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Trauma characteristics and sleep impairment among trauma-exposed children

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ABSTRACT

Trauma-related sleep difficulties are quite common and their functional and clinical importance are increasingly recognized. High rates of sleep problems have been documented among trauma-exposed adults, particularly those diagnosed with posttraumatic stress disorder (PTSD); however, research with trauma-exposed children is relatively limited. Research specifically with child samples is critical due to the numerous developmental and functional implications that may result from sleep impairment. Characteristics of the traumatic event may play a key role in understanding sleep difficulties, yet, these associations are not well understood among trauma-exposed children. The current study therefore investigated whether aspects of the traumatic event (i.e., type, nature, chronicity, age of onset, removal from home, and complex trauma) were related to higher levels of sleep disturbances among 276 treatment-seeking children ages 6–18 years ($M = 10.88$, $SD = 3.39$; 63.4% female; 62.7% Black). Sleep problems were common in this sample. Domestic and community violence exposure were associated with higher levels of select sleep difficulties, as were interpersonal trauma, chronic trauma, a trauma that began early in life, and complex trauma. Nonetheless, type of trauma and characteristics of the traumatic event were largely unrelated to sleep problems on either caregiver's or children's reports. Removal from the home was not linked with sleep impairment. Although findings signify the relevance of sleep disturbances among trauma-exposed children, trauma characteristics may have limited influence on sleep problems.

1. Introduction

Sleep impairment is a frequent and prototypic symptom of posttraumatic stress disorder (PTSD) (Spoomaker & Montgomery, 2008). Sleep disturbances, specifically nightmares, have been captured in the PTSD diagnostic construct since its inception in the *Diagnostic Statistical Manual (DSM-III; American Psychiatric Association, 1980)* and have been recently broadened in *DSM-5* to include sleep difficulties (as opposed to only nightmares). Sleep problems, specifically issues falling and staying asleep, have been proposed to be a core symptom of PTSD (Babson & Feldner, 2010; Kovachy et al., 2013) and are critically involved in PTSD development and maintenance (Spoomaker & Montgomery, 2008). Trauma-related sleep disturbances are associated with significant functional impairment (Brownlow, Brown, & Mellman, 2014; Giosan et al., 2015; Norman, Stein, & Davidson, 2007) and may play a role in other health difficulties, including pain and hypertension (Galovski, Monson, Bruce, & Resick, 2009). Further, trauma-exposed individuals evidence increased sympathetic activity during rapid eye movement (REM) sleep, which may interfere with PTSD treatment (Charuvastra & Cloitre, 2009; Mellman & Hipolito, 2006).

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Although trauma-related sleep problems are an important area of study, much of the prior research has been conducted with adult samples and pediatric trauma-related sleep difficulties are less understood. A review of trauma-related sleep disturbances in children concluded that trauma exposure is linked with sleep problems among children (Kovachy et al., 2013) yet, much of the prior literature has used small samples of children who have experienced one type of trauma (e.g., Arnberg, Rydelius, & Lundin, 2011; Carrion, Weems, Ray, & Reiss, 2002; Dollinger, 1986; Sadeh et al., 1995; Wittmann, Zehnder, Schredl, Jenni, & Landolt, 2010). Research utilizing a larger sample of children who have experienced various forms of trauma is needed to more accurately determine the prevalence of pediatric sleep problems. Further, studies with adult samples indicate that the presence of sleep impairment may be influenced by aspects of the trauma (Chapman et al., 2011, 2013; Duval, McDuff, & Zadra, 2013; Koskenvuo, Hublin, Partinen, Paunio, & Koskenvuo, 2010; Lind et al., 2017); yet, the ties between trauma characteristics and children's sleep difficulties remain unclear and findings from the adult literature may not downwardly extend to child populations. As sleep is critical for children's development (Roberts, Roberts, & Duong, 2009), sleep impairment is an important research topic. Further, evidence that pediatric sleep problems are more common following certain types of traumas has implications for prevention and treatment. It is therefore a research priority to investigate the role of trauma characteristics in sleep difficulties among trauma-exposed children.

