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Post-Traumatic Stress Disorders (K Chard and T Geracioti, Section Editors)

Simultaneous Treatment of Co-occurring Posttraumatic Stress Disorder and Substance Use Disorder

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Opinion statement

Posttraumatic stress disorder (PTSD) and substance use disorder (SUD) frequently co-occur. Existent evidence suggests that SUD often develops in reaction to PTSD symptoms, as individuals attempt to "self-medicate" their PTSD symptoms. Once the SUD develops, the disorders establish a bi-directional loop, with PTSD driving further substance use behaviors, and the SUD symptoms mirroring and reinforcing symptoms of PTSD. Once this bi-directional cycle is locked in, the disorders become more resistant to treatment and result in poorer prognoses and worse health outcomes versus having only one of these disorders. Traditional approaches to treatment of co-occurring PTSD and SUD have involved segregated and sequential treatment models. Normally, this involves treatments focused first on the SUD followed by a referral to different providers to address the PTSD. This traditional sequential and segregated treatment model presents several challenges to patients and treatment providers and may unintentionally contribute to the poorer prognosis observed in individuals with co-occurring PTSD-SUD. There are now state-of-the-art treatment approaches that focus on simultaneously treating PTSD and SUD. Psychotherapeutic protocols are available to simultaneously treat PTSD and SUD. Findings show that psychotherapies that simultaneously address PTSD and SUD show superior outcomes in reducing PTSD versus SUD treatment as usual. Recent studies also support the efficacy of several medications, including sertraline, naltrexone, and prazosin in treating co-occurring PTSD-SUD. Although treatments are shown to produce benefits to either reduce PTSD or improve SUD outcomes, no psychotherapeutic treatment,

psychopharmacologic treatment, or combination thereof is shown to produce greater benefits versus SUD treatment as usual for simultaneously reducing both PTSD symptoms and improving SUD outcomes. The current research suggests that clinicians should consider simultaneous treatment approaches for co-occurring PTSD and SUD.

Introduction

More than 50 % of the US population will experience a traumatic event during their lifetime [1]. Prevalence estimates indicate that 5–30 % of individuals who experience traumatic events will develop posttraumatic stress disorder (PTSD) [1–3]. To qualify for diagnosis of PTSD, individuals must have personally experienced or witnessed an event that involves actual or threatened serious injury, death, or sexual violence, or have learned that a close friend or close relative was exposed to violent or accident-related trauma. In addition, individuals must have the following symptoms for a period of at least 1 month, resulting in significant distress or interference with their daily functioning: persistent intrusive symptoms reminiscent of the trauma, avoidance of internal (e.g., memories, emotions) or external (e.g., situations, people activities) reminders of the trauma, negative changes in thoughts and mood resultant from the trauma, and increased arousal and reactivity following the trauma [4].

Prevalence of lifetime co-occurrence of psychiatric disorders is 88 % for men with PTSD and 79 % for women with PTSD [3]. Among men with PTSD, 53 % will develop alcohol use disorder during their lifetime, making alcohol use disorder the highest co-occurring lifetime psychiatric disorder among men with PTSD. Other drug use disorders are also common among men with PTSD, with 34 % having a lifetime drug use disorder. In comparison to men, women with PTSD have lower prevalence of substance use disorder (SUD), although the co-occurrence of SUD for women with PTSD is still common. Specifically, 34 % of women with PTSD have lifetime co-occurring alcohol use disorder, and 15 % have lifetime co-occurring drug use disorder [3]. Prevalence of PTSD among individuals with SUD is shown to range from 8 % of individuals with SUD in the general population to 43 % among patients in inpatient SUD treatment [5]. These population-based prevalence data show that co-occurring SUD-PTSD is a common issue that may be encountered by providers who treat patients with PTSD or SUD.

What explains the co-occurrence of PTSD and SUD?

