Published in final edited form as:

J Subst Abuse Treat. 2017 September ; 80: 45–51. doi:10.1016/j.jsat.2017.06.007.

Demographic and clinical characteristics of treatment seeking women with full and subthreshold PTSD and concurrent cannabis and cocaine use disorders

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Abstract

While the detrimental effects of concurrent substance use disorders (SUDs) are now being well documented, very few studies have examined this comorbidity among women with posttraumatic stress disorder (PTSD). Data for these analyses were derived from the “Women and Trauma” study conducted within the National Drug Abuse Treatment Clinical Trials Network. Women with full or subthreshold PTSD and co-occurring cannabis use disorder (CUD) and cocaine use disorder (COD; N = 99) were compared to their counterparts with co-occurring CUD only (N = 26) and co-occurring COD only (N = 161) on rates of trauma exposure, psychiatric disorders, psychosocial problems, and other substance use utilizing a set of multivariate logistic regressions. In models adjusted for age and race/ethnicity, women with PTSD and COD only were significantly older than their counterparts with CUD only and concurrent CUD+COD. Relative to those with CUD only, women with concurrent CUD+COD had higher odds of adult sexual assault. Relative to those with COD only, women with concurrent CUD+COD had higher odds of alcohol use disorder in the past 12 months. Finally, relative to those with CUD only, women with COD only had higher odds of ever being arrested/convicted and adult sexual assault. The higher rates of adult sexual

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assault and alcohol use disorder among those with concurrent CUD+COD suggest the need for trauma-informed approaches that can respond to the needs of this dually-diagnosed population. Moreover, the causal link between repeated traumatic stress exposure and polysubstance use requires further examination.

Keywords

trauma; PTSD; cannabis use disorder; cocaine use disorder; concurrent drug use disorders; comorbidity

1. Introduction

The co-occurrence of posttraumatic stress disorder (PTSD) and substance use disorders (SUDs) is well established and associated with a host of complex clinical and public health challenges. The estimated prevalence rates of SUDs in persons with PTSD range from 34%–52% (Mills, Teesson, Ross, & Peters, 2006a; Vujanovic, Bonn-Miller, & Petry, 2016) while the rates of current PTSD in persons with SUDs range from 15%–42% (Pietrzak, Goldstein, Southwick, & Grant, 2011; Vujanovic et al., 2016), depending on the clinical population studied, with pregnant women and adolescents in substance abuse treatment having the highest rates. These rates far surpass the rates of either PTSD or SUD alone among the general populations (Vujanovic et al., 2016).

A number of etiological models have been proposed to explain the co-occurrence of PTSD and SUDs including the “high risk hypothesis,” “self-medication hypothesis,” and “shared vulnerability” models (McCauley, Killeen, Gros, Brady, & Back, 2012; Ruglass, Lopez-Castro, Cheref, Papini, & Hien, 2014; van Dam, Ehling, Vedel, & Emmelkamp, 2013). The self-medication hypothesis has received the most clinical and research attention and posits that individuals use substances as a way to manage painful affect states. Indeed, individuals with anxiety and/or PTSD frequently endorse affect regulation as a reason for their substance use (McCauley et al., 2012; van Dam et al., 2013). Nevertheless, other theoretical models are just as likely. For example, the high risk hypothesis posits that a substance-using lifestyle places the individual at high-risk for exposure to traumatic events and subsequent development of PTSD (McCauley et al., 2012; van Dam et al., 2013). Shared vulnerability models implicate common cognitive, affective, and neurobiological factors (e.g., attentional bias, emotion regulation difficulties, and dysfunction in the HPA axis) in the development of both PTSD and SUD and their associations. For example, research shows that adults with either PTSD or SUDs may exhibit deficits in emotion processing and self-regulation, thus there is growing appreciation for this perspective (Koenen, 2006; Sloboda, Glantz, & Tarter, 2012).

Given the complexity of the relationship between PTSD and substance use disorders due to differences in the psychoactive properties of various substances; the various meanings of substance use in the context of PTSD; and the significant number of bio-psycho-social factors that likely contribute to the use of particular substances by individuals with PTSD, a multifactorial model of understanding the association is necessary (McCauley et al., 2012; Ruglass, Hien, Hu, & Campbell, 2014a; van Dam et al., 2013).

