at 4-month follow-up (i.e., substance use during the 30 days before the 4-month posttreatment discharge date). Here, separate analyses were conducted for each of the 3 substance classes (i.e., cannabis, alcohol, and opiates). In each analysis, length of treatment stay and respective substance use frequency during the 2 months before residential treatment intake were included as covariates. Finally, among the entire sample (n = 432), post hoc analyses were conducted to determine the predictive validity of specific DSM-IV PTSD symptom clusters (i.e., re-experiencing, avoidance/numbing, hyperarousal) with regard to cannabis use at 4-month follow-up.

Results

Participant Characteristics

In terms of substance use during the 2 months before treatment intake, 23.1% (n = 100) of patients reported alcohol use, 8.1% (n = 35) reported cannabis use, 3.0% (n = 13) reported opiate use, 2.1% (n = 9) reported cocaine use, and 1.9% (n = 8) reported amphetamine use. In terms of substance use at 4-month follow-up, 31.9% (n = 138) of patients reported alcohol use, 13.7% (n = 59) reported cannabis use, 4.9% (n = 21) reported opiate use, 3.0% (n = 13) reported cocaine use, and 1.6% (n = 7) reported amphetamine use. In terms of combat-related trauma exposure, 99.3% (n = 429) of patients served in a war zone, 98.1% (n = 424) witnessed incoming fire, 65.3% (n = 282) witnessed or participated in atrocities, and 0.9% (n = 4) were held as prisoners of war. In terms of PTSD symptom severity, the mean PCL-M score at treatment intake was 66.89 (SD = 10.88), while the mean PCL-M score at treatment discharge was 63.72 (SD = 13.54). Here, no differences between patients identified as cannabis or noncannabis users during the 2 months before treatment intake were observed in terms of either intake, F(1, 430) = 1.90, p > .10 or discharge, F(1, 430) = 0.84, p > .10 PCL-M scores.

Prevalence of Cannabis Relapse and Initiation

First, prevalence of posttreatment cannabis use was examined among patients who reported cannabis use within the 2-months before treatment onset (n = 35; 8.1% of the total sample) to examine relapse to cannabis use. These patients reported using cannabis, on average, 16.17 (SD = 11.22) days during the month before the required pretreatment substance use abstinence. Analyses revealed that 54.3% (n = 19) of patients, who reported using cannabis before treatment, relapsed to cannabis use during the 4 months after residential PTSD treatment (average length of stay = 69.91 days, SD = 22.83). Those patients who relapsed to cannabis use reported using cannabis a mean of 11.63 (SD = 19.0) days during the 4-month follow-up assessment.

Second, prevalence of posttreatment cannabis use was examined among individuals who reported no pretreatment cannabis use (i.e., no cannabis use during the 2 months before treatment intake; n = 397), to examine rates of posttreatment cannabis ‘initiation.’ Analyses revealed that 10.1% (n = 40) of individuals, who had not used cannabis within the 2-months before PTSD residential treatment, reported use during the 4-months after residential PTSD treatment (average length of stay = 69.94, SD = 22.48). Those patients who
reported 'initiating' cannabis use, reported using cannabis for an average of 9.88 (SD = 10.20) days during the month before follow-up assessment.

Zero-Order Correlations

Table 1 presents zero-order correlations among continuous variables. Individuals with lower levels of change in PCL-M scores during the course of treatment reported significantly greater frequency of cannabis use during the 30 days before the 4-month follow-up assessment (r = -.12, p < .05). Change in PCL-M scores during treatment was not associated with the frequency of use of any other substance at 4-month follow-up (p > .10).

Hierarchical Regression Analyses

First, change in PCL-M scores between treatment intake and discharge was examined in relation to the frequency of cannabis use during the 30 days before 4-month follow-up. At step one of the regression, frequency of cannabis use during the 2-months before treatment intake significantly predicted follow-up cannabis use (β = -.27; p < .01), while length of treatment stay did not (β = -.03; p > .10). Step two of the regression revealed that lower levels of change in PCL-M scores between treatment intake and discharge were significantly predictive of greater frequency of cannabis use during the 30 days before 4-month follow-up (β = -.11; p < .05), above and beyond the variance accounted for by the covariates at step one of the model.