The self-medication hypothesis has been proposed to explain the relationship between PTSD and SUD. According to this model, PTSD is thought to develop prior to the SUD, and the substance use behaviors become a reactionary and dysfunctional way to "self-medicate" PTSD symptoms [6, 7]. The effort to use alcohol or drugs to self-medicate symptoms is consistent with PTSD avoidance behaviors in that individuals are attempting to escape from the aversive intrusive and hyperarousal symptoms that accompany the disorder. Following behavioral learning principles, alcohol or drug use is hypothesized to be negatively reinforcing in that substance use provides short-term, immediate relief from PTSD symptoms. Consistent with this hypothesis, military veterans with PTSD report that they are motivated to use alcohol in an effect to cope with PTSD intrusion and hyperarousal symptoms [8]. The potent but short-term negative reinforcement from alcohol and drugs may lead these individuals to begin to increase their substance use to try to cope with the persistent PTSD symptoms. SUD then develops as the individuals began to experience negative consequences and symptoms associated with their alcohol or drug use.

In addition to psychological mechanisms explaining the co-occurrence of PTSD and SUD, large-scale studies of monozygotic and dizygotic twins demonstrate that a combination of environmental and genetic factors play important roles [9–11]. Relative to genetic factors, environmental factors appear to explain more of the co-occurrence of PTSD and SUD [10]. Among Vietnam combat veterans, the linkage between combat exposure and later alcohol misuse was found to be entirely explained by genetic and environmental vulnerabilities associated with PTSD [10]. This suggests that genetic and environmental underpinnings of PTSD appear to be the key ingredient for why these individuals develop SUD following combat. Finally, large-scale, longitudinal research has supported the self-medication hypothesis by showing that the onset of PTSD precedes onset of SUD, and the relationship between prior traumatic events and SUD is explained by the introduction of PTSD [12]. These findings suggest that it may be important to effectively treat PTSD in order to improve substance use outcomes among individuals with co-occurring PTSD and SUD.

How does co-occurring PTSD and SUD impact treatment?

The co-occurrence of PTSD with SUD is associated with more substance-related problems and worse physical health outcomes. Individuals with SUD and co-occurring PTSD relapse to alcohol or drugs more quickly than those with SUD who do not have co-occurring PTSD [13•]. In comparison to those with SUD but without PTSD, individuals with co-occurring SUD and PTSD have lower rates of remission from SUD and higher ongoing negative consequences of their substance use [14]. Also, co-occurring SUD and PTSD is associated with worse physical health outcomes versus having SUD without PTSD [15] or PTSD without SUD [16].

Clinician perceptions and common practices in addressing co-occurring PTSD and SUD

Not only are patients with co-occurring PTSD and SUD shown to exhibit worse outcomes on clinical measures, but clinicians also view them as more difficult to treat. Clinicians rate patients with PTSD and SUD as more difficult to treat versus patients with PTSD only or SUD only [17, 18]. Some of the reasons that clinicians view these patients as being particularly difficult to treat include occurrence of self-harm behaviors (e.g., suicidal behaviors) and potential for violence [17, 18]. In addition, clinicians report that they perceive that these patients require a high amount of case management needs and higher levels of care [17, 18].

Despite the high co-occurrence rate between PTSD and SUD [3], only about half of SUD treatment providers routinely screen for PTSD [14]. If SUD providers do screen for PTSD, it is rare that they use validated screening measures, and almost none use validated, structured clinical interviews to assess for PTSD diagnosis [14]. It is obvious then from these data that approximately half of the patients with PTSD who are being treated in SUD clinics do not get treatments that directly addresses their PTSD. Since SUD patients with untreated PTSD may be motivated to use substances to self-medicate their symptoms [6–8], the failure

to receive PTSD-focused treatment for these patients likely contributes to the poor treatment outcomes that has been shown to occur in this population.

Among SUD patients who are determined to have probable PTSD, it is unusual that these patients are treated for their PTSD within the SUD treatment program. Studies have revealed that fewer than 20 % of SUD clinicians provide PTSD treatment to their patients who are shown to have probable PTSD [14]. The more common scenario is for SUD treatment providers to refer these patients to another clinic for PTSD-focused treatment. Survey data show that between 40 and 60 % of SUD treatment providers routinely refer patients with co-occurring PTSD and SUD for PTSD-focused treatment [14].

In looking at the practices of clinicians who are working in PTSD or general mental health treatment settings, the majority of treatment providers report that they screen for SUD [16]. SUD has historically been considered to be a rule out for PTSD-focused treatments [19], and clinicians have commonly perceived that patients need to obtain abstinence from substances prior to starting PTSD treatment [17]. Therefore, patients may be referred to a SUD treatment program to address their substance use behaviors with the plan of stabilizing their addiction before PTSD-focused treatment is started.

