U.S. Department of Veterans Affairs

Public Access Author manuscript

Suicide Life Threat Behav. Author manuscript; available in PMC 2018 April 09.

Published in final edited form as:

Suicide Life Threat Behav. 2018 April ; 48(2): 140–148. doi:10.1111/sltb.12345.

The Impact of Cannabis Use Disorder on Suicidal and Nonsuicidal Self-Injury in Iraq/Afghanistan-Era Veterans with and without Mental Health Disorders

Nathan A. Kimbrel^{a,b,c,*}, Eric C. Meyer^{d,e,f}, Bryann B. DeBeer^{d,e,f}, Suzy B. Gulliver^g, and Sandra B. Morissette^h

^aDurham Veterans Affairs Medical Center, Durham, NC, USA

^bVA Mid-Atlantic Mental Illness Research, Education, and Clinical Center; Durham, NC, USA

^cDuke University Medical Center, Durham, NC, USA

^dVISN 17 Center of Excellence for Research on Returning War Veterans, Waco, Texas, USA

^eCentral Texas Veterans Health Care System, Temple, Texas, USA

^fTexas A&M University Health Science Center, College Station, Texas, USA

^gWarriors Research Institute, Baylor, Scott & White Healthcare System, Waco, TX, USA

^hThe University of Texas at San Antonio, San Antonio, TX, USA

Abstract

The objective of the present study was to assess the association between cannabis use disorder (CUD) and self-injury among veterans. As expected, after adjusting for sex, age, sexual orientation, combat exposure, traumatic life events, traumatic brain injury, posttraumatic stress disorder, depression, alcohol use disorder, and non-cannabis drug use disorder, CUD was significantly associated with both suicidal ($OR=3.10$, $p=0.045$) and nonsuicidal ($OR=5.12$, $p=0.009$) self-injury. CUD was the only variable significantly associated with self-injury in all three models examined. These findings are consistent with prior research among civilians and suggest that CUD may also increase veterans' risk for self-injurious behavior.

Keywords

Nonsuicidal self-injury; suicide; suicide attempts; posttraumatic stress disorder; depression; veterans

Cannabis is the most widely used illicit drug in the world (Curran et al., 2016; Hoch et al., 2015; Sherman & McRae-Clark, 2016; United Nations, 2014). It is currently being legalized for medicinal and recreational use in many areas, including the United States, where 27 states and the District of Columbia have now legalized some form of cannabis use (Sherman & McRae-Clark, 2016). Despite the strong political push for legalization of cannabis, many

*Correspondence concerning this article should be sent to: Dr. Nathan A. Kimbrel, Durham Veterans Affairs Medical Center, 508 Fulton Street, Durham, NC, 27705. Phone: (919) 286-0411, ext. 6759. Nathan.Kimbrel@va.gov.

questions and concerns have been raised regarding the safety of the drug, as heavy cannabis use has been associated with an array of physical and mental health problems, including pulmonary problems, cognitive impairment, lower levels of educational attainment, unemployment, and increased risk for mental health disorders, such as cannabis use disorder (CUD) and psychotic disorders (e.g., Borges et al., 2016; Curran et al., 2016; Gentes et al., 2016; Goldman et al., 2010; Hoch et al., 2015; Joshi et al., 2014; Sherman & McRae-Clark, 2016).

One area of research particularly important to the debate concerning cannabis legalization is the relationship between heavy cannabis use and self-injury. There has been only limited research on this association to date (e.g., Borges et al., 2016; Giletta et al., 2012; Moller et al., 2012), none of which has focused on veterans with mental health disorders—a population known to be at markedly increased risk for both suicidal and nonsuicidal self-injury (e.g., Bullman & Kang, 1994; Kimbrel et al., 2014a, 2014b, 2016a, 2016b). The present study aimed to address this gap in the literature by conducting the first comprehensive assessment of the association between CUD and self-injury among veterans with and without mental health disorders.