As suggested by the zero-order correlations (see Table 1), regression analyses revealed that change in PCL-M scores was not a significant predictor of alcohol (β = .04; p > .10) or opiate (β = -.07; p > .10) use during the 30 days before 4-month follow-up, above the variance accounted for by length of treatment stay and respective substance use during the 2-months before treatment intake.

Post Hoc Analyses

A set of post hoc analyses was conducted to determine whether changes in certain PTSD symptom clusters (e.g., hyperarousal), during residual PTSD treatment, were predictive of cannabis use at the 4-month follow-up. Three separate hierarchical linear regressions were conducted, identical in design to the primary regression analyses, with the global PCL-M change score predictor replaced with (1) change in PCL-M re-experiencing symptoms (PTSD Criterion B), (2) change in PCL-M avoidance/numbing symptoms (PTSD Criterion C), or (3) change in PCL-M hyperarousal symptoms (PTSD Criterion D). All regression results reported below refer to the incremental predictive validity of each respective symptom cluster, above and beyond the statistically significant contribution of frequency of cannabis use during the 2-months before treatment intake and statistically nonsignificant contribution of length of treatment stay, entered at step one of the model (see primary analysis above).

In terms of PTSD re-experiencing symptoms (Criterion B), step two revealed that change in PTSD re-experiencing symptom severity was not significantly incrementally predictive of cannabis use during the 30 days before 4-month follow-up at step 2 (β = -.09; p = .07), though a trend toward significance was evident. In terms of PTSD avoidance/numbing symptoms (Criterion C), step two revealed that change in PTSD avoidance/numbing symptom severity (i.e., lower levels of symptom change between treatment intake and discharge) was significantly predictive of greater frequency of cannabis use during the 30 days before 4-month follow-up (β = -.11; p < .05), above and beyond the variance accounted for by the covariates at step one of the model. Finally, in terms of PTSD hyperarousal symptom severity (Criterion D), step two revealed that change in severity of hyperarousal symptoms (i.e., lower levels of change in between treatment intake and discharge) was significantly predictive of greater frequency of cannabis use during the 30 days before 4-month follow-up (β = -.09; p = .05), above and beyond the variance accounted for by the covariates at step one of the model.

Discussion

The present investigation examined substance use patterns after treatment discharge among military Veterans who participated in a PTSD residential rehabilitation program at a VA medical center. Results were consistent with the primary hypothesis. Change in symptom severity between treatment intake and discharge was incrementally predictive of cannabis use frequency at 4 months after discharge. These effects were observed above and beyond the covariates of length of treatment stay and reported pretreatment cannabis use. Thus, military Veterans who experienced lower levels of change in PTSD symptom severity during the course of residential treatment for PTSD were more likely to use cannabis after discharge from treatment. This extends past empirical work (Bonn-Miller & Moos, 2009; Bonn-Miller et al., 2007; Bremner et al., 2009).

1 Analyses were re-conducted with the inclusion of follow-up alcohol, opiate, cocaine, and amphetamine use as covariates at Step 1 of the regression so as to account for the impact of co-occurring substance use on cannabis use at 4-month follow-up. Though both follow-up alcohol (β = .18; p < .01) and cocaine (β = .16; p < .01) use were significant predictors of follow-up cannabis use at Step 1 of the model, lower levels of change in PCL-M scores between treatment intake and discharge remained significantly predictive of greater frequency of cannabis use during the 30 days before 4-month follow-up (β = -.12; p < .01), at Step 2.

2 Though data on cocaine and amphetamine use was collected in the current study and correlations suggest no relation between change in PCL-M scores and cocaine and amphetamine use during the 30 days before 4-month follow-up (see Table 1), because there were such a low number of cocaine and amphetamine users at 4-month follow-up, there was not sufficient power to conduct regression analyses with these substance use classes.