The practice of segregated PTSD and SUD treatment (i.e., treatment being done by separate clinicians in separate clinics) and sequential PTSD and SUD treatment (i.e., SUD treatment first followed by PTSD treatment) may create several challenges to the patient and contribute to the difficulty in treating these conditions. One challenge for clinicians who are treating patients in a segregated treatment setting can be communication around patient care. As noted earlier, clinicians view patients with co-occurring PTSD and SUD as requiring a higher degree of case management and higher level of care versus patients who have only one of these conditions [17, 18]. The higher degree of case management and intensity of treatment that is thought to be required for these patients becomes especially challenging when clinicians are trying to coordinate care with others that are not within their program. This division of clinical responsibility can also create scenarios in which clinicians are giving patients different advice about the recommended course of treatment. For example, SUD providers may recommend that to the patient that he or she should achieve a set period of sobriety before engaging in trauma-focused treatment for PTSD, in order to remain focused on his or her substance use recovery and to avoid the emotional challenge of such treatment too early in the recovery process. The message being given to the patient by the PTSD treatment provider may go directly against that advice, and the PTSD treatment provider may be encouraging of the patient to start trauma-focused treatment for PTSD as soon as possible in order not to enable PTSD avoidance symptoms and to quickly gain relief from the PTSD symptoms. Given the evidence that patients with PTSD and SUD are motivated to use substances to self-medicate their PTSD symptoms [6–8], patients who receive sequential treatment (SUD first then referral to PTSD treatment) may be more prone to relapse to substances during the course of SUD treatment [13•]. Ongoing relapses for these patients then leads them to remain in the SUD treatment program, thereby creating a barrier for their referral to PTSD treatment. Given these potential problems that are created by sequential and segregated treatment models, treatments that simultaneously address PTSD and SUD have been developed and are worth considering in clinical practice.

Integrated psychotherapies for co-occurring PTSD and SUD

Instead of sequentially treating SUD first and then later treating PTSD, integrated psychotherapies have been developed to simultaneously address PTSD and SUD. Most of the research in integrated treatments for PTSD and SUD has been on psychotherapies that are "present-centered," meaning that they do not involve processing past trauma memories or directly addressing thoughts or emotions that are related to the past traumas. Present-centered psychotherapies include psychoeducation about PTSD and SUD and teaching skills in order to help individuals to stabilize symptoms and improve their coping capabilities. The present-centered psychotherapy for PTSD-SUD with the most research to date is Seeking Safety [19]. Seeking Safety is a structured treatment that targets both PTSD and SUD by teaching a range of coping skills that target PTSD symptoms and SUD-related problems. In randomized clinical trials that have compared Seeking Safety to other SUD or psychoeducational interventions, some studies showed better improvements in PTSD for those who received Seeking Safety [19]. The majority of studies have not found Seeking Safety to superior to treatment as usual on SUD outcomes [19].

Although certain studies have shown benefits for Seeking Safety and other present-centered therapies for improving PTSD symptoms among those with co-occurring PTSD and SUD, a recent meta-analysis found little combined evidence for superiority of these treatments versus standard of care or psychoeducational interventions [20•]. Seeking Safety and other present-centered therapies were not found to have significant benefits versus treatment as usual/minimal intervention on PTSD outcomes [20•]. Seeking Safety but no other present-centered therapies produced better initial SUD outcomes at posttreatment. However, the superiority of Seeking Safety on SUD outcomes was not maintained at later follow-up periods.