Cannabis Use and Self-injury in Civilians

The limited research focused on heavy cannabis use and self-injury to date has largely focused on civilians. For example, Borges and colleagues (2016) recently identified six studies examining the association between heavy cannabis use and suicide attempts. As expected, meta-analysis revealed that heavy cannabis use was associated with increased risk for suicide attempts ($OR = 3.20$, 95% CI: 1.72 – 5.94); however, examination of the included studies reveals a lack of diversity in sample selection (e.g., a lack of clinical samples with a variety of mental health diagnoses, lack of veteran samples) and heavy reliance on self-report of cannabis use and suicidal behavior. Similar concerns can be raised in relation to the literature on cannabis use and nonsuicidal self-injury, which refers to the intentional destruction of one's own body tissue without conscious suicidal intent for reasons that are not socially sanctioned (Chapman et al., 2006; Kimbrel et al., 2015a, 2016a). Nonsuicidal self-injury is associated with significant clinical distress and functional impairment (e.g., Gratz et al., 2015; Selby et al., 2012, 2015) and has been repeatedly demonstrated to increase patients' risk for suicidal self-injury (e.g., Bryan et al., 2015; Kimbrel et al., 2014a, 2015a, 2016a; Klonsky, 2011). Thus, nonsuicidal self-injury is an important form of self-injury to study in its own right (e.g., Gratz et al., 2015; Selby et al., 2012, 2015), even though it is often overlooked, particularly among men (Kimbrel et al., in press).

The majority of the work examining the association between cannabis use and nonsuicidal self-injury has been survey research conducted within community samples. Giletta and colleagues (2012) used surveys to examine the relationship between cannabis use and nonsuicidal self-injury in three community samples of adolescents from Italy, the Netherlands, and the United States. Across samples, they found that cannabis use was positively associated with nonsuicidal self-injury ($OR = 1.69$, 95% CI: 1.13–2.53); however, this study was limited by its reliance on self-report questionnaires of cannabis use and nonsuicidal self-injury and its failure to statistically control for the effects of other mental

health disorders (e.g., posttraumatic stress disorder) in the analyses. Moller and colleagues (2012) extended this line of research by examining the association between cannabis use and nonsuicidal self-injury in a large, representative sample of Australian adults. While this study did rely on self-report questionnaires of cannabis use and nonsuicidal self-injury, it found that current cannabis use was associated with significantly increased risk for nonsuicidal self-injury ($OR = 1.77$, 95% CI: 1.09–2.87), even after accounting for the effects of a wide range of covariates associated with nonsuicidal self-injury, such as gender, sexual orientation, psychological distress, history of abuse, alcohol use, and other drug use.

Cannabis Use and Self-injury in Veterans

Taken together, the findings from the literature reviewed above suggest that cannabis use is likely to be associated with increased risk for both suicidal and nonsuicidal self-injury in civilians. Unfortunately, the association between cannabis use and self-injury has been largely overlooked among veterans to date. The lack of research on this topic is surprising, given that a recent study found that rates of CUD had increased by over 50% among veterans who received their care from the Veterans Affairs (VA) Health Care System between 2002 and 2009 (Bonn-Miller et al., 2012). Other recent studies have shown that veterans with PTSD, depression, and other mental health disorders are at elevated risk for both suicidal (e.g., Kimbrel et al., 2014b e.g., Kimbrel et al., 2016b) and nonsuicidal self-injury (Kimbrel et al., 2014a, 2015a, 2016a). However, to our knowledge, no study has examined the relationship between CUD and self-injury in veterans to date, although one recent study did find that self-reported cannabis use was positively associated with self-reported suicidal ideation in a large sample of male veterans seeking treatment for PTSD (Gentes et al., 2016). This study did not, however, evaluate the relationship between cannabis use and actual self-injury (i.e., actual suicide attempts or nonsuicidal self-injury).

Study Objective and Hypothesis

The objective of the present study was to address this critical gap in the literature by conducting the first comprehensive assessment of the association between CUD and self-injury among veterans with and without mental health disorders using well-validated clinical interviews to assess self-injury, CUD, and other relevant mental health disorders. Consistent with recent findings in civilians (e.g., Borges et al., 2012; Giletta et al., 2012; Moller et al., 2012), we hypothesized that CUD would be significantly associated with both suicidal and nonsuicidal self-injury behavior in veterans, even after statistically controlling for known risk factors for self-injury, such as sex, sexual orientation, age, combat exposure, traumatic life events, traumatic brain injury (TBI), PTSD, depression, alcohol use disorder, and non-cannabis drug use disorder.