3 As researchers have suggested a four-factor model for PTSD symptoms that splits DSM-IV (APA, 1994) Criterion C (avoidance/numbing) into two separate factors (i.e., effortful avoidance and emotional numbing; King et al., 1998), the post hoc analysis with Criterion C as the predictor was re-conducted as two separate regression analyses, with avoidance as one predictor (comprised of 2 items from the PCL-M: King et al., 1998) and numbing as the second predictor (comprised of 5 items from the PCL-M: King et al., 1998). Analyses revealed that, at step two of the model, less treatment change in the severity of PTSD numbing symptoms (β = -.11; p < .05), but not avoidance symptoms (β = -.08; p > .05), was significantly predictive of greater frequency of cannabis use during the 30 days before 4-month follow-up, above and beyond the variance accounted for by the covariates at step one of the model.
al., 1996) via the examination of the predictive associations between levels of change in PTSD symptoms during treatment and cannabis use 4-months after treatment discharge. Notably, these findings document these effects prospectively, and among military Veterans enrolled in residential PTSD treatment, an especially difficult-to-treat population. Indeed, it is plausible that Veterans who exhibited lower levels of change in PTSD symptom severity were experiencing high levels of PTSD symptoms throughout treatment (and at discharge), as indicated by the mean PCL-M scores reported by the current sample (intake: $M = 66.89, SD = 10.88$; discharge: $M = 63.72, SD = 13.54$). Thus, these Veterans might have engaged in cannabis use after treatment as an alternative method of coping (e.g., self-medication; Khantzman, 1997). Future work might benefit from examining this possibility and the pertinence of potential mediating mechanisms (e.g., distress tolerance) underlying such instances of relapse/initiation to cannabis use.

In addition, post hoc analyses were conducted to determine the specific effects of particular PTSD symptom clusters with regard to posttreatment cannabis use frequency. Here, less change in PTSD avoidance/numbing and hyperarousal symptom severity during treatment demonstrated significant incremental predictive effects with regard to cannabis use at 4-month follow-up. When the PTSD avoidance and numbing symptom clusters were examined individually (King et al., 1998; please see Footnote 3), results suggested a unique predictive effect for the PTSD numbing symptom cluster and not the avoidance cluster. These findings might suggest that higher levels of PTSD numbing symptoms (e.g., emotional detachment), and not avoidance symptoms, may be a risk factor for increased cannabis use over time. Indeed, cannabis may be used by these Veterans in an effort to emotionally numb negative trauma-related emotions. Further replication of this work is necessary to re-evaluate the predictive validity of PTSD avoidance cluster symptoms with regard to cannabis use. Similarly, these findings replicate those of Bremner et al. (1996), who documented the self-reported effects of cannabis use on decreasing PTSD symptoms of hyperarousal among a Veteran sample. Thus, military Veterans with PTSD, who experience elevated levels of hyperarousal symptoms (e.g., irritability, sleep disturbance, exaggerated startle response), may be especially likely to use cannabis. Indeed, these Veterans may be using cannabis to down-regulate hyperarousal symptoms (Bonn-Miller et al., 2007; Bonn-Miller, Babson et al., 2010) or to aid in avoidance of trauma-related reminders, consistent with the self-medication hypothesis (Khantzman, 1985, 1997). Future work might further extend these findings by specifying the reasons why military Veterans use or relapse to using cannabis after PTSD treatment.

Finally, these data demonstrated a substance specificity effect, such that lower levels of change in PTSD symptom severity during treatment were only predictive of cannabis use at the 4-month follow-up. When other substance use patterns (i.e., alcohol and opiates) were examined, change in PTSD symptom severity was not incrementally predictive of any noncannabis substance use, after accounting for the effects of length of treatment stay and respective substance use during the 2-months before treatment intake. These data are surprising as prior work has shown PTSD to be related to high rates of alcohol and opiate use (Chilcoat & Menard, 2003; Cottler, Compton, Mager, Spitzenegel, & Janca, 1992; Kessler, Sonnega, Bromet, & Hughes, 1995; McFall et al., 

### Table 1

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*p < .05, **p < .01, F/U = Follow-up*
1992; Stewart, 1996). It is possible that assessing patients only 4-months after discharge did not allow enough time for the use of other substances to develop. Here, cannabis may be more likely to be used initially after treatment, while other substance use may develop later on. It is important for future work to replicate and extend these findings by assessing patients’ substance use patterns for longer posttreatment durations.