Previous research examining the association between PTSD and SUDs have often focused on the global category of SUD, generally obscuring the differential relationship between PTSD and specific substances (Hien et al., 2009; Zlotnick, Johnson, & Najavits, 2009). Other studies have examined the relationship between PTSD and specific SUDs such as cannabis use disorder (CUD) (Bonn-Miller, Boden, Vujanovic, & Drescher, 2013; Kevorkian et al., 2015) or cocaine use disorder (COD), suggesting differential mechanisms of association. In the context of PTSD, cannabis use is often associated with reductions in traumatic memories and improvements in sleep disturbances (Boden, Babson, Vujanovic, Short, & Bonn-Miller, 2013; Cogle, Bonn-Miller, Vujanovic, Zvolensky, & Hawkins, 2011), whereas, cocaine is often linked with PTSD for its ability, in the short-term, to reduce trauma-related avoidance and numbing symptoms (S. Back et al., 2000; S. E. Back, Brady, Jaanimägi, & Jackson, 2006; Najavits et al., 2003). In both cases, however, and in the long-run, chronic substance use is often associated with a worsening of PTSD ((Ruglass, Hien, Hu, & Campbell, 2014b). A growing body of literature suggests that a large proportion of those with PTSD are polysubstance users or have dual drug use disorders (Salgado, Quinlan, & Zlotnick, 2007; Schäfer & Najavits, 2007). Yet, very few studies have examined the differential impact of concurrent SUDs (i.e., more than one SUD simultaneously) in the context of PTSD, which may have important implications for treatment and recovery. The additive or interactive effect of concurrent substance use may have detrimental health and psychosocial effects. Existing studies that have examined concurrent substance use or use disorders either alone (Leri, Stewart, Tremblay, & Bruneau, 2004; Peters, Schwartz, Wang, O'Grady, & Blanco, 2014) or in the context of other psychiatric disorders indicate greater psychological and social problems, and poorer treatment outcomes among co-occurring substance users (Peters et al., 2014; Salgado et al., 2007).

In general, cannabis use has been found to be associated with a significant increase in use of a number of other substances, including cocaine, supporting the “gateway drug theory,” which posits that cannabis use typically precedes use of other illicit substances with greater addiction potential such as cocaine (Fergusson et al., 2006; Secades et al., 2015). Indeed, cocaine and cannabis co-use is a common type of polydrug use. Studies suggest up to 90% of individuals with COD co-use cannabis and up to 53% will have a concurrent CUD (Lindsay, Stotts, Green, Herin, & Schmitz, 2009; Miller, Klahr, Gold, Sweeney, & Cocores, 1990). Cannabis and cocaine may be co-used to increase the positive subjective effects of cocaine (Lukas, Sholar, Kouri, Fukuzako, & Mendelson, 1994) or they may be functionally independent in the same person (Budney, Higgins, & Wong, 1996). Chronic cannabis use has been shown to negatively affect vascular function, leading to higher anxiety and exacerbated stress-induced cravings for alcohol and cocaine (Fox, Tuit, & Sinha, 2013). Researchers have posited other variables that might contribute to the concurrent use of substances such as cannabis and cocaine including underlying genetic/personality vulnerabilities or environmental factors such as similar drug markets contributing to ease of access and availability (Agrawal, Budney, & Lynskey, 2012; Tzilos, Reddy, Caviness, Anderson, & Stein, 2014).

Regardless of the underlying mechanisms, concurrent cannabis and cocaine use is associated with more severe psychopathology compared with use of either drug alone (Lindsay et al., 2009). Studies indicate the interactive effects of combining both drugs can lead to more

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detrimental health consequences, including increased absorption of cocaine, increased heart rate and blood pressure, and heavier or more frequent drug use (Lindsay et al., 2009). Moreover, concurrent cannabis use has been associated with increased cocaine dependence, frequently leading to greater psychopathology and functional impairment, and poorer treatment outcomes (Lindsay et al., 2009).