Integrated, trauma-focused psychotherapies have been developed for addressing SUD-PTSD co-occurrence. These trauma-focused therapies differ from present-centered therapies in that they focus on reducing PTSD symptoms by helping patients to confront and process their traumatic memories, challenge trauma-related thoughts, and reduce avoidance behaviors that are thought to maintain PTSD. Like present-centered therapies, trauma-focused psychotherapies for PTSD-SUD simultaneously include interventions to also help individuals to reduce problems related to SUD. One example of trauma-focused psychotherapy for PTSD-SUD is Concurrent Treatment of PTSD and Substance Use Disorders Using Prolonged Exposure (COPE). COPE combines prolonged exposure therapy for PTSD [21] with motivational enhancement and cognitive-behavioral treatment for substance use [22•]. A randomized controlled trial showed that COPE was superior to treatment as usual for reducing PTSD but not for reducing the severity of SUD problems [22•]. This finding is consistent with results from a meta-analysis, which showed that, trauma-focused psychotherapies in conjunction with SUD-focused treatment were superior to treatment as usual in reducing PTSD symptoms, but not for reducing SUD problems [20•]. Finally, results from an open trial pilot study showed that participation in a trauma-focused, couple-based treatment for co-occurring PTSD and alcohol use disorder was associated with reduction of PTSD symptoms, alcohol

consumption, and depression symptoms [23]. In summary, trauma-focused psychotherapies for co-occurring SUD-PTSD show potential in helping to reduce PTSD symptoms, but there is not compelling evidence for these psychotherapies to produce better SUD outcomes versus SUD treatment as usual.

Psychopharmacological treatments for co-occurring PTSD and SUD

Some research shows there is promise for combining psychopharmacological interventions with PTSD-SUD psychotherapies for individuals with co-occurring PTSD and alcohol use disorder. A recent randomized clinical trial was conducted to test the efficacy of sertraline plus Seeking Safety versus placebo plus Seeking Safety for individuals with co-occurring PTSD and alcohol use disorder [24•]. The results showed that sertraline plus Seeking Safety was superior to placebo plus Seeking Safety in reducing PTSD symptoms. However, the combination of sertraline plus Seeking Safety was not superior to placebo plus Seeking Safety for reducing alcohol-related problems [24•]. This finding is not entirely surprising, since there is demonstrated efficacy for sertraline in treating PTSD [25], whereas the cumulative evidence shows mixed findings for sertraline in reducing alcohol use behaviors [24•].

Another study examined the efficacy of combining naltrexone with prolonged exposure therapy among individuals with co-occurring alcohol use disorder and PTSD [26•]. In this study, individuals were randomly assigned to receive: (a) prolonged exposure therapy plus naltrexone, (b) prolonged exposure therapy plus placebo, (c) supportive counseling plus naltrexone, or (d) supportive counseling plus placebo. All conditions showed significant and large reductions in drinking behaviors and PTSD symptoms. Those who received naltrexone demonstrated fewer days of alcohol consumption versus those who received placebo. Prolonged exposure was not superior to supportive counseling in reducing PTSD symptoms. This finding is somewhat surprising, since prolonged exposure is shown to be a highly efficacious treatment among individuals with PTSD who do not exhibit co-occurring SUD [27]. Overall, these findings suggest that naltrexone has promise in helping to reduce alcohol consumption among individuals with alcohol use disorder and PTSD, and present-centered and trauma-focused therapies appear to both produce benefits in reducing PTSD symptoms in this population.

Finally, a recent study examined the efficacy of prazosin among individuals with co-occurring PTSD and alcohol use disorder [28]. Although prazosin has shown to produce benefits for individuals with PTSD who do not have alcohol use disorder and for individuals with alcohol use disorder who do not have PTSD, no studies had tested the efficacy of prazosin among those with co-occurring PTSD and alcohol use disorder. This study showed that when compared to placebo, prazosin produced lower levels of alcohol consumption. However, prazosin was not superior to placebo in reducing PTSD symptoms. Prazosin produced significantly greater

complaints regarding drowsiness versus placebo. These findings suggest that prazosin has promise for reducing alcohol consumption but not for reducing PTSD symptoms among individuals with co-occurring PTSD and alcohol use disorder.