Rates of childhood trauma exposure are distressingly high. National surveys have reported that approximately 70% of children will experience at least one traumatic event (Copeland, Keeler, Angold & Costello, 2007; Finkelhor, Turner, Ormond, & Hamby, 2009). Nonetheless, consistent with trauma-exposed adults, relatively few trauma-exposed children go on to develop PTSD, with pediatric PTSD prevalence rates ranging from 0.5%–5% (Copeland et al., 2007; Merikangas et al., 2010). Although only a minority of trauma-exposed children meet PTSD criteria, subthreshold PTSD and other trauma-related difficulties such as depression and behavioral problems are relatively common (Ackerman, Newton, McPherson, Jones, & Dykman, 1998; Copeland et al., 2007; Kim & Cicchetti, 2010; Kilpatrick et al., 2003). As PTSD rates increase with age (Merikangas et al., 2010), it has been argued that children are less likely to exhibit PTSD after trauma compared to adults (Copeland et al., 2007). Lower rates of pediatric PTSD may be the function of PTSD being originally validated using adult samples as well as difficulties diagnosing PTSD in children (Scheeringa, 2011; Scheeringa, Zeanah, & Cohen, 2011; Scheeringa, Zeanah, Myers, & Putnam, 2003), particularly prior to the development of the preschool subtype in *DSM-5*.

Regardless of whether the child meets criteria for PTSD, there is compelling evidence that childhood trauma exposure results in a host of negative physical and mental health outcomes, including several of the leading causes of death (Anda et al., 2006; Felitti et al., 1998; Chapman et al., 2004; Heim & Nemeroff, 2001). Trauma-focused treatment may also be indicated in the absence of a PTSD diagnosis (Cohen, Mannarino, & Deblinger, 2006). Sleep impairment is not restricted to trauma-exposed individuals with PTSD, although sleep difficulties may be more common among those diagnosed with PTSD (Giosan et al., 2015). It is therefore valuable for the field of childhood traumatic stress to utilize samples of trauma-exposed children, as opposed to limiting research to only children with a PTSD diagnosis.

1.1. Sleep disturbances among trauma-exposed adults

As sleep disturbance is a symptom of PTSD (American Psychiatric Association, 1980) it is not surprising that sleep problems are almost ubiquitous in adults with a PTSD diagnosis, with prevalence estimates ranging from 70 to 90% (Maher, Rego, & Asnis, 2006). The crucial role of sleep difficulties in the context of PTSD has been increasingly recognized. Sleep initiation and maintenance problems are present in 66% of adults with a PTSD diagnosis (Ohayon & Shapiro, 2000) and greater sleep onset latency, less total sleep time, and poorer sleep quality are also commonly reported (Krakow et al., 2007). Sleep impairment is related to both the development and maintenance of PTSD and may worsen PTSD symptoms (Spoormaker & Montgomery, 2008). Sleep problems prior to, and immediately following, trauma exposure predict PTSD development and are related to greater PTSD severity (Bryant, Creamer, O'Donnell, Silove, & McFarlane, 2010; Gehrman et al., 2012; Koffel, Polusny, Arbisi, & Erbes, 2013; Koren, Arnon, Lavie, & Klein, 2002; Mellman, Bustamante, Fins, Pigeon, & Nolan, 2002; Mellman, Pigeon, Nowell, & Nolan, 2007).

Trauma-related nightmares may lower sleep efficiency and create longer wake after sleep onset, and awaking from these nightmares may result in behaviors that increase sleep disruption such as sleeping with the light on, eating in the middle of the night, or drinking alcohol (Spoormaker & Montgomery, 2008). PTSD has been linked with other sleep disturbances such as obstructed sleep apnea (OSA; Sharafkhaneh, Giray, Richardson, Young, & Hirshkowitz, 2005) and periodic limb movement (Spoormaker & Montgomery, 2008). Indeed, in one sample of veterans, a PTSD diagnosis was a risk factor for developing OSA over and above traditional risk factors such as age and high body mass index (BMI; Colvonen et al., 2015). Thus, there are a range of sleep problems that may be present following trauma exposure, which may act synergistically to contribute to reduce the total sleep time and sleep efficiency.

1.2. Sleep impairment in trauma-exposed children

In general child samples, approximately 16%–40% of children exhibit sleep disturbances, depending upon the definition of sleep difficulties (Archbold, Pituch, Panabi, & Chervin, 2002; Fricke-Oerkermann et al., 2007; Liu, Liu, Owens, & Kaplan, 2005). Among trauma-exposed child samples, prevalence rates are less clear and the relationship between trauma exposure and sleep impairment in children has received less attention than in adults. A review of pediatric trauma-related sleep disturbances reported that although several studies observed sleep impairment, the range varied considerably from 3% to 77.1% (Kovachy et al., 2013). Nightmares were most commonly reported, although rates varied widely (20.3%–80.8%). The large range of sleep problems is likely a function of methodological differences in sample types, assessment instruments, and who is reporting on the child's symptoms (caregiver vs.

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