Methods

Participants

Participants included 292 Iraq/Afghanistan-era veterans who participated in a larger study aimed at examining predictors of post-deployment functional impairment. Study recruitment and selection criteria have been described in detail previously (Kimbrel et al., 2016a

Kimbrel et al., 2016b). The primary inclusion criterion to participate in the larger study was Iraq/Afghanistan-era veteran status. In general, participants with and without mental disorders were eligible to participate, as long as they did not meet criteria for bipolar disorder or psychosis. Participants receiving mental health treatment were required to be on a stable treatment plan at the time of the assessment and be willing to complete all study procedures. Finally, to be eligible for the current analyses, participants had to have complete data available concerning their lifetime history of self-injury. After applying these criteria, 292 participants were eligible for inclusion in the present analyses.

Participants were recruited through advertisements, presentations to hospital staff, and recruitment letters targeting Iraq/Afghanistan-era veterans with and without mental health diagnoses (e.g., PTSD, depression), with the exception of bipolar disorder and psychosis. All participants were Iraq/Afghanistan-era veterans ($N=292$). Fifty-seven percent of participants ($n=166$) were White/Caucasian; 33% ($n=97$) were Black/African American; 20% ($n=57$) were Latino; 94% ($n=275$) were heterosexual; 33% ($n=95$) were female. Participants' mean age was 38.7 ($SD=9.8$) years. The majority of participants (85%; $n=249$) had served in the U.S. Army.

Procedures

Following informed consent, participants completed a battery of clinical interviews and self-report measures. Interviews were conducted by clinical psychologists and masters-level assessment technicians, all of whom underwent extensive training procedures. In addition, all interviews and diagnostic conclusions were reviewed by diagnostic review groups led by experienced clinical psychologists. Diagnostic consensus was reached in each case. Hair samples were obtained from all participants to validate self-reported drug use, of which 10% were analyzed to validate drug use status.

Measures

Self-injury was assessed with the Columbia Suicide Severity Rating Scale (CSSRS; Posner et al., 2011). Nonsuicidal self-injury was operationalized as any form of nonsuicidal self-directed violence (e.g., cutting one's wrist without any conscious suicidal intent), whereas suicidal self-injury was defined as any type of self-directed violence in which the person's intent was to end their own life (e.g., cutting one's wrist with conscious suicidal intent). Note that only actual suicide attempts were included in the suicidal self-injury category examined in the present analyses (i.e., interrupted and aborted suicide attempts were not included in the calculation of this variable). The more general category of any form of self-injury was defined as lifetime history suicidal and/or nonsuicidal self-injury.

Lifetime PTSD was diagnosed with the Clinician Administered PTSD Scale for DSM-IV (CAPS-IV; Blake et al., 1995). The Structured Clinical Interview for DSM-IV (SCID-IV; First et al., 1994) was used to diagnose lifetime depression, CUD, alcohol use disorder, and non-cannabis drug use disorder. Substance dependence and abuse diagnoses were combined to create substance use disorder variables for each substance examined. Thus, participants who met criteria for cannabis abuse or dependence were coded as having CUD. No discrepancies were identified between self-reported cannabis use and verification based on

hair sample testing. TBI was assessed with a clinician administered TBI interview (Vasterling, 2008); combat exposure was assessed with the Critical Warzone Experiences Scale (CWE; Kimbrel et al., 2014b); cumulative number of lifetime traumatic experiences was indexed by the total score on the Traumatic Life Events Questionnaire (TLEQ; Kubany et al., 2000).

Data Analysis Plan

Chi-square tests examined the bivariate associations between CUD and self-injury. For these and all other analyses, we separately examined the association between CUD and (a) any form of self-injury (b) suicidal self-injury, and (c) nonsuicidal self-injury. Adjusted and unadjusted logistic regression models were conducted to further evaluate the hypothesized association between CUD and self-injury. Adjusted logistic regression models included variables that have been previously associated with self-injury, such as sex (male=0; female=1), sexual orientation (0=heterosexual; 1=non-heterosexual), age, PTSD, depression, alcohol use disorder, non-cannabis drug use disorder, TBI, combat exposure, and trauma history.