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Cannabis and cocaine use have been linked to a number of factors that may contribute to their common association with PTSD, including high rates of childhood and adult trauma, re-victimization, higher levels of posttraumatic symptom severity, social marginalization, poor mental and physical health, and criminal justice involvement (Saddichha, Werker, Schuetz, & Krausz, 2015). In one study examining a highly traumatized population, childhood sexual abuse was more strongly associated with adult use of cannabis and cocaine, as compared to heroin, alcohol, and tobacco, suggesting type of abuse may influence type of substance use (Khoury, Tang, Bradley, Cubells, & Ressler, 2010). This same study found that severity of cocaine use disorder was also strongly correlated with both severity of current PTSD symptoms and number of traumatic childhood exposures (Khoury et al., 2010). Crack cocaine use, in particular, has been associated with more severe psychopathology and PTSD symptom severity in addition to more significant substance abuse, including cannabis (Narvaez et al., 2014). The association between severity of cocaine use and PTSD symptom severity is thought to be driven by cocaine's exacerbation of hyperarousal symptoms of PTSD, while the use of cannabis in the context of severe PTSD symptoms is thought to be driven by perceived alleviation of negative affect to improve sleep or reduce hyperarousal symptoms (Bonn-Miller, Babson, & Vandrey, 2014; Bonn-Miller, Boden, Bucossi, & Babson, 2014). Individuals suffering from posttraumatic stress have endorsed using cannabis as a short-term emotion regulation strategy and those with high PTSD symptom scores were more likely to use cannabis for negative affect reduction (Bonn-Miller, Boden, et al., 2014; Bonn-Miller, Vujanovic, Feldner, Bernstein, & Zvolensky, 2007). Several studies of individuals with co-occurring PTSD and CUD further highlight the complexity of the relationship between these disorders. Specifically, the rate of PTSD was found to be higher among patients with a CUD diagnosis than those with other SUDs (Bonn-Miller, Harris, & Trafton, 2012), yet greater frequency of cannabis use was associated with PTSD symptom reduction, with one study finding a 75% reduction in PTSD symptoms associated with cannabis use (Bonn-Miller, Vujanovic, Boden, & Gross, 2011; Greer, Grob, & Halberstadt, 2014). Overall, findings give a mixed picture of the impact of co-occurring CUD/COD, suggesting in some cases an amelioration of PTSD symptoms, and in others, an escalation. And few studies have explored concurrent CUD+COD and associated consequences despite high rates of polysubstance use and use disorders among those with PTSD ((Salgado et al., 2007).

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Thus, more research is needed to better understand the factors associated with concurrent CUD/COD among individuals with PTSD. The present study characterizes the psychiatric and psychosocial correlates of concurrent CUD+COD at baseline in a large, multi-site, randomized clinical trial ("The Women and Trauma Study") examining treatments for women with co-occurring PTSD and SUD (Hien et al., 2009). We hypothesized that trauma exposure, psychiatric disorders, psychosocial problems and other substance use would be more prevalent or severe in women with PTSD (full or subthreshold) and concurrent CUD

+COD relative to their counterparts with CUD only, and relative to their counterparts with COD only. This hypothesis is based on previous research showing more psychosocial problems and psychiatric symptoms among those who co-use substances or have poly-drug use disorders compared to those with only one SUD (Ullman, Townsend, Starzynski, & Long, 2006)

2. Materials and Methods

2.1. Participants

Data for these analyses were derived from the “Women and Trauma” study conducted within the National Institute on Drug Abuse Clinical Trials Network (NIDA CTN). Female participants were recruited from seven community-based substance abuse treatment programs located in the United States. Eligible participants were between the ages of 18–65 years, had exposure to at least one traumatic event and met criteria for either full PTSD (as defined by the Diagnostic and Statistical Manual of Mental Disorders (4th ed., text rev.; DSM-IV-TR, American Psychiatric Association, 2000) or subthreshold PTSD (Grubaugh et al., 2005). Subthreshold PTSD requires that the participant meet the following DSM-IV TR criteria: exposure to a traumatic event (Criterion A), and re-experiencing symptoms (Criterion B), and avoidance and numbing symptoms (Criterion C) OR hyperarousal symptoms (Criterion D), as well as symptom duration of at least 1 month (Criterion E) and significant distress or impairment of functioning (Criterion F) (Grubaugh et al., 2005). Moreover, eligible participants also had to have a current diagnosis of drug/alcohol abuse or dependence and had used those substances in the prior six months; and had the capacity to provide informed consent. Exclusion criteria included: advanced stage medical disease, impaired cognition, significant risk of suicide/homicide, history of schizophrenia-spectrum disorder, history of active psychosis (prior 2 months), involvement in PTSD-related litigation, non-English speaking, and refusal to be video- or audiotaped. Additional details of the overall trial design and treatment approaches are described in (Hien et al., 2009).

