

Attention-deficit/hyperactivity disorder comorbidity in a sample of veterans with posttraumatic stress disorder

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Abstract

This study examined attention-deficit/hyperactivity disorder (ADHD) comorbidity in military veterans with a high prevalence of posttraumatic stress disorder (PTSD) and evaluated the relationships between the 2 disorders and exposure to traumatic events. The sample included 222 male and female military veterans who were administered structured clinical interviews based on the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*. Results show that 54.5% met the criteria for current PTSD, 11.5% of whom also met the criteria for current adult ADHD. Level of trauma exposure and ADHD severity were significant predictors of current PTSD severity. Evaluation of the underlying structure of symptoms of PTSD and ADHD using confirmatory factor analysis yielded a best-fitting measurement model that comprised 4 PTSD factors and 3 ADHD factors. Standardized estimates of the correlations among PTSD and ADHD factors suggested that the largest proportion of shared variance underlying PTSD-ADHD comorbidity is related to problems with modulating arousal levels that are common to both disorders (ie, hyperarousal and hypoarousal).
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1. Introduction

Posttraumatic stress disorder (PTSD) is an extreme psychobiological reaction to a traumatic event characterized by marked disturbances in cognitive, affective, behavioral, and physiological functioning. The *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR)* [1] defines PTSD by 3 core symptom clusters: (1) intrusive reexperiencing of traumatic events, (2) avoidance of reminders of traumatic events and emotional numbing, and (3) general hyperarousal (ie, sleep problems,

irritability/anger, difficulty concentrating, hypervigilance, and startle response). Epidemiologic and clinical studies have shown that an overwhelming majority of individuals diagnosed with PTSD meet the criteria for at least 1 additional Axis I disorder (ie, >80%), and a substantial percentage meet the criteria for 3 or more other psychiatric diagnoses [2–4]. Based on epidemiologic data from the National Comorbidity Survey [3], lifetime prevalence estimates of the most common Axis I disorders comorbid with PTSD included major depressive disorder (48%–49%), substance use disorders (27%–52%), and other anxiety disorders (specific phobias, social phobia, panic disorder, agoraphobia: 7%–31%).

There is also accumulating evidence suggesting that substantial comorbidity exists between PTSD and attention-deficit/hyperactivity disorder (ADHD), with prevalence estimates ranging from 12% to 37% across the lifespan [5–8]. The *DSM-IV-TR* defines ADHD by 2 primary symptom dimensions, inattention and hyperactivity-impulsivity. Despite evidence of considerable comorbidity between PTSD and ADHD, relatively few studies have examined the nature

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of the overlap between these 2 disorders. Thus, the primary objectives of the current study were to examine ADHD comorbidity and trauma exposure in a sample of military veterans with a high prevalence of PTSD and to investigate the specific nature of associations among symptoms of these 2 disorders. An improved understanding of the covariation between symptoms of PTSD and ADHD represents an important step toward advancing the mental health treatment of individuals who present with both disorders and developing risk reduction and prevention programs for populations at risk for high trauma exposure.

1.1. The relationship between PTSD-ADHD comorbidity and exposure to psychological trauma

There is mixed evidence regarding the role of trauma exposure in PTSD-ADHD comorbidity. Adler and colleagues [5] suggested that ADHD may be one risk factor that increases vulnerability for developing PTSD after trauma exposure, based on their finding that patients with PTSD reported higher levels of childhood ADHD relative to patients with panic disorder. Some longitudinal studies have found that early exposure to trauma was significantly associated with a diagnosis of childhood ADHD [9] as well as a lifetime diagnosis of ADHD [10]. Similarly, a longitudinal study by Koenen and colleagues [11] found that individuals were 50% more likely to experience a psychological trauma if they had problems with hyperactivity, antisocial behavior, and difficult temperament during childhood as compared with individuals without such a history. Furthermore, there is evidence that children and adolescents diagnosed with ADHD are at greater risk for sustaining severe injuries [12–14] and that adolescent and adult drivers with ADHD are much more likely to have traffic violations and motor vehicle accidents relative to drivers without ADHD [15]. Additional studies have found elevated rates of physical and sexual abuse among children diagnosed with ADHD relative to a comparison group without ADHD [16–18] or children diagnosed with adjustment disorder [19]. In contrast, Wozniak and colleagues [20] reported no significant differences in the rate of trauma exposure or the development of PTSD between children diagnosed with ADHD and controls.

1.2. Potential mechanisms underlying PTSD-ADHD comorbidity

A number of hypotheses have been advanced regarding potential mechanisms underlying the high levels of comorbidity of PTSD with other psychiatric disorders [21], several of which are relevant for understanding the comorbidity between PTSD and ADHD. First, it has been proposed that the presence of certain psychiatric disorders may function as a risk factor for the development of PTSD, and these disorders may have been present before the trauma exposure [22]. There is evidence suggesting that the presence of early childhood risk factors (eg, pretrauma psychopathology

including antisocial behavior, hyperactivity, and conduct disorder; family psychiatric history; and general childhood adversity) may play an important role in the development of PTSD [11,23]. Childhood ADHD may function as a risk factor for trauma exposure, such that children with ADHD may place themselves in riskier situations relative to their non-ADHD peers, thereby increasing their risk for certain types of trauma exposure, including physical injuries, physical and sexual abuse, neglect, and parental conflict [18,24]. In addition, children who are exposed to traumatic events might be more vulnerable to experiencing an exacerbation of ADHD symptoms. In support of this hypothesis, childhood physical and sexual abuse have been linked to increased externalizing problems including hyperactivity, impulsivity, aggression, anger, and physical attacks [25–27].

Another possible explanation for psychiatric comorbidity is the *common-factor hypothesis*, which postulates that the observed covariations between seemingly distinct disorders reflect manifestations of a common, unobserved latent psychopathology dimension [28–30]. One candidate for a common factor underlying PTSD-ADHD comorbidity is likely related to shared temperament or personality traits that confer the risk for psychopathology. The personality trait of neuroticism/negative emotionality (NEM) is a fairly non-specific factor that contributes to a broad array of mental disorders, and it has been linked to disorders spanning the internalizing and externalizing spectrums [31–33]. Research examining the relationship between personality/temperament and ADHD has suggested that this diagnostic group is often characterized by high NEM, low constraint (CON), low conscientiousness or low effortful control, low reactive control, and low agreeableness [34–36]. Moreover, problems with CON, behavioral disinhibition, and executive control have been hypothesized to play a central etiologic role in ADHD [37–39]. Thus, problems in the domain of high NEM and behavioral disinhibition (ie, low CON) may underlie the expression of ADHD. Similarly, research on structural models of PTSD and its comorbidity by Miller and colleagues [40–42] suggests that high NEM is the primary personality risk factor involved in the development of PTSD and that externalizing forms of posttraumatic psychopathology reflect a tendency toward both high NEM and low CON. Based on the common-factor hypothesis, we expected that the strongest associations between PTSD and ADHD would be those thought to reflect generalized distress (ie, negative affectivity, NEM, or dysphoria) as opposed to trauma-specific symptoms.

1.3. Associations between specific symptom clusters of PTSD and ADHD

Another important step toward improving our understanding of the specific nature of PTSD-ADHD comorbidity is to examine the associations between symptoms of the 2 disorders. There are no known factor analytic studies that

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