Results

Approximately 13% ($n=37$) of the veterans interviewed with the CSSRS had engaged in at least one form of self-injury during their lifetime. Among veterans who had engaged in some form of self-injury, 19% ($n=7$) had engaged in nonsuicidal self-injury only; 51% ($n=19$) had engaged in suicidal self-injury only; and 30% ($n=11$) had engaged in both nonsuicidal and suicidal self-injury. With respect to lifetime psychiatric diagnoses, 14% ($n=42$) met criteria for CUD, 45% ($n=131$) met criteria for alcohol use disorder, 9.6% ($n=28$) met criteria for non-cannabis drug use disorder, 50% ($n=145$) met criteria for PTSD, 46% ($n=133$) met criteria for major depressive disorder, and 69% ($n=200$) had a history of TBI.

As expected, CUD was positively associated with history of any self-injury [$\chi^2(1)=8.103$, $p=0.004$], history of suicidal self-injury [$\chi^2(1)=4.096$, $p=0.043$] and history of nonsuicidal self-injury [$\chi^2(1)=14.076$, $p<0.001$] at the bivariate level (Figure 1). Unadjusted logistic regression models demonstrated that veterans with a history of CUD had 3.06 times the odds (95% CI: 1.38–6.80) of reporting any form of self-injury, 2.44 times the odds (95% CI: 1.01–5.91) of reporting suicidal self-injury, and 5.65 times the odds (95% CI: 2.08–15.30) of reporting nonsuicidal self-injury compared to veterans without a history of CUD. As can be seen in Table 1, after adjusting for sex, age, sexual orientation, combat exposure, traumatic life events, TBI, PTSD, depression, alcohol use disorder, and non-cannabis drug use disorder, CUD continued to be significantly associated with history of any self-injury ($OR = 3.41$, 95% CI: 1.26–9.45, $p=0.016$), suicidal self-injury ($OR = 3.10$, 95% CI: 1.03–9.33, $p=0.045$), and nonsuicidal self-injury ($OR = 5.12$, 95% CI: 1.49–17.55, $p=0.009$).

Discussion

Findings from the present research are consistent with prior research in civilians demonstrating a positive association between CUD and different forms of self-injury (e.g.,

Borges et al., 2012; Giletta et al., 2012; Moller et al., 2012); however, the present findings significantly expand upon the limited research on this topic by demonstrating for the first time that CUD is associated with both suicidal and nonsuicidal self-injury in veterans, even after a wide range of relevant covariates are considered. Particularly notable was the finding that CUD was the only variable associated with self-injury in all three models (Table 1). CUD was also the only statistically significant predictor of nonsuicidal self-injury identified, outperforming a wide range of established predictors, including sexual orientation, PTSD, depression, alcohol use disorder, and non-cannabis drug use disorder.

While the present findings provide additional support for the idea that CUD may increase users' risk for self-injurious behavior, the basis of this association remains unclear. Furthermore, the cross-sectional nature of the present design precludes us from making causal inferences. It should be noted, however, that a 30-year longitudinal study of a birth cohort has previously demonstrated that regular use of cannabis use leads to increases in suicidal ideation among susceptible males (van Ours et al., 2013). In contrast, suicidal ideation was not associated with increased risk for CUD in either males or females. Together, these findings provide preliminary support for the idea that CUD may be a prospective risk factor for suicidal behavior among men; however, additional longitudinal research is still needed to replicate this finding in other samples.

There are a number of pathways through which CUD might be expected to increase risk for self-injury. For example, the impaired functioning theory proposes that CUD leads to functional impairment, which, in turn, leads to self-injury (Delforterie et al., 2015). The disinhibition theory argues that cannabis intoxication leads to disinhibition, which, in turn, directly increases users' risk for self-injury (Delforterie et al., 2015). It is also possible that variables not considered in the present analyses (e.g., attention-deficit/hyperactivity disorder, childhood sexual abuse) might increase risk for both conditions (Few et al., 2016). Finally, as noted by Few and colleagues (2015), repeated exposure to 9-tetrahydrocannabinol (THC) and endocannabinoids through chronic cannabis use could also potentially modulate users' pain perception, thereby increasing their risk for self-injury, particularly nonsuicidal self-injury.

