



The mediating role of sleep disturbances in the relationship between posttraumatic stress disorder and self-injurious behavior



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ABSTRACT

Although posttraumatic stress disorder (PTSD) is associated with self-injurious behavior, it is currently unclear what mechanisms may account for this relationship. Sleep disturbances may be relevant as they are common among those with PTSD and are associated with emotion regulation difficulties, which may increase vulnerability to self-injurious behavior. As such, we investigated the relationship between PTSD and self-injurious behaviors, and the mediating roles of nightmares and insomnia. Hypotheses were tested cross-sectionally in a sample of psychology clinic outpatients ($N=255$). Participants completed a structured clinical interview assessing PTSD and self-report questionnaires measuring insomnia, nightmares, and self-injurious behaviors (i.e., Have you ever cut, burned, or scratched yourself on purpose?). PTSD was associated with self-injurious behavior after covarying for depression, and nightmare severity mediated the relationship between PTSD and self-injurious behavior. Findings are consistent with research indicating that sleep disturbances, specifically nightmares, are important predictors of poor outcomes among those with PTSD, and extend this research to suggest their role in self-injurious behaviors as well.

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1. Introduction

Among the general population, it is estimated that 70–80% of individuals will experience a traumatic event in their lifetime (Resnick, Kilpatrick, Dansky, Saunders, & Best, 1993). Approximately 8% of these individuals will go on to develop clinically significant symptoms in the wake of traumatic event exposure and be diagnosed with posttraumatic stress disorder (PTSD; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). PTSD is a disorder characterized by the onset of various types of symptoms in the aftermath of a traumatic event. Symptoms include re-experiencing the event (e.g., intrusive memories, flashbacks), avoidance of reminders of the trauma, negative alterations in cognitions and mood (e.g., inability to feel positive emotions), and hyperarousal (e.g., hypervigilance). PTSD is associated with significant distress and impairment, with many individuals reporting substantial disability in social, occupational, and familial domains (Kessler, 2000; Rodriguez et al., 2012). For example, many individuals with PTSD have difficulties with work and/or academic performance, suffer from social isolation, and are at risk for comorbid mental illnesses

and suicidality, resulting in a substantial societal burden (Kessler, 2000; Rodriguez et al., 2012).

Another negative consequence associated with PTSD is self-injurious behavior. Self-injurious behavior refers to the deliberate destruction of one's own body tissue and includes a wide range of behaviors such as skin cutting, which is the most common form, burning, biting, self-hitting, and skin scratching (Briere & Gil, 1998; Favazza & Rosenthal, 1993; Muehlenkamp, 2005). Self-injurious behavior is similar to suicidal behavior in that it involves serious bodily injury, but differs in that oftentimes it occurs without intent to die. In contrast with suicide attempts, self-injurious behavior is often performed for several different functions including emotion regulation, interpersonal influence or communication, self-punishment, and as a means to end dissociation (Klonsky, 2007; Nock & Prinstein, 2004). Specifically, research has shown that individuals use self-injury to experience shock (e.g., through the sight of blood) or physical sensations to interrupt dissociation or depersonalization. This may be particularly relevant as dissociation can be common among certain individuals with PTSD (Hart, Nijenhuis, & Steele, 2005). Moreover, research has demonstrated differences in individuals who had engaged in self-injurious behavior versus those who had attempted suicide. For example, Muehlenkamp and Gutierrez (2004) found that individuals with a history of self-injurious behavior had more positive attitudes about life than individuals who have attempted suicide. Prevalence esti-

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mates for self-injurious behavior are between 12 and 23% among samples such as adolescents and adults presenting at Emergency Departments, and these rates appear to be increasing (Jacobson & Gould, 2007; O'Loughlin & Sherwood, 2005). Furthermore, self-injurious behavior is associated with psychiatric problems and increased risk for suicide attempts and death by suicide (Hawton, Harriss, Simkin, Bale, & Bond, 2004; Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006). Given that self-injurious behavior is a considerable public health problem and appears to function differently than suicidal behavior, it has recently been proposed as a clinically distinct diagnosis in the DSM-5 (American Psychiatric Association, 2013).

Self-injurious behavior also appears to be associated with traumatic event exposure and associated PTSD symptoms. Traumatic events such as childhood sexual abuse, intimate partner violence, and witnessing trauma have all been shown to be positively related to self-injurious behavior (Smith, Kouros, & Meuret, 2014). Self-injurious behavior is also related to PTSD, with between 13.8% to 52.7% of individuals who meet criteria for PTSD also engaging in self-injurious behavior (Harned, Najavits, & Weiss, 2006; Maršanić et al., 2014). Meta-analysis has demonstrated that PTSD symptoms, rather than trauma exposure itself, are important in predicting engagement in self-injurious behavior (Klonsky & Moyer, 2008). Additionally, PTSD, in comparison with other anxiety-related disorders, is associated with a variety of impulsive behaviors not limited to self-injurious behavior, including alcohol and substance use, risky sexual behavior, and interpersonal aggression (Weiss, Tull, Viana, Anestis, & Gratz, 2012). Taken together, research demonstrates that trauma exposure, and PTSD symptoms in particular, are associated with engagement in self-injurious behavior.