Conclusions and future directions

Co-occurring PTSD and SUD are notoriously more difficult to treat than either condition alone. Fortunately, there are psychotherapies and medications that are shown to be beneficial in addressing these conditions. These contemporary PTSD-SUD treatments shift away from sequential and segregated treatment models, in which PTSD and SUD are separately addressed. Instead current treatments for co-occurring PTSD and SUD target both disorders simultaneously. Controlled studies show that the integrated psychotherapeutic treatment approaches to SUD-PTSD have some advantages versus SUD treatment as usual in reducing PTSD, particularly when these treatments incorporate trauma-focused interventions to address dysfunctional cognitions and reduce avoidance behaviors. However, these integrated PTSD-SUD psychotherapies are not superior to SUD treatment as usual or psychoeducational interventions for reducing SUD-related problems. It is important to note that SUD treatment as usual or psychoeducational interventions are associated with improvements in SUD outcomes among individuals who have co-occurring PTSD-SUD. Nonetheless, this suggests that there is a need to develop treatments that will further improve SUD outcomes among those with co-occurring PTSD-SUD, especially since this population has worse SUD treatment outcomes and prognosis versus individuals with SUD who do not have co-occurring PTSD [13•].

Recent studies of psychopharmacological treatments suggest that there is promise for the efficacy of medications in conjunction with PTSD-SUD psychotherapies. Randomized clinical trials among individuals with PTSD and alcohol use disorder show that sertraline reduces PTSD symptoms, and naltrexone and prazosin reduce alcohol consumption. However, there is a paucity of research to examine the efficacy of medications for substance use disorders other than alcohol use disorder. Also, the findings show that certain medications may be efficacious for either PTSD or SUD but not both. Additional research is needed to replicate these findings, and further development is needed for medications that are efficacious for simultaneously treating PTSD and SUD.

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Compliance with Ethical Standards

Conflict of Interest
Jeremiah A. Schumm declares that he has no conflict of interest.
Whitney L. Gore declares that she has no conflict of interest.

Human and Animal Rights and Informed Consent
This article does not contain any studies with human or animal subjects performed by any of the authors.

References and Recommended Reading

Papers of particular interest, published recently, have been highlighted as:
- • Of importance

1. Ozer E, Best S, Lipsey T, Weiss D. Predictors of posttraumatic stress disorder and symptoms in adults: a meta-analysis. Psychol Bull. 2003;129:52–73.
2. Breslau N, Davis GC, Andreski P, Peterson E. Traumatic events and posttraumatic stress disorder in an urban population of young adults. Arch Gen Psychiatry. 1991;48:216–22.
3. Kessler RC, Sonnega A, Bromet E, Hughes M, Nelson CB. Posttraumatic stress disorder in the National Comorbidity Survey. Arch Gen Psychiatry. 1995;52:1048–60.
4. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 5th ed. Arlington: American Psychiatric Publishing; 2013.
5. Jacobsen LK, Southwick SM, Kosten TR. Substance use disorders in patients with posttraumatic stress disorder: a review of the literature. Am J Psychiatry. 2001;158:1184–90.
6. Jacobsen L, Southwick S, Kosten TR. Substance use disorders in patients with posttraumatic stress disorder: a review of the literature. Am J Psychiatry. 2001;158:1184–90.
7. Khantzian EJ. Treating addiction as a human process. London: Jason Aronson; 1999.
8. Bremner JD, Southwick SM, Darnell A, Charney DS. Chronic PTSD in Vietnam combat veterans: course of illness and substance abuse. Am J Psychiatry. 1996;153:369–75.
9. Scherrer JF, Xian H, Lyons MJ, et al. Posttraumatic stress disorder, combat exposure, nicotine dependence, alcohol dependence, and major depression in male twins. Compr Psychiatry. 2008;49:297–304.
10. Xian H, Chantarujikapong SI, Scherrer JF, et al. Genetic and environmental influences in posttraumatic stress disorder, alcohol and drug dependence in twin pairs. Drug Alcohol Depend. 2000;61:95–102.
11. Brown PJ, Stout RL, Mueller T. Substance use disorder and posttraumatic stress disorder comorbidity: addiction and psychiatric treatment rates. Psychol Addict Behav. 1999;13:115–22.
12. Breslau N, Davis GC, Andreski P, Peterson E. Traumatic events and posttraumatic stress disorder in an urban population of young adults. Arch Gen Psychiatry. 1991;48:216–22.
13. • Ouimette PC, Finney JW, Moos RH. Two-year posttreatment functioning and coping of substance abuse patients with posttraumatic stress disorder. Psychol Addict Behav. 1999;13:105–14.

This study provides evidence for the negative prognosis that is exhibited by individuals with substance use disorders and co-occurring posttraumatic stress disorder.