Notably, although it was not a primary aim of the present study, analyses revealed that 10.1% (n = 40) of individuals, who had not used cannabis within the 2-months before PTSD residential treatment, reported use at 4-months after completion of residential PTSD treatment. Those patients who reported ‘initiating’ cannabis use, reported using cannabis for an average of 9.88 (SD = 10.20) days during the month before follow-up assessment. Additionally striking is that 54.3% (n = 19) of patients who used cannabis before treatment, relapsed during the 4-months after discharge. Here, average use of cannabis by those who ‘relapsed’ during the month before 4-month follow-up was slightly higher than among those who reported ‘initiating’ use. Thus, it seems that cannabis might be a substance that is either (a) perceived by Veterans with PTSD as especially helpful for management of PTSD symptoms, even among those who have not recently used the drug; or (b) perceived by Veterans with PTSD as a more acceptable (alternative) substance to use after discontinuing other alcohol or drug use.

Taken together, these findings put forth at least two important clinical implications. First, it is important for future research to determine the perceived and/or actual benefits as well as the possibly detrimental effects of cannabis use among Veterans with PTSD. Given the increased use of cannabis for the treatment of chronic pain as well as PTSD in certain states within the U.S. (e.g., California; Center for Medicinal Cannabis Research, 2010), this area of study is important from both treatment and public health perspectives. Second, gaining further understanding of the motives for cannabis use among individuals with PTSD might facilitate this line of inquiry. Here, further identifying factors that are associated with a reduction in coping-oriented cannabis use among those who have experienced trauma (e.g., nonjudgmental acceptance; Bonn-Miller, Vujanovic, Twohig, Medina, & Huggins, 2010) may aid in the treatment of cannabis use disorders among those with PTSD.

The present investigation has several limitations to be considered as interpretive caveats. First, the full diagnostic composition of patients was not documented, as a full battery of structured diagnostic interviews was not administered to this clinical, treatment-seeking sample. It is possible that differences in the number, type, or severity of co-occurring Axis-I or Axis-II diagnoses may have accounted (at least partially) for the findings. Thus, it is important for future research to replicate and extend the current results, using a more structured assessment methodology, to ascertain the specificity of these effects to PTSD. Second, PTSD symptom severity and substance use were assessed using the well-established PCL-M and NEPEC surveys, both self-report indices. Additionally, all data in the present study were collected by the same institution that both treated and was responsible for the determination of benefits (e.g., service connected status) for the present sample, highlighting the potential for Veteran bias in reporting symptoms and substance use behaviors. Future work would benefit from extending these findings by conducting third-party assessment via semi-structured interviews, such as the Clinician-Administered PTSD Scale for DSM-IV (Blake et al., 1995) and Addiction Severity Index (McLellan et al., 1992), to more accurately and definitively assess symptoms of PTSD and substance use and its disorders over time. Third, only combat trauma exposure was assessed among patients enrolled in the PTSD residential rehabilitation program. Future research might also more comprehensively assess trauma exposure history so as to provide a more comprehensive picture of how trauma exposure severity might relate to cannabis use, specifically, and substance use, more generally (e.g., Kilpatrick et al., 2000). Fourth, the current study was comprised of an entirely male Veteran sample and data were collected over 10 years ago. It is possible that the current findings are not applicable to women or Veterans of more recent conflicts (e.g., OEF/OIF). Future research should extend the present findings to a more gender diverse sample, while also collecting data on era of service so as to better describe the studied population and assure the inclusion of Veterans from recent conflicts. Finally, an ongoing challenge to research on cannabis use involves attaining reliable and valid measures of this drug behavior (Stephens, 1999). Though the measure used to determine cannabis use (and substance use more broadly) has been used in prior literature, future research would benefit from the assessment of severity of substance use (e.g., substance abuse and dependence, number of substance use occasions per day, drug potency).

Overall, the present investigation extended past work by utilizing a prospective, longitudinal design to examine the association between treatment changes in PTSD symptom severity and cannabis use frequency after discharge from a residential PTSD program. This study builds on past work, while also illuminating avenues for future study on this clinically important topic with significant public health relevance.

References


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