Despite emerging research on the relationship between PTSD and self-injurious behavior, no studies to our knowledge have examined potential mechanisms of this relationship. One factor that may be of promise in this regard is sleep disturbances. Sleep disturbances are common among those with PTSD, with some researchers considering disturbed sleep as a hallmark feature of PTSD (Germain, 2013). Specifically, symptoms of insomnia, defined as a difficulty initiating or maintaining sleep leading to daytime consequences (e.g., fatigue, poor concentration), is the most commonly reported symptom of PTSD (Neylan et al., 1998). Indeed, previous research has indicated that up to 44% of individuals with PTSD report trouble falling asleep, while up to 91% of those with PTSD complain of difficulty maintaining sleep (Dow, Kelsoe, & Gillin, 1996; Freed, Craske, & Greher, 1999). In addition, it is estimated that 19–71% of those with PTSD suffer from nightmares, which may be reenactments or reminders of the traumatic event, and can be highly distressing for those with PTSD (Leskin, Woodward, Young, & Sheikh, 2002; Ohayon & Shapiro, 2000). Both insomnia and nightmares contribute to difficulties with psychosocial functioning and decreased quality of life (Ancoli-Israel & Roth, 1999; Silver, Brooks, & Obenchain, 1995; Zadra & Pihl, 1997). Moreover, among those with PTSD, sleep disturbances have been associated with problems with daytime functioning, as well as increased risk for physical health problems, substance use, and depression (Clum, Nishith, & Resick, 2001; DeViva, Zayfert, & Mellman, 2004; Krakow et al., 2000; Nishith, Resick, & Mueser, 2001).

In addition to these negative consequences associated with sleep disturbances, the literature suggests that sleep disturbances may also be associated with increased vulnerability to self-injurious behaviors. Specifically, sleep loss is associated with increased negative affect and increased reactivity to negative emotional cues (Babson, Feldner, Trainor, & Smith, 2009; Yoo, Gujar, Hu, Jolesz, & Walker, 2007), which may be a risk factor on its own considering that a common use of self-injurious behavior is to

relieve intense negative affect (Klonsky, 2007). Additionally, sleep loss is associated with decreases in ability to utilize effective emotion regulation strategies (Mauss, Troy, & LeBourgeois, 2013; Yoo et al., 2007), perhaps leaving only maladaptive strategies such as self-injurious behavior as seemingly the only option. Research also indicates that sleep loss is associated with increased impulsive behavior and difficulties in decision making (Anderson & Platten, 2011; Harrison & Horne, 1999), furthering the risk for engagement in self-injury. Taken together, poor sleep may lead individuals to be more vulnerable to engage in self-injurious behavior due to increases in negative affect and impulsivity, paired with problems with regulating their emotions and problem solving. Indeed, there is some limited evidence this association may exist. For example, sleep disturbances have been shown to be associated with self-injurious behavior among adults with developmental disabilities (Symons, Davis, & Thompson, 2000).

In terms of individuals with PTSD, research has also demonstrated that sleep disturbances may be associated with difficulties in emotion regulation (Pickett, Barbaro, & Mello, *in press*). Indeed, the relationship between sleep and emotional functioning may be particularly relevant among individuals who experience PTSD considering the prevalence of nightmares in this population. This is because nightmares represent a disruption in rapid eye movement (REM) sleep, the sleep stage hypothesized to be most important for emotional processing and preparing for next day emotional challenges (Goldstein & Walker, 2014). In sum, although the relationship between PTSD, sleep disturbances, and self-injurious behavior has not yet been tested, it is plausible that sleep disturbances associated with PTSD may lead to difficulties in emotion regulation and decision making skills, and thus increase risk of engaging in self-injurious behavior as a maladaptive emotion regulation or problem solving strategy.

Considering this, the current study examined the cross-sectional relationship between PTSD and self-injurious behavior, as well as the potential mediating role of sleep disturbances, among a sample of individuals presenting for outpatient psychological services. First, based on prior research (Harned et al., 2006), we hypothesized that PTSD, but not other anxiety-related conditions, would be associated with self-injurious behavior, after covarying for depression. This is based on research indicating that PTSD is associated with a variety of impulsive behaviors, and would be consistent with new conceptualizations of PTSD in the DSM-5 as separate from the anxiety disorders and with the addition of reckless and/or self-destructive behaviors as a symptom (American Psychiatric Association, 2013). Second, consistent with the function of self-injury as an emotion regulation strategy and the importance of sleep for emotional functioning, we hypothesized that insomnia and nightmares will mediate the relationship between PTSD and self-injurious behavior in a multiple mediator model, after covarying for depression. Third, we hypothesized that this mediation model will be specific to sleep disturbances, and not another potential alternate mediator shown to be related to both PTSD and self-injurious behavior (i.e., ruminative brooding; Hoff & Muehlenkamp, 2009; Michael, Halligan, Clark, & Ehlers, 2007). Specifically, rumination has been shown to predict and maintain PTSD symptoms, and is associated with poorer outcomes among those with PTSD (Echiverri, Jaeger, Chen, Moore, & Zoellner, 2011). In addition, rumination both triggers and is used to cope with intrusive memories, and can be associated with significant distress (Michael et al., 2007). Self-injurious behavior has been conceptualized as a method to cope with the negative emotions associated with rumination (Selby, Franklin, Carson-Wong, & Rizvi, 2013), and thus it is plausible that PTSD symptoms, such as intrusions, lead to rumination, which in turn lead to the use of self-injury as a maladaptive coping strategy to cope with associated distress.

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