Journal of Anxiety Disorders 29 (2015) 93–100

Contents lists available at ScienceDirect

Journal of Anxiety Disorders

Associations between lifetime PTSD symptoms and current substance use disorders using a five-factor model of PTSD

S. Trautmann[a,*], S. Schönfeld[a], S. Behrendt[a], J. Schäfer[a], M. Höfler[a], P. Zimmermann[b], H.-U. Wittchen[a]

[a] Institute of Clinical Psychology and Psychotherapy, Technische Universität Dresden, Dresden, Germany
[b] Centre for Psychiatry and Posttraumatic Stress, Federal Armed Forces Hospital Berlin, Berlin, Germany

ARTICLE INFO

Article history:
Received 1 July 2014
Received in revised form
16 November 2014
Accepted 17 November 2014
Available online 5 December 2014

Keywords:
Alcohol use disorders
Nicotine dependence
PTSD
Symptom cluster
Numbing
Hyperarousal
Military

ABSTRACT

This paper aimed to extend the existing knowledge on the association between PTSD symptoms, alcohol use disorders (AUD) and nicotine dependence (ND) by distinguishing between anxious and dysphoric arousal PTSD symptoms and by considering the putative contribution of additional comorbidity. Data stem from a cross-sectional study in a stratified, representative sample of 1483 recently deployed soldiers using standardized diagnostic interviews. All lifetime PTSD symptom clusters (occurrence of any symptom and number of symptoms) were associated with current AUD and ND in crude models except that anxious arousal was not related to AUD. Associations were reduced in magnitude when controlling for comorbidity. Current ND was related to the occurrence of any emotional numbing and to the number of re-experiencing symptoms above the contribution of other symptom clusters and comorbidity. In conclusion, associations between PTSD symptoms, AUD and ND may be partially attributable to additional comorbidity. Findings also yield further evidence for a role of emotional numbing and re-experiencing symptoms in the comorbidity between PTSD and ND and for a distinction between dysphoric and anxious arousal PTSD symptoms.

1. Introduction

The objective of this paper was to investigate associations between specific lifetime posttraumatic stress disorder (PTSD) symptom clusters and two current substance use disorders (SUD): alcohol use disorders (AUD) and nicotine dependence (ND). Since heterogeneity in previous findings could be attributable to potential effects of comorbid disorders and heterogeneity within the hyperarousal cluster, we expanded upon existing work by distinguishing between dysphoric and anxious arousal PTSD symptoms and by taking into account the contribution of comorbidity.

Soldiers with previous deployments, especially those in combat roles, have an elevated risk for the experience of traumatic events and for the development of PTSD (Goodwin & Rona, 2013; Wittchen, Schönfeld, Kirschbaum, Thurau, Trautmann, & Steudte, 2012; Wittchen, Schönfeld, Thurau, Trautmann, Galle, & Mark, 2012). Findings in civilian and military samples also suggest that PTSD often co-occurs with SUD (Jacobsen, Southwick, & Kosten, 2001) of which AUD and ND are the most prevalent in military populations (Seal et al., 2011; Trautmann et al., 2014). Despite conclusive evidence for an associations between PTSD, AUD and ND in general, it has to be noted that PTSD is a complex disorder comprising various different symptoms that are characterized by different physiological, behavioral and psychological processes which can be differently related to the use of substances such as alcohol and nicotine (Garland, Pettus-Davis, & Howard, 2013; Kushner et al., 1996; Le Moal & Koob, 2007; Stevens, Rist, & Gerlach, 2008). Special efforts have been made to identify specific PTSD symptoms that are associated with the occurrence of AUD and ND to be able to describe individuals being at high risk for comorbidity and to generate hypotheses about its etiology.

In the last two decades, various latent factor models of PTSD have been proposed and used to analyze the relationship between PTSD symptoms, AUD and ND (Table 1). The DSM-IV (APA, 2000) manual suggests a three factor structure comprising symptoms of re-experiencing, avoidance and hyperarousal. Other models have suggested four factors: the dysphoria model (Simms, Watson, & Doebbeling, 2002) and the emotional numbing model (King, Leskin, King, & Weathers, 1998). Both models comprise the re-experiencing and the hyperarousal cluster of the DSM-IV model.