Study Strengths and Limitations

Strengths of the present research include examination of the relationship between CUD and self-injury in a large and diverse sample of veterans, use of well-validated clinical interviews, and the inclusion of many known predictors of self-injury in the models. However, these findings should also be considered within the context of several limitations. First, while the sample size of the present study was fairly large given our extensive use of clinical interviews, future studies on this topic would benefit from even larger sample sizes due to the low base rate at which suicidal and nonsuicidal self-injury occurs. Larger sample sizes would also facilitate analysis of potential sex differences in the association between cannabis and self-injury (e.g., van Ours et al., 2013), as the present sample did not contain enough female veterans to examine this issue. Second, because the study sample was not randomly selected from the larger population of veterans, our findings should not be considered representative of veterans in general. Additional research using more

representative samples of veterans, including those from other war theatres, is needed. Third, because the statistical analyses were cross-sectional in nature, longitudinal research on this topic is necessary to determine if CUD is a prospective predictor of self-injurious behaviors in veterans. It is possible that suicidal behavior might increase risk for CUD among veterans, or that some other variable (e.g., impulsivity) might account for the co-occurrence of these conditions. Fourth, as noted above, more research aimed at understanding the specific mechanisms through which CUD might be related to self-injury is also needed.

Clinical Implications

Given recent findings indicating that CUD diagnoses are on the rise among veterans (Bonn-Miller et al., 2012), these findings have significant implications for clinicians who work with veterans with mental health and substance use disorders, as prior research demonstrates that mental health problems, such as PTSD, are strongly associated with cannabis use in veterans (Boden et al., 2013; Cheung et al., 2010; Hall et al., 2004). Multiple studies find that psychiatric patients may attempt to self-medicate their symptoms by using cannabis (Belendiuk et al., 2015; Boden et al., 2013; Bonn-Miller et al., 2007; Bremner et al., 1996). Furthermore, PTSD is listed by multiple U.S. states as an approved condition for medicinal cannabis use. It is important that clinicians realize that these states' choice to list PTSD as an approved condition for medicinal cannabis use was a political decision that was not based on sound scientific evidence.

Indeed, no well-controlled randomized clinical trials aimed at studying medicinal cannabis use as a treatment for PTSD have been published to date (Belendiuk et al., 2015). Prior research has, however, demonstrated that heavy cannabis use is associated with pulmonary problems, cognitive impairment, lower levels of educational attainment, unemployment, and increased risk for CUD and psychotic disorders (e.g., Borges et al., 2016; Curran et al., 2016; Gentes et al., 2016; Goldman et al., 2010; Hoch et al., 2015; Joshi et al., 2014; Sherman & McRae-Clark, 2016). Such findings, in conjunction with the present finding that CUD was associated with increased risk for both suicidal and nonsuicidal self-injury, lead us to caution clinicians against the use of medicinal cannabis as a first-line treatment for PTSD or any other psychiatric condition at the present time. We further recommend that clinicians working with mental health and substance use patients routinely assess for the presence of both CUD and self-injurious behavior and proactively treat these important clinical conditions as needed.

Acknowledgments

This work was supported by Merit Award #I01RX000304 to Dr. Morissette from the Rehabilitation Research and Development (RR&D) Service of the Department of Veterans Affairs (VA) Office of Research and Development (ORD), Merit Award #I01RX000304-04 to Dr. Meyer from the RR&D Service of VA ORD, and Merit Award #I01CX001486 to Dr. Kimbrel from the Clinical Science Research and Development (CSR&D) Service of VA ORD. Dr. Kimbrel was also supported by a Career Development Award (#IK2 CX000525) from the CSR&D Service of VA ORD. This research was also supported by the VA VISN 17 Center of Excellence for Research on Returning War Veterans, the Central Texas Veterans Health Care System, the VA Mid-Atlantic Mental Illness Research, Education, and Clinical Center, and the Research & Development and Mental Health Services of the Durham VA Medical Center. The views expressed in this article are those of the authors and do not necessarily reflect the position or policy of the Department of Veterans Affairs or the United States government.

