

Posttraumatic Stress and Substance Use Disorders: A Biological and Clinical Summary

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The comorbidity of post-traumatic stress disorder (PTSD) and substance use disorders (SUD) has been established in a number of studies, however treatment programs have historically focused on one disorder without considering the other. In addition to the growing clinical awareness of the comorbidity, there has been increased interest in its biological underpinnings and treatment options. This paper seeks to briefly review the biological processes involved, the interplay between symptoms, and examine two of the recent attempts at integrative treatment.

The comorbidity of post-traumatic stress disorder (PTSD) and substance use disorders (SUD) has been established in a number of studies (Breslau, Davis, Andreski, & Peterson, 1991; Kessler, Sonnega, Bromet, Hughes, & et al., 1995; Kulka et al., 1990; Resnick, Kilpatrick, Dansky, Saunders, & et al., 1993). For example, in studies of combat veterans with PTSD, alcohol abuse or dependence was the most common comorbid diagnosis. Other substance abuse or dependence also occurred at high rates in this population (Kessler et al., 1995; Kulka et al., 1990). In one study the comorbidity between alcohol abuse and PTSD was as high as 75% (Kulka et al., 1990).

With growing awareness of the comorbidity, there has been increased interest in both its biological underpinnings and treatment options. This paper seeks to briefly review the biological processes involved and the interplay between symptoms, as well as examine two of the recent attempts at integrative treatment.

Diagnostic Criteria

Substance use disorders (SUD) vary in their presentation from substance to substance, but share certain common features. In this paper, SUD will include both substance abuse and substance dependence. Substance abuse is defined as meeting one of the following criteria in a year: failure to meet obligations at work, school, or home as a result of use, engaging in dangerous behaviors while intoxicated (such as drunk driving), recurrent substance use related legal problems, and continued substance use despite recurrent social or interpersonal problems (American Psychiatric Association, 2000). Criteria for dependence involve meeting at least three of the following criteria: tolerance for

longer or in larger amounts than intended, inability to control or reduce use, spending large amounts of time procuring, using, or recovering from a substance, giving up major life activities in favor of substance use, and continued use despite the awareness of negative physical or psychological effects caused by or exacerbated by the substance (American Psychiatric Association, 2000).

PTSD, by definition, is precipitated by either a direct threat to one's life or physical integrity or witnessing such an act and is marked by feelings of fear, helplessness, or horror (American Psychiatric Association, 2000). PTSD symptoms consist of three clusters. The first is reexperiencing symptoms such as flashbacks, nightmares, or intrusive recollections that may be caused by environmental cues associated with the trauma. The second group is characterized by avoidance of thoughts, feelings, or places associated with the trauma, as well as dissociation, restricted affect, and social withdrawal. The final symptom group involves increased arousal; which includes hypervigilance, difficulty concentrating, sleep dysfunction, or increased startle response. War veterans and rape and incest survivors are grouped together in this discussion. Though there may be differences in their specific experiences, both trauma types must meet DSM-IV-TR criteria and both involve a "violation of pre-existing schemata of the self and the world, such as, that one is a good person and that the world is a safe and fair place where bad things do not happen to good people without reason" (Dye & Roth, 1991, p. 104).

Biological Similarities

On a biological and neurological level, a number of similarities have been found between PTSD and SUD. These disorders share two major systems: the hypothalamic-pituitary-adrenal (HPA) axis and the noradrenergic system (though other systems are involved to a lesser extent). These two systems work simultaneously in response to stress during both substance use and PTSD (Jacobsen, Southwick, & Kosten, 2001). In the HPA system, stress

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leads to an increased turnover of norepinephrine in the locus ceruleus and the discharge of the corticotropin-releasing hormone (CRH) in the pituitary portal system. These processes lead to the discharge of adrenocorticotrophic hormone (ACTH, also referred to as *corticotropin*) in the pituitary, which in turn leads to a release of cortisol from the adrenal glands. Cortisol then in turn inhibits the production of CRH, creating a negative feedback loop (see figure 1; Austgen, Bowen, & Rouge, 2003).

There is growing evidence that increased CRH is associated with anxious withdrawal symptoms and is a mediating factor in substance relapse (Jacobsen et al., 2001). Increased levels of CRH also have been shown to lead to a startle response, as seen in PTSD. Blocking the effects of CRH, on the other hand, prevents the development of withdrawal associated behaviors related to anxiety. For example Jacobson et al describe a study which found that injecting CRH “reinstated heroin seeking after extinction in rats trained to self-administer the drug” (Jacobsen et al., 2001, p. 1186).