14. Young HE, Rosen CS, Finney JW. A survey of PTSD screening and referral practices in VA addiction treatment programs. J Subst Abuse Treat. 2005;28:313–9.
15. Ouimette PC, Goodwin E, Brown PJ. Health and well-being of substance use disorder patients with and without PTSD. Addict Behav. 2006;31:1415–23.
16. Rosen CS, Chow HC, Finney JF, Greenbaum MA, Moos RH, Sheikh JI, et al. VA practice patterns and practice guidelines for treating posttraumatic stress disorder. J Trauma Stress. 2004;17:213–22.
17. Najavitis LM, Norman SB, Kivlahan D, Kosten TR. Improving PTSD/substance abuse treatment in the VA: a survey of providers. Am J Addict. 2010;19:257–63.
18. Back SE, Waldrop AE, Brady KT. Treatment challenges associated with comorbid substance use and posttraumatic stress disorder: clinician's perspectives. Am J Addict. 2009;18:15–20.
19. Najavitis LM, Hien D. Helping vulnerable populations: a comprehensive review of the treatment outcome literature on substance use disorder and PTSD. J Clin Psychol In Session. 2013;69:433–79.
20. • Roberts NP, Roberts PA, Jones N, Bisson JI. Psychological interventions for post-traumatic stress disorder and comorbid substance use disorder: a systematic review and meta-analysis. Clin Psychol Rev. 2015;38:25–38.

This recent meta-analysis summarizes the evidence for present-centered and trauma-focused psychotherapies for addressing co-occurring substance use disorders and posttraumatic stress disorder.

21. Foa EB, Hembree EA, Rothbaum BO. Prolonged exposure therapy for PTSD: emotional processing of traumatic experiences: therapist guide. New York: Oxford University Press; 2007.

22.• Mills KL, Teeson M, Back SE, et al. Integrated exposure-based therapy for co-occuring posttraumatic stress disorder and substance dependence: a randomized controlled trial. J Am Med Assoc. 2012;308:690–9.

This randomized controlled trial examined the efficacy of integrating prolonged exposure therapy with substance use psychotherapy for individuals with co-occurring substance use disorders and posttraumatic stress disorder. Findings showed greater benefits for the study treatment with regard to posttraumatic stress disorder but not substance use disorder.

23. Schumm JA, Monson CM, O'Farrell TJ, Gustin N, Chard KM. Couple treatment for alcohol use disorder and posttraumatic stress disorder: pilot results from military veterans and their partners. J Trauma Stress. 2015;28:247–52.

24.• Hien DA, Levin FR, Ruglass LM, et al. Combining seeking safety with sertraline for PTSD and alcohol use disorders: a randomized control trial. J Consult Clin Psychol. 2015;83:359–69.

This recent randomized clinical trial examined the efficacy of combining sertraline with Seeking Safety for individuals with co-occurring alcohol use disorder and posttraumatic stress disorder. Findings showed that the combination of Seeking Safety plus sertraline was superior to Seeking Safety plus placebo for treating posttraumatic stress disorder.

25. Friedman MJ, Davidson JRT, Stein DJ. Psychopharmacotherapy for adults. In: Foa EB, Keane TM, Friedman MJ, Cohen JA, editors. Effective treatments for PTSD. 2nd ed. New York: The Guilford Press; 2009. p. 245–68.

26.• Foa EB, Yusko DA, McLean CP, et al. Concurrent naltrexone and prolonged exposure therapy for patients with comorbid alcohol dependence and PTSD: a randomized clinical trial. J Am Med Assoc. 2013;310:488–95.

This randomized controlled trial showed benefits of adding naltrexone to psychotherapy for the treatment of co-occurring alcohol use disorder and posttraumatic stress disorder.

27. Cahill SP, Rothbaum BO, Resick PA, Follette VM. Cognitive-behavioral therapy for adults. In: Foa EB, Keane TM, Friedman MJ, Cohen JA, editors. Effective treatments for PTSD. 2nd ed. New York: The Guilford Press; 2009. p. 139–222.

28. Simpson TL, Malte CA, Dietel B, et al. A pilot trial of prazosin, an alpha-I adrenergic antagonist, for comorbid alcohol dependence and posttraumatic stress disorder. Alcohol Clin Exp Res. 2015;39:808–17.