References

- Ashrafioun L, Pigeon WR, Conner KR, Leong SH, Oslin DW. Prevalence and correlates of suicidal ideation and suicide attempts among veterans in primary care referred for a mental health evaluation. *J Affect Disord.* 2016; 189:344–350. [PubMed: 26474375]
- Belendiuk KA, Baldini LL, Bonn-Miller MO. Narrative review of the safety and efficacy of marijuana for the treatment of commonly state-approved medical and psychiatric disorders. *Addiction Science & Clinical Practice.* 2015; 10:10. [PubMed: 25896576]
- Blake D, Weathers FW, Nagy LM, Kaloupek DG, Gusman FD, Charney DS, et al. The development of a Clinician-Administered PTSD Scale. *J Trauma Stress.* 1995; 8:75–90. [PubMed: 7712061]
- Boden MT, Babson KA, Vujanovic AA, Short NA, Bonn-Miller MO. Posttraumatic stress disorder and cannabis use characteristics among military veterans with cannabis dependence. *Am J Addict.* 2013; 22:277–284. [PubMed: 23617872]
- Bonn-Miller MO, Vujanovic AA, Feldner MT, Bernstein A, Zvolensky MJ. Posttraumatic stress symptom severity predicts marijuana use coping motives among traumatic event-exposed marijuana users. *J Trauma Stress.* 2007; 20:577–86. [PubMed: 17721963]
- Bonn-Miller MO, Harris AH, Trafton JA. Prevalence of cannabis use disorder diagnoses among veterans in 2002, 2008 and 2009. *Psychol Serv.* 2012; 9:404–416. [PubMed: 22564034]
- Borges G, Bagge CL, Orozco R. A literature review and meta-analyses of cannabis use and suicidality. *J Affect Disord.* 2016; 195:63–74. [PubMed: 26872332]
- Bremner JD, Southwick SM, Darnell A, Charney DS. Chronic PTSD in Vietnam combat veterans: course of illness and substance abuse. *Amer J Psychiatry.* 1996; 153:369–75. [PubMed: 8610824]
- Bryan CJ, Rudd MD, Wertenberger E, Peterson AL, Young-McCaughan S, Mintz J, et al. Nonsuicidal self-injury as a prospective predictor of suicide attempts in a clinical sample of military personnel. *Compr Psychiat.* 2015; 59:1–7. [PubMed: 25749478]
- Bullman TA, Kang HK. Posttraumatic stress disorder and the risk of traumatic deaths among Vietnam veterans. *J Nerv Ment Dis.* 1994; 182:604–610. [PubMed: 7964667]
- Chapman AL, Gratz KL, Brown MZ. Solving the puzzle of deliberate self-harm: The experiential avoidance model. *Behav Res Ther.* 2006; 44:371–394. [PubMed: 16446150]
- Cheung JT, Mann RE, Ialomiteanu A, Stoduto G, Chan V, Ala-Leppilampi K, Rehm J. Anxiety and mood disorders and cannabis use. *Am J Drug Alcohol Abuse.* 2010; 36:118–122. [PubMed: 20337509]
- Curran HV, Freeman TP, Mokysz C, Lewis DA, Morgan CJA, Parsons LH. Keep off the grass? Cannabis, cognition and addiction. *Nature Reviews Neuroscience.* 2016; 17:293–306. [PubMed: 27052382]
- Delforterie MJ, Lynskey MT, Huizink AC, Creemers HE, Grant JD, Few LR, Glowinski AL, ... Agrawal A. The relationship between cannabis involvement and suicidal thoughts and behaviors. *Drug and Alcohol Dependence.* 2015; 150:98–104. [PubMed: 25772435]
- Few LR, Grant JD, Nelson EC, Trull TJ, Grucza RA, Bucholz KK, Agrawal A. Cannabis involvement and nonsuicidal self-injury: A discordant twin approach. *Journal of Studies on Drugs and Alcohol.* 2016:874–880.
- First, MB., Spitzer, RL., Gibbon, M., Williams, JB. *Structural Clinical Interview for Axis I DSM-IV Disorders.* New York, NY: Biometrics Research Department; 1994.
- Gentes EL, Schry AR, Hicks TA, Clancy CP, Collie CF, Kirby AC, Dennis MF, Hertzberg MA, Beckham JC, Calhoun PS. Prevalence and correlates of cannabis use in an outpatient VA posttraumatic stress disorder clinic. *Psychol Addict Behav.* 2016; 30:415–421. [PubMed: 27214172]
- Giletta M, Scholte RHJ, Engels RCME, Ciairano S, Prinstein MJ. Adolescent non-suicidal self-injury: A cross-national study of community samples from Italy, the Netherlands and the United States. *Psychiatry Research.* 2012; 197:66–72. [PubMed: 22436348]
- Goldman M, Suh JJ, Lynch KG, Szucs R, Ross J, Hu X, O'Brien CP, Oslin DW. Identifying risk factors for marijuana use among veterans affairs patients. *J Addict Med.* 2010; 4:47–51. [PubMed: 21625378]