2.2. Procedures

After informed consent, eligible participants ($N = 353$) were randomized into 12-sessions of Seeking Safety (Najavits, 2002) or Women’s Health Education (S. Miller, Pagan, & Tross, 1998) groups. Assessments were conducted at baseline, weekly during treatment, and at four follow-up timepoints (1-week, 3-, 6-, and 12-months posttreatment). For this secondary analysis, a subset of participants who had a current substance use diagnosis of CUD, COD, or CUD+COD were selected ($n = 286$); this analysis focused only on the baseline assessments.

2.3. Measures

Demographic information such as age, race/ethnicity, education, marital status, and medication status (i.e., psychotropic medication prescription received) were collected at the screening and baseline visits.

2.3.1. The Structured Clinical Interview for DSM-IV for Axis I Disorders—(First, Spitzer, Gibbon, & Williams, 2002) was administered to assess current alcohol or substance

use disorders (A/SUD), age of onset of A/SUD, and the presence of any mood disorders (e.g., major depressive disorder or dysthymic disorder; current or lifetime). The SCID-I has demonstrated excellent inter-rater reliability (First et al., 2002)

2.3.2. The Life Events Checklist—(LEC, Gray, Litz, Hsu, & Lombardo, 2004), a self-report measure, was utilized to assess exposure to a variety of *potentially traumatic events* (e.g., physical assault, sexual assault, life-threatening illness or injury).

2.3.3. The Clinician Administered PTSD Scale—(CAPS; Blake et al., 1995), a structured clinical interview, was used to assess current DSM-IV PTSD diagnosis and symptom severity within the prior 30 days. Consistent with DSM-IV, the CAPS has three subscales (1: re-experiencing; 2: avoidance/emotional numbing, and 3: hyperarousal) from which a total PTSD severity score was obtained by summing the subscale severity scores (range = 0 to 136). Formal training was provided to all clinical assessors on how to administer the CAPS.

2.3.4. Brief Symptom Inventory—(BSI; Derogatis & Fitzpatrick, 2004). The BSI is a 53-item self-report questionnaire that measures the extent to which a participant is “distressed or bothered” by psychological symptoms in the past seven days. For the BSI, the frequency of each item is measured on 5-point scale (0 = *not at all* to 4 = *extremely*). Nine primary symptom dimensions (somatization, obsessive-compulsive behavior, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism) are assessed. Three indices can be derived from the BSI: the Global Severity Index (GSI), Positive Symptom Total (PST), and the Positive symptom Distress Index (PSDI). The psychometric properties of the BSI have been well established, with good internal consistency and test-retest reliability, and strong convergent validity with related psychiatric symptom measures (Boulet & Boss, 1991; Derogatis & Fitzpatrick, 2004).

2.3.5. The Addiction Severity Index Lite—[*ASI-Lite* (revised from the 1992 ASI Fifth Edition)]; (Cacciola et al., 2007; Denis, Cacciola, & Alterman, 2013; McLellan, Luborsky, Woody, & O'Brien, 1980), a semi-structured clinical interview, was used to assess current (past 30-days) alcohol and other substance (e.g., cocaine, marijuana, heroin etc.) use, as well as severity of problems/impairments in the following areas: medical, employment, legal, family/social, and psychiatric.

2.4. Statistical Analysis

At the bivariate level, sociodemographic, legal, psychiatric and substance use characteristics by the three groups (i.e., CUD+COD; CUD only; COD only) were compared using Chi-square tests for categorical variables and F-tests for continuous variables. A multinomial logistic regression was conducted to predict membership in one of the three groups ((i.e., CUD+COD; CUD only; COD only) using legal history, psychotropic medication use, trauma history, psychiatric symptomatology, other substance use characteristics (i.e., nicotine and alcohol), age, and race/ethnicity as predictors, when those variables in each univariate analysis were significant at $p < .05$. PROC LOGISTIC (with GLOGIT link function) in SAS 9.4 was used to conduct all analyses.

3. Results

Participant sociodemographic characteristics are displayed in Table 1. Participants with COD only were significantly older than those with CUD only and those with CUD+COD, $F(2) = 11.15, p < .0001$. On average, all participants completed 12 years of education and had similar rates of employment and marital status. There were significant race/ethnicity distribution differences among the three groups ($\chi^2(6) = 19.45, p < .01$): For example, compared to Caucasians, African Americans were more likely to be a part of the COD only group. Given significant group differences in age and race/ethnicity distributions, these variables were included as covariates in the multinomial logistic regression model.