The growing consensus at this time around the effects of chronic stress or PTSD on HPA axis function is that the “glucocorticoid negative feedback loop is enhanced in PTSD,” (Jacobsen et al., 2001, p. 1186) thus elevating CRH. This is of interest because CRH in the amygdala has been linked with fear-related behaviors such as the startle response. In addition, as mentioned earlier, elevated CRH has been implicated in stress related relapse. Therefore, CRH may be related to both hyperarousal and relapse. Interestingly, elevated CRH “enhances the euphorogenic properties of certain drugs, such as stimulants, and may worsen the severity of withdrawal symptoms, thereby prompting patients to relapse to drug use” (Jacobsen et al.,

2001, p. 1187). The opposite could also be true: that high levels of CRH caused by withdrawal may increase PTSD symptoms such as hyperarousal, which negatively effects mood and increases the chance of relapse.

The second major system involved in PTSD and SUD is the noradrenergic system. When an individual experiences chronic, uncontrollable stress, there is increased norepinephrine turnover in the brain (Jacobsen et al., 2001). The regions of the brain affected most are the locus ceruleus, hypothalamus, amygdala, and cerebral cortex. This scenario has also been observed in individuals withdrawing from alcohol and opiates.

The noradrenergic and HPA systems also interact with one another. For example, stress increases both CRH and norepinephrine via the amygdala and hypothalamus (Jacobsen et al., 2001). There has been some evidence that these two systems may increase one another, causing an increasing spiral of anxiety and hyperarousal related to PTSD, withdrawal, or both.

Clinical Interaction

The biological interplay between PTSD and SUD affects the client and treatment in a number of ways. For example, treating one disorder does not resolve the other, and often makes it worse (Najavits, 2002). Clients frequently abuse substances in an attempt to reduce PTSD symptoms and when an individual stops taking the substance, one of the major coping mechanisms is taken away. Furthermore, withdrawal symptoms are similar to and can exacerbate PTSD symptoms such as hyperarousal (Jacobsen et al., 2001; Najavits, 2002).

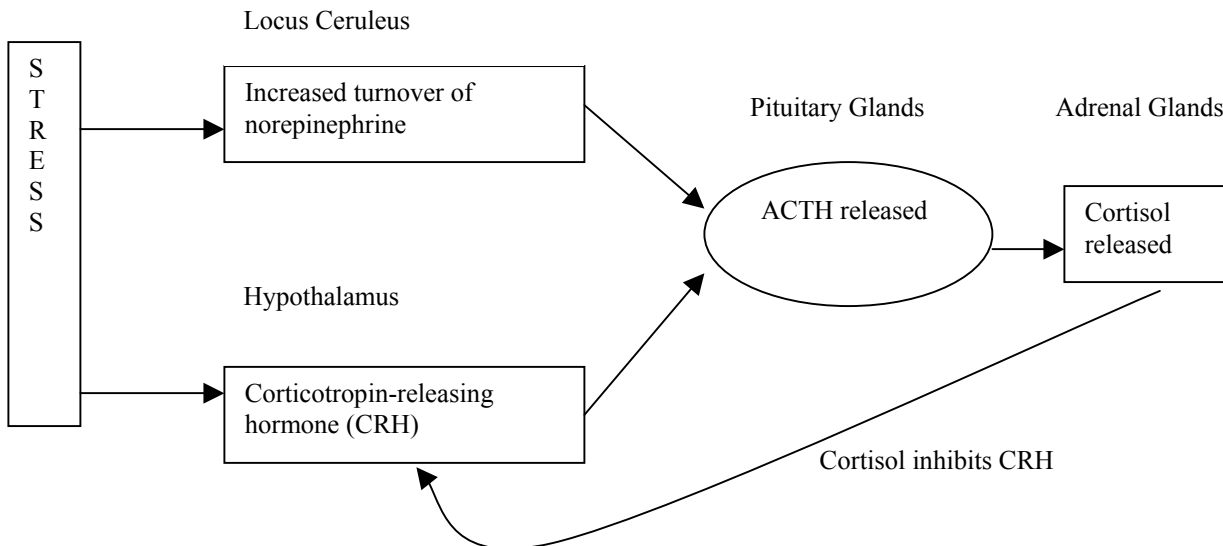


Figure 1.

In addition, SUD clients are at increased risk for trauma and PTSD sufferers are more susceptible to repeated abuse than someone who has not been traumatized in the past (Messman-Moore & Long, 2003; Najavits, 2002; Roodman & Clum, 2001).

These and other factors can lead to a “downward spiral” for the client. PTSD clients are at increased risk to develop a SUD and SUD clients are at increased risk for trauma. As a client uses substances in response to PTSD symptoms, their SUD develops further. When entering treatment, the already difficult process of withdrawal is compounded by PTSD symptoms (Najavits, 2002).