- Gratz KL, Dixon-Gordon KL, Chapman AL, et al. Diagnosis and characterization of DSM-5 nonsuicidal self-injury disorder using the Clinician-Administered Nonsuicidal Self-Injury Disorder Index. *Assessment*. 2015; 22:527–539. [PubMed: 25604630]
- Hall W, Degenhardt L, Teesson M. Cannabis use and psychotic disorders: An update. *Drug Alcohol Rev*. 2004; 23:433–443. [PubMed: 15763748]
- Hoch E, Bonnet U, Thomasius R, Ganzer F, Havemann-Reinecke U, Preuss UW. Risks associated with the non-medicinal use of cannabis. *Dtsch Arztebl Int*. 2015; 112:271–8.
- Joshi M, Joshi A, Bartter T. Marijuana and lung diseases. *Curr Opin Pulm Med*. 2014; 20:173–179. [PubMed: 24384575]
- Kimbrel NA, Calhoun PS, Beckham JC. Nonsuicidal self-injury in men: A serious problem that has been overlooked for too long. *World Psychiatry*. in press.
- Kimbrel NA, Calhoun PS, Elbogen EB, Brancu M, MIRECC 6 Registry Workgroup. Beckham JC. The factor structure of psychiatric comorbidity among Iraq/Afghanistan veterans and its relationship to violence, incarceration, suicide attempts, and suicidality. *Psychiatry Research*. 2014b; 220:397–403. [PubMed: 25169889]
- Kimbrel NA, DeBeer BB, Meyer EC, Gulliver SB, Morissette SB. Nonsuicidal self-injury and suicide attempts in Iraq/Afghanistan war veterans. *Psychiatry Research*. 2016a; 243:232–237. [PubMed: 27419652]
- Kimbrel NA, Evans LD, Patel AB, Wilson LC, Meyer EC, Gulliver SB, Morissette SB. The Critical Warzone Experiences (CWE) Scale: Initial Psychometric properties and association with PTSD, anxiety, and depression. *Psychiatry Research*. 2014c; 220:1118–1124. [PubMed: 25238984]
- Kimbrel NA, Gratz KL, Tull MT, Morissette SB, Meyer EC, DeBeer BB, Silvia PJ, Calhoun PC, Beckham JC. Non-suicidal self-injury as a predictor of active and passive suicidal ideation among Iraq/Afghanistan veterans. *Psychiatry Research*. 2015a; 227:360–362. [PubMed: 25858799]
- Kimbrel NA, Johnson ME, Clancy C, Hertzberg M, Collie C, Van Voorhees EE, Dennis M, Calhoun PS, Beckham JC. Deliberate self-harm and suicidal ideation among male Iraq/Afghanistan veterans seeking treatment for PTSD. *Journal of Traumatic Stress*. 2014a; 27(4):474–477. [PubMed: 25066891]
- Kimbrel NA, Meyer EC, DeBeer BB, Gulliver SB, Morissette SB. A 12-month prospective study of the effects of PTSD-depression comorbidity on suicidal behavior in Iraq/Afghanistan-era veterans. *Psychiatry Research*. 2016; 243:97–99. [PubMed: 27376669]
- Klonsky ED. Non-suicidal self-injury in United States adults: prevalence, sociodemographics, topography and functions. *Psychol Med*. 2011; 41:1981–1986. [PubMed: 21208494]
- Kubany ES, Haynes SN, Leisen MB, Owens JA, Kaplan AS, Watson SB, Burns K. Development and preliminary validation of a brief broad-spectrum measure of trauma exposure: the Traumatic Life Events Questionnaire. *Psychol Assess*. 2000; 12:210–224. [PubMed: 10887767]
- Moller CI, Tait RJ, Byrne DG. Self-harm, substance use and psychological distress in the Australian general population. *Addiction*. 2012; 108:211–220. [PubMed: 22788830]
- van Ours JC, Williams J, Fergusson D, Horwood J. Cannabis use and suicidal ideation. *Journal of Health Economics*. 2013; 32:524–537. [PubMed: 23518573]
- Posner K, Brown GK, Stanley B, Brent DA, Yershova KV, Oquendo MA, et al. The Columbia-Suicide Severity Rating Scale: Initial validity and internal consistency findings from three multisite studies with adolescents and adults. *Am J Psychiat*. 2011; 168(12):1266–1277. [PubMed: 22193671]
- Selby EA, Bender TW, Gordon KH, et al. Non-suicidal self-injury (NSSI) disorder: A preliminary study. *Personal Dis*. 2012; 3(2):167–175.
- Selby EA, Kranzler A, Fehling KB, et al. Nonsuicidal self-injury disorder: The path to diagnostic validity and final obstacles. *Clin Psychol Rev*. 2015; 38:79–91. [PubMed: 25881206]
- Sherman BJ, McRae-Clark AL. Treatment of cannabis use disorder: Current science and future outlook. *Pharmacotherapy*. 2016; 36:511–535. [PubMed: 27027272]
- United Nations Office on Drugs and Crime: World Drug Report. United Nations publication; 2014. Sales No. E.14.XI.7
- Vasterling, JJ. TBI screening interview. VA Boston Healthcare System; Boston, MA: 2008. Unpublished measure