Table 1 also shows the prevalence rates of lifetime criminal justice involvement, trauma history, psychotropic medication use, psychiatric symptomatology and other substance use among the three groups of participants. Participants with COD only and with CUD+COD had higher rates of ever being arrested/convicted compared to the CUD only group (77% and 68% versus 44%, respectively; $\chi^2(2) = 12.18, p < .01$). Those with COD only had lower rates of alcohol use disorders in the prior 12 months compared to those with concurrent CUD+COD and CUD only (COD: 50.31%; CUD: 69.23%; and CUD+COD: 73.74%; $\chi^2(2) = 15.01, p < .001$). Participants with concurrent CUD+COD had higher rates of childhood physical abuse ($\chi^2(2) = 6.37, p = .04$), compared to those with COD only and CUD only. In contrast, participants with CUD only had lower rates of adult sexual assault ($\chi^2(2) = 9.44, p < .01$), compared to those with concurrent CUD+COD and COD only. There were no significant differences among the three groups in PTSD symptoms severity, level of psychological distress, or percentage of individuals reporting nightmares and insomnia (all $p > .05$). Table 2 shows the unadjusted and adjusted odds ratio for the three groups of participants (adjusted for age and race, lifetime criminal justice involvement, trauma history and other substance use). In the adjusted model, relative to those with CUD only, participants with COD only and CUD+COD had higher odds of adult sexual assault, after controlling for other variables in the model. Relative to those with COD only, participants with CUD+COD had higher odds of alcohol use disorder in the past 12 months, after controlling for other variables in the model. Finally, relative to those with CUD only, participants with COD only had higher odds of ever being arrested/convicted, after controlling for other variables in the model.

4. Discussion

4.1. Main Conclusions

We examined whether concurrent cannabis and cocaine use disorders among those with PTSD was associated with more severe psychopathology and psychosocial ramifications compared with either cannabis use disorder only or cocaine use disorder only. On the whole, we found that those with cocaine use disorder only were significantly older than those with concurrent cocaine use disorder and cannabis use disorder and those with cannabis use disorder only. This finding is consistent with studies showing that cocaine users tend to be older than those with other substance use disorders (Horey et al., 2012). It is possible that those who use cannabis concurrently or alone may be of a younger cohort or this difference may be associated with the relatively higher cost of cocaine. In our adjusted model,

participants with cocaine use disorder only had higher odds of ever being arrested/convicted compared to the cannabis use disorder only group. Since cocaine is considered an illicit drug with greater addiction potential and associated social consequences than cannabis (Nutt, King, Saulsbury, & Blakemore, 2007), it is not surprising that its use would be associated with more negative consequences such as higher rates of arrest. Additionally, harsher legal consequences have existed for cocaine-related, and specifically crack cocaine related, offenses as compared to other substances. These historical legal disparities towards individuals with cocaine use disorder may also be a factor in the higher rates of arrests seen in our sample (Facchin & Margola, 2015; Hunt, 1991; Palamar, Davies, Ompad, Cleland, & Weitzman, 2015). Arrests may be due to obtainment, possession, or use of an illicit drug; however, it may also be due to the commission of other crimes (e.g., robberies or property crimes) while under the influence to secure money to purchase more drugs, which tend to be greater with cocaine (National Institute on Drug Abuse, 2006). In this study, however, we had limited information on the reasons for arrest, thus it is unclear whether there were group differences in different types of arrests (i.e., interpersonal aggression, property offenses, or other criminal behaviors).