Integrative Treatments

Seeking Safety

This paper seeks to compare two of the recent empirically supported integrative treatments that have been developed: Substance Dependence PTSD Therapy (SDPT; Triffleman, Carroll, & Kellogg, 1999) and Seeking Safety (Najavits, 2002). Seeking Safety’s title is derived from the author’s belief that safety is the most urgent and important need of people recovering from PTSD and SUD. “Safety” encompasses behaviors, thoughts, friends, and places in the client’s life.

There are five central ideas underlying the Seeking Safety treatment. First, as stated above, safety is the priority of treatment. Second, the treatment is integrative, not merely an addiction treatment added on to a PTSD treatment. Treatment of the two disorders is simultaneous, regardless of which is predominant in the presenting complaint. Third, there is a strong focus on creating meaning and living up to ideals. The fourth is that treatment consists of four areas: cognitive, behavioral, interpersonal, and case management. Lastly, the process of therapy and the therapist are as important as the techniques that are implemented. This includes attention to the dynamic issues in the relationship between therapist and client. Therapy is expected to last approximately six months.

As mentioned above, four areas are targeted for intervention. The cognitive techniques focus on relapse prevention, such as problem solving and cognitive restructuring. In addition, there is a strong emphasis on compassion for self and others. Behavioral interventions include techniques such as activity scheduling, self-care, and behavioral experiments. The goal is to make concrete steps, however small, during each session. These techniques, which can be applied to both disorders, are familiar concepts from relapse prevention (Marlatt & Gordon, 1985) and general cognitive behavior therapy (Beck, 1995).

Seeking Safety also focuses on interpersonal issues. This is especially salient because the violence involved in PTSD is often interpersonal in nature and self-perpetuating. For example, an individual may be in an abusive relationship (interpersonal situation) which may be a pattern that has been repeated since an initial childhood trauma (Messman-Moore & Long, 2003). Furthermore, substance abusers

are at higher risk for interpersonal violence (Najavits, 2002).

The last area of focus is case management. Because clients are often in need of a wide variety of services, it is important they have case management to help reconnect them to their communities and to take care of urgent needs such as food and shelter. Other case management needs may include medication management, vocational counseling, and domestic violence counseling.

The treatment is also specific in which elements it does not include, such as Prolonged Exposure therapy (PE; Foa, Hembree, & Dancu, 1999). Najavits (2002) states that the treatment is focused on current life issues and does not dwell on the precursors that led to the diagnoses. There is also the additional concern that PE could trigger relapse, especially due to the time-limited nature of the treatment. In order to stay focused on the present symptom picture, this treatment does not recommend psychodynamic interpretations of the disorders.

Substance Dependence Posttraumatic Stress Disorder Therapy

Another recent empirically supported cognitive behavioral approach is SDPT (Triffleman et al., 1999). The primary goals of treatment are abstinence through Cognitive Behavioral and Coping Skills Treatment (CBCST), continued abstinence during PTSD treatment, and reduced PTSD symptoms. It is a two phase treatment lasting approximately five months. The first phase, lasting 12 weeks and covering 9 topics, is called “Trauma-Informed, Addictions-Focused Treatment” (Triffleman et al., 1999, p. 4) and focuses on abstinence, PTSD psychoeducation, PTSD symptoms, and the interaction between the two diagnoses within each participant. Five of the topics have been adapted specifically for this dually-diagnosed population.

The second phase, called “Trauma-Focused, Addictions-Informed” (Triffleman et al., 1999, p. 5), focuses on an adaptation of PE and stress inoculation training (SIT; Foa, Rothbaum, Riggs, & Murdock, 1991). Phase II is divided into two parts. The first section involves stress inoculation training, which uses cognitive and behavioral strategies to learn how to approach avoided stimuli, how to confront it, ways to cope when overwhelmed, and how to deal with any after-effects of the confrontation. The second portion continues the SIT while conducting in vivo exposure. In vivo exposure is carried out much like Foa et al.’s (1999) manualized treatment. Special attention is paid to developing the hierarchy of feared situations and implementing exposure in a slow and measured way so as to reduce the risk of relapse.

SDPT allows for clinical judgment in transitioning an individual from Phase I to Phase II. Abstinence is preferred, but not mandatory, as long as progress has been made in the SUD treatment. The client must also be evaluated as to whether they are stable enough to endure the additional stress involved in Phase II.

Comparison of Treatments

Both SDPT and Seeking Safety are strong empirically based treatments of PTSD and SUD. Though their format varies, the majority of the components overlap. Seeking Safety contains 25 topics, but several, such as Compassion, Recovery Thinking, and Create Meaning, could be condensed under a single heading of cognitive restructuring and core beliefs. The benefit of separating these topics may be to make them more palatable to the client (and clinician) and more easily absorbed, though this is not explicitly stated.