Figure 1.
Association between Cannabis Use Disorder and Self-injury in Veterans (N=292)

Table 1
Summary of the Adjusted Logistic Regression Models Predicting Self-injury in Veterans (N=292)

Variable Name	Any Self-injury		Suicidal Self-Injury		Nonsuicidal Self-Injury	
	OR	95% CI	OR	95% CI	OR	95% CI
Sex	2.07	0.71 – 6.06	4.36*	1.28 – 14.85	1.30	0.31 – 5.42
Sexual Orientation	1.30	0.33 – 5.15	1.10	0.25 – 4.84	1.17	0.21 – 6.55
Age	0.92*	0.88 – 0.97	0.92**	0.87 – 0.98	0.95	0.89 – 1.01
Combat Exposure	1.73*	1.03 – 2.88	2.19***	1.23 – 3.89	0.67	0.32 – 1.41
Traumatic Life Events	1.04	1.00 – 1.08	1.02	0.98 – 1.06	1.04	0.99 – 1.09
Traumatic Brain Injury	0.96	0.37 – 2.49	1.03	0.36 – 2.92	1.62	0.41 – 6.39
Posttraumatic Stress Disorder	0.51	0.19 – 1.33	0.52	0.18 – 1.50	1.01	0.29 – 3.48
Major Depressive Disorder	2.80*	1.08 – 7.27	3.02*	1.04 – 8.80	3.04	0.81 – 11.35
Alcohol Use Disorder	0.84	0.36 – 1.99	0.94	0.36 – 2.41	1.17	0.37 – 7.25
Non-Cannabis Drug Use Disorder	2.25	0.69 – 7.39	1.89	0.51 – 6.91	1.68	0.39 – 7.25
Cannabis Use Disorder	3.41*	1.26 – 9.25	3.10*	1.03 – 9.33	5.12**	1.49 – 17.55

Note: Sex coded as 0 = male, 1 = female. sexual orientation coded as 0 = heterosexual, 1 = non-heterosexual;

* $p < 0.05$;

** $p < 0.01$;

*** $p < 0.001$.