Further, relative to those with cannabis use disorder only, participants with concurrent cocaine use disorder and cannabis use disorder and participants with cocaine use disorder only had higher odds of adult sexual assault. Sexual assault is considered a high-impact trauma and is associated with a range of psychological and social problems that confer greater risk for developing SUDs (Mills, Teesson, Ross, & Peters, 2006b; Ullman, Filipas, Townsend, & Starzynski, 2005; Ullman, Relyea, Peter-Hagene, & Vasquez, 2013). Studies show that sexual assault is associated with PTSD, depression, disruptions in emotion regulation processes, loss of trust, erosion of self-esteem, and self-destructive behaviors (Schneider, Baumrind, & Kimerling, 2007). One study found that women who were raped were six times more likely to use cocaine compared to women who were not raped (Resnick, Kilpatrick, Dansky, Saunders, & Best, 1993). Substance use may be seen as a form of self-medication; a way to cope with the painful emotional and interpersonal consequences of sexual trauma (McCauley et al., 2012; Ruglass, Lopez-Castro, et al., 2014; van Dam et al., 2013). However, over time, chronic substance use may lead to the development of a SUD along with a host of associated negative consequences. These findings are also consistent with studies showing increased rates of trauma exposure among those who utilize substances with higher addiction potential such as cocaine and among those with co-occurring SUDs (i.e., cocaine use disorder and cannabis use disorder). Therefore, the use of substances concurrently (i.e., both cocaine and cannabis) might indicate greater psychopathology, thus necessitating self-medication with more than one substance (Khoury et al., 2010). Contrary to expectations, however, we did not find that co-occurring cannabis and cocaine use disorder or cocaine use disorder only was associated with greater psychological symptom severity as assessed by the Brief Symptom Inventory and the Clinician-Administered PTSD scale. This is in contrast to studies that show strong positive associations between concurrent SUDs and psychological symptom severity (Khoury et al., 2010). It is possible, however, that among this sample of women, the psychological distress that was captured in our clinician administered and self-report measures may not adequately account for the nature of the psychological disturbance that might contribute to concurrent substance use among this

population. Alternatively, the use of cocaine alone or in combination with cannabis may place women in drug-using contexts or situations that place them greater risk for exposure to sexual traumas (Haller & Chassin, 2014; Mccauley et al., 2012). More research is needed to identify the mechanisms underlying the increased association between these two variables.

Finally, in our adjusted model, relative to those with cocaine use disorder only, participants with co-occurring cocaine use disorder and cannabis use disorder had higher rates of alcohol use disorder in the prior 12 months. This finding is consistent with studies showing that individuals with co-occurring drug use disorders are more likely to use greater and other substances compared to those using only one substance (Connor, Gullo, White, & Kelly, 2014).

4.2. Limitations

The study had several strengths including the utilization of data from one of the largest multi-site randomized clinical trials examining treatments for women with co-occurring PTSD and SUD, as well as multi-method assessments of trauma exposure and its associated consequences. However, several limitations should be noted. The data were cross-sectional in nature, which limits our ability to make causal inferences about the temporality of the relationships. We were not able to directly assess participants' motives for polysubstance use. Moreover, participants' responses were based on self-report and thus were subject to social desirability effects. The small sample size of the cannabis use disorder group may have limited our ability to detect significant associations. Finally, the data were derived from a clinical trial, thus participants were required to meet certain inclusion/exclusion criteria in order to participate in the study. Therefore, the sample may not represent the population of patients that are seen in typical treatment agencies. Moreover, the results may not generalize beyond women with co-occurring PTSD and SUD.

4.2. Implications

Overall, these findings suggest that co-occurring cocaine use disorder and cannabis use disorder is associated with greater odds of adult sexual assault compared to cannabis use disorder only and greater odds of alcohol use disorders compared to cocaine use disorder only. This co-occurrence of drug use disorders and increased rates of sexual trauma along with alcohol use disorders may serve as risk factors for poorer treatment response and treatment outcomes among this population (Peters et al., 2014). The complexity of treatment for those with more than one SUD increases, particularly as efforts to reduce the "target" and primary substance of abuse, which is often a harm reduction approach taken in evidence based treatment of PTSD/SUD, still leaves open the possibility of escalation of use of other substances to compensate. While from a harm reduction perspective this may be viewed as a positive outcome, from a clinical perspective the co-occurring use remains problematic, and may lead to triggering further trauma related symptoms. Thus, there is a need for the development of approaches to address trauma-related responses that may contribute to concurrent substance use disorders, as well as to meaningfully address the concurrent substance use to reduce risk of retraumatization. In tandem, more research is needed to understand trauma survivors' motives for concurrent use of cannabis and cocaine. In

addition, longitudinal studies examining the differential impact of sequential versus simultaneous use of cannabis and cocaine on trauma-related symptomatology are essential.