Psychodynamic issues such as transference, countertransference, defenses, and projections are considered in both therapies. Because of the strong (often contradictory) feelings that traumatized and substance-abusing clients evoke in therapists, awareness of dynamic issues is critical (Daskovsky, 1998). However, both make the distinction that dynamic interpretations are not appropriate or productive for this type of treatment. In other words, awareness of the transference and countertransference is important for the clinician's objectivity, but the analysis of such issues with the client is beyond the scope of these short-term treatments.

The role of case management is highlighted to varying extents in both treatments. While Seeking Safety considers it one of the four core approaches, it is still well accounted for in SDPT. Both recognize that many clients who enter treatment are in need of a wide range of services that therapy alone cannot provide.

There are, however, a number of differences between treatments. First and most notably is the issue of in vivo exposure. Seeking Safety states that the risk of relapse due to the stress is too great to consider exposure treatment in this time limited format. Though similar in duration, SDPT makes in vivo exposure a core component of its program. SDPT allows for clinical judgment in deciding when to proceed, but the assumption is that the majority of clients can and will benefit from in vivo exposure.

Seeking Safety does allow for in vivo exposure as an adaptation that can be undertaken by individual clinicians in longer-term treatment. Future research may indicate whether patients treated with SDPT experience significant relapses or drop out more frequently when compared to other treatments that do not include exposure.

Another difference between the two therapies is Seeking Safety's emphasis on interpersonal issues. While SDPT includes interpersonal elements, Seeking Safety considers it tantamount in importance with cognitive and behavior methods. A third of the topics covered address interpersonal issues (Najavits, 2002).

An additional variation is that Seeking Safety borrows some techniques from the growing psychological field of mindfulness treatment (Kabat-Zinn, 1990). Seeking Safety's "grounding" techniques ask clients to notice everything they can about the world around them. Increasing one's awareness of the world around them and "de-

centering" oneself from one's emotions is a central theme of this Buddhism-derived therapy (Lau & McMain, 2003).

While both of these protocols advance the treatment of comorbid PTSD and SUD, they are still in the early stages of empirical testing. SDPT cites unpublished clinical trials that guided its development, but had no published clinical trials to date. Seeking Safety's author, Najavits, has undertaken studies to provide an empirical basis for her treatment (Najavits, 2000, 2002; Najavits, Weiss, & Liese, 1996; Najavits, Weiss, Shaw, & Muenz, 1998; Zlotnick, Najavits, Rohsenow, & Johnson, 2003). For example, in a sample of 17 incarcerated women diagnosed with both PTSD and SUD 53% no longer met criteria for PTSD by the end of treatment (Zlotnick et al., 2003). Data on substance use was not very meaningful due to the reduced access to drugs in prison. In a study of 100 low-income women, Seeking Safety significantly reduced substance use and PTSD symptoms when compared to a control group receiving the 'standard' outpatient treatment (Najavits et al., 1998). However, a third group in this study was treated with relapse prevention techniques (Marlatt & Gordon, 1985) and made similar gains to Seeking Safety, raising the question of whether Seeking Safety offers something above and beyond other current treatments.

This initial research on the integration PTSD and SUD treatments has spurred other clinicians to develop empirically tested treatments. Most notable are Concurrent Treatment of PTSD and Cocaine Dependence (CTPCD; Back, Dansky, Carroll, Foa, & Brady, 2001), which includes imaginal exposure in their treatment, and Transcend (Donovan, Padin-Rivera, & Kowaliw, 2001) which is a more intensive, partial hospitalization program developed for veterans.

While many techniques are effective, Prolonged Exposure (PE), which includes both in vivo and imaginal exposure, has the greatest long term effect on reducing PTSD symptoms (Foa et al., 1991; Hembree, Rauch, & Foa, 2003; Taylor, 2003; Taylor et al., 2003; van Etten & Taylor, 1998). It would seem useful to incorporate PE into a truly integrative treatment in order to fully address the PTSD symptoms, however, as mentioned before, this may increase the risk of relapse and drop out. It is necessary to have these treatments tested by other clinicians in other settings to settle issues such as this. In addition, the author suggests that a component analysis be undertaken to elucidate which factors are most important for the reduction of symptoms.

Conclusion

The difficulties clients face from SUD and PTSD are enormous. Either disorder alone can be serious and debilitating. When combined, they complement each other in what appears to be a synergistic manner, with one disorder driving and reinforcing the other and vice versa. There is a strong comorbidity of these two separately formulated diagnoses that until relatively recently was overlooked. However, the anecdotal connection has been strengthened by biological and psychological research findings.

Both treatments are relatively new, though many of their components have been proven effective with other disorders. While future research may indicate one is more efficacious than the other, it seems that they hold much in common. The most significant difference, in this writer's opinion, is the presence or absence of the PE component. However, because both treatments stress their flexibility, it seems that therapist preference and client presentation may be the best guide as to which treatment to choose at this point.

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