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Highlights

- We examined whether concurrent cannabis and cocaine use disorders among those with PTSD was associated with more severe psychopathology and psychosocial ramifications compared with either cannabis use disorder only or cocaine use disorder only.
- Relative to those with cannabis use disorder only, women with concurrent cannabis use disorder and cocaine use disorder had higher odds of adult sexual assault.
- Relative to those with cocaine use disorder only, women with concurrent cannabis use disorder and cocaine use disorder had higher odds of alcohol use disorder in the past 12 months.
- The co-occurrence of drug use disorders and increased exposure to sexual trauma along with alcohol use disorders may serve as risk factors for poorer treatment response and treatment outcomes among this population.

Table 1

Sociodemographic, psychiatric and psychosocial characteristics of participants by substance use disorder among treatment seeking women with PTSD (N=286)

	Group 1. CUD+COD (N=99)	Group 2. CUD only (N=26)	Group 3. COD only (N=161)	F or X^2 , p
	Mean (Standard Deviation)/ Percentage			
Demographics Characteristics				
Age	35.46 (9.03) ^a	34.68 (10.91) ^a	40.22 (8.23) ^b	F(2)=11.15, p<.0001
Education	12.22 (1.97)	12.41 (3.36)	12.19 (2.12)	F(2)= 0.11, p=.89
Employment				
Employed/student	39.39	57.69	36.02	X^2 (2)=4.41, p=.11
Unemployed/retired/disabled	60.61	42.31	63.98	
Marital Status				
Married	14.14	15.38	15.53	X^2 (4)=0.34, p=.99
Divorced/separated/widowed	43.43	42.31	45.34	
Never married	42.42	42.31	39.13	
Race/ethnicity				
Caucasian	51.52	53.85	31.68	X^2 (6)=19.45, p<.01
African American	33.33	15.38	47.83	
Hispanics	8.08	11.54	6.21	
Multiracial/other	7.07	19.23	14.29	
Legal History (Lifetime)				
Any arrested/convictions (%)	67.68 ^a	44.00 ^b	77.02 ^a	X^2 (2)=12.18,p<.01
Any driving with intoxication/ major driving violations (%)	52.53	69.23	46.58	X^2 (2)=4.80, p=.09
Psychiatric/Psychological and Other Substance Use Characteristics				
Child physical abuse (%)	68.69 ^a	53.85 ^b	53.13 ^b	X^2 (2)=6.37, p=.04
Child sexual abuse (%)	74.75	61.54	68.75	X^2 (2)=2.07, p=.36
Adult physical assault (%)	86.87	73.08	85.63	X^2 (2)=3.20, p=.20
Adult sexual assault (%)	73.74 ^a	42.31 ^b	68.75 ^a	X^2 (2)=9.44, p<.01
Transportation Accident (%)	77.55	88.46	68.32	X^2 (2)=6.00, p=.05
Life-threatening illness (%)	37.76	30.77	44.72	X^2 (2)=2.47, p=.29
Exposure to sudden violent death (%)	40.82	46.15	50.93	X^2 (2)=2.51, p=.29
Psychotropic medication past 30 days	45.45	46.15	31.68	X^2 (2)=5.81, p=.06
PTSD total severity score	63.93(21.43)	63.46(17.67)	62.70(18.54)	F(2)=0.13, p=.88
Nightmares (yes/no) (%)	35.35	15.38	29.81	X^2 (2)=3.94, p=.14
Insomnia (yes/no) (%)	53.54	53.85	56.52	X^2 (2)=0.24, p=.89
BSI (PST Subscale)	30.22(10.10)	29.92 (9.36)	27.39(10.38)	F(2)=2.60, p=.08
Number of days of cannabis use in past 30 days	4.18 (8.57) ^a	8.27 (11.76) ^a	1.59 (5.29) ^b	F(2)=11.01, p<.0001

	Group 1. CUD+COD (N=99)	Group 2. CUD only (N=26)	Group 3. COD only (N=161)	F or X^2 , p
	Mean (Standard Deviation)/ Percentage			
Number of days of cigarette use in past 30 days	23.48 (11.75)	22.38 (12.42)	23.18 (11.92)	$F(2)=0.09$, $p=.91$
Alcohol use disorder past 12 months (%)	73.74 ^a	69.23 ^a	50.31 ^b	$X^2(2)=15.02$, $p<.001$

Note. CUD = Cannabis Use Disorder; COD = Cocaine Use Disorder; BSI = Brief Symptom Inventory; PST = Positive Symptom Total

^{ab} different superscripts in the same row were significantly different from each other at $p<.05$.

The associations of substance use disorder category with psychiatric and psychosocial characteristics among treatment seeking individuals with PTSD (N=286)

Covariates	Univariate			Multivariable			
	Group 2 (CUD) vs Group 1 (CUD+COD)	Group 3 (COD) vs Group 1 (CUD+COD)	Group 3 (COD) vs Group 2 (CUD)	Group 2 (CUD) vs Group 1 (CUD+COD)	Group 3 (COD) vs Group 1 (CUD+COD)	Group 3 (COD) vs Group 2 (CUD)	χ^2 , p
	Unadjusted Odds Ratio (95%CI)			Adjusted Odds Ratio (AOR) (95% CI)			
Any arrested/convictions (%)	0.38 (0.15–0.92) *	1.60 (0.92–2.80)	4.27 (1.79–0.19) **	0.51 (0.19–1.33)	1.55 (0.83–2.88)	3.04 (1.14–8.14) *	$\chi^2(2)=5.31$, p=0.07
Any driving with intoxication/major driving violations (%)	2.03 (0.81–5.11)	0.71 (0.47–2.28)	0.39 (0.16–0.94) *				
Child physical abuse (%)	0.53 (0.22–1.28)	0.52 (0.31–0.88) *	0.97 (0.42–2.23)	0.55 (0.20–1.50)	0.60 (0.34–1.08)	1.09 (0.40–2.96)	$\chi^2(2)=3.36$, p=0.19
Child sexual abuse (%)	0.54 (0.22–1.34)	0.74 (0.42–1.31)	1.38 (0.58–3.24)				
Adult physical assault (%)	0.41 (0.14–1.17)	0.90 (0.43–1.87)	2.20 (0.83–5.81)				
Adult sexual assault (%)	0.26 (0.11–0.64) **	0.78 (0.45–1.37)	3.30 (1.29–7.00) **	0.26 (0.10–0.67) **	0.75 (0.40–1.40)	2.95 (1.11–7.83) *	$\chi^2(2)=7.65$, p=0.02
Transportation Accident (%)	2.22 (0.61–8.09)	0.62 (0.35–1.11)	0.28 (0.08–0.98) *				
Life-threatening illness (%)	0.73 (0.29–1.85)	1.33 (0.80–2.23)	1.82 (0.75–4.43)				
Exposure to sudden violent death (%)	1.24(0.52–2.97)	1.51 (0.91–2.50)	1.21 (0.53–2.78)				
Psychotropic medication past 30 days	1.03 (0.43–2.45)	0.56 (0.33–0.93) *	0.54 (0.23–1.25)				
PTSD total severity score	1.00(0.98–1.02)	1.00 (0.98–1.01)	1.00(0.98–1.02)				
Nightmares (yes/no) (%)	0.33 (0.11–1.04)	0.78 (0.46–1.32)	2.34 (0.76–7.14)				
Insomnia (yes/no) (%)	1.01 (0.43–2.41)	1.13 (0.68–1.87)	1.11 (0.49–2.56)				
BSI (PST Subscale)	1.00 (0.95–1.04)	0.97 (0.95–1.00) *	0.98 (0.94–1.02)				
Number of days of cannabis use in past 30 days	1.04 (1.00–1.08)	0.95 (0.91–0.98) **	0.91 (0.87–0.95) ***	1.05 (1.00–1.10)	0.93 (0.90–0.97) **	0.89 (0.84–0.94) ***	$\chi^2(2)=18.03$, p<.001
Number of days of cigarette use in past 30 days	0.99 (0.96–1.03)	1.00 (0.98–1.02)	1.01 (0.97–1.04)				
Alcohol use disorder past 12 months (%)	0.80 (0.31–2.06)	0.36 (0.21–0.62) ***	0.45 (0.19–1.09)	0.94 (0.32–2.73)	0.38 (0.21–0.69) **	0.41 (0.14–1.17)	$\chi^2(2)=10.95$, p<.01

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Note. PTSD = Posttraumatic Stress Disorder; CUD = Cannabis Use Disorder; COD = Cocaine Use Disorder; BSI = Brief Symptom Inventory; AOR are adjusted for age and race. In the adjusted model, race was non-significant($\chi^2(6) = 10.17, p=.12$); however age was significant ($\chi^2(2)=13.50, p<.01$) indicating COD participants are older than the other two groups.

* $p < .05$;
** $p < .01$;
*** $p < .001$