* Corresponding author at: Institute of Clinical Psychology and Psychotherapy, Technische Universität Dresden, Chemnitzer Str. 46, 01187 Dresden, Germany. Tel.: +49 35146342464.
E-mail address: trautmann@psychologie.tu-dresden.de (S. Trautmann).

http://dx.doi.org/10.1016/j.janxdis.2014.11.009
0887-6185/

Table 1
Mapping of the DSM-IV-TR PTSD symptoms to different factor models.

PTSD symptoms	Model			
	3-factor	4-factor		5-factor
	DSM-IV	Dysphoria	Emotional numbing	Dysphoric arousal
B1. Intrusive thoughts	R	R	R	R
B2. Recurrent dreams	R	R	R	R
B3. Flashbacks	R	R	R	R
B4. Emotional reactivity	R	R	R	R
B5. Physiological reactivity	R	R	R	R
C1. Avoiding thoughts of trauma	A	A	A	A
C2. Avoiding reminders of trauma	A	A	A	A
C3. Inability to recall aspects of trauma	A	D	N	N
C4. Loss of interest	A	D	N	N
C5. Detachment	A	D	N	N
C6. Restricted affect	A	D	N	N
C7. Sense of foreshortened future	A	D	N	N
D1. Sleep disturbance	H	D	H	DA
D2. Irritability/anger	H	D	H	DA
D3. Difficulties concentrating	H	D	H	DA
D4. Hypervigilance	H	H	H	AA
D5. Exaggerated startle response	H	H	H	AA

Source: Adapted from Harpaz-Rotem et al. (2014).
Note: R, re-experiencing; A, avoidance; H, hyperarousal; D, dysphoria; N, emotional numbing; DA, dysphoric arousal; AA, anxious arousal.

In the dysphoria model, the DSM-IV avoidance cluster is separated into avoidance and dysphoria symptoms while the emotional numbing model distinguishes between avoidance and emotional numbing symptoms (Table 1). Various, mostly cross-sectional studies have been conducted to analyze the relation between symptoms of these three and four-factor models and the risk for AUD and ND. Strong evidence from these studies has emerged for an association between emotional numbing symptoms and different measures of SUD and substance use related to alcohol and nicotine. In fact, these associations were found for heavy smoking (Cook, Jakupcak, Rosenheck, Fontana, & McFall, 2009), smoking intensity (Joseph et al., 2012) and alcohol misuse (see Debell et al., 2014 for a review), although it has to be considered that Cook et al. (2009) did not control for other PTSD clusters. It has been suggested that individuals use substances like alcohol and nicotine to compensate the blunted affect that can be part of the PTSD symptomatology since these substances can have a positive effect on mood and negative emotions (King, de Wit, McNamara, & Cao, 2011; Picciotto, Brunzell, & Caldarone, 2002). However, other studies suggest that hyperarousal symptoms are related to AUD, ND or measures of alcohol and nicotine use in addition or instead of emotional numbing symptoms. This could be shown particularly for the risk of alcohol use (Zahradnik, Stewart, Sherry, Stevens, & Wekerle, 2011) without, and for alcohol use problems (Taft et al., 2007) and ND (Greenberg et al., 2012) with consideration of other symptom clusters. This finding is often explained by a relieving effect of alcohol and nicotine use on tension, anxiety and stress (Beckham et al., 1997, 2008; Bradford, Shapiro, & Curtin, 2013) which could make subjects with hyperarousal symptoms more vulnerable to AUD and ND. Some evidence also exists for relations between avoidance symptoms and ND (Baschnagel, Coffey, Schumacher, Drobes, & Saladin, 2008), between avoidance and smoking (Kirby et al., 2008; only bivariate association) as well as for associations between re-experiencing and alcohol use problems (Pietrzak, Goldstein, Malley, Rivers, & Southwick, 2010) and ND (Weaver & Etzel, 2003). Pietrzak et al. (2010) further showed a relation between dysphoria symptoms and alcohol use problems. These associations are also explained by an attempt to avoid aversive emotions related to re-experiencing and to counteract dysphoric emotional states (Baschnagel et al., 2008). To summarize, findings from three- and four-factor models of PTSD suggest that AUD, ND or measures of alcohol and nicotine use can be related to emotional numbing, but also to hyperarousal, re-experiencing and avoidance symptoms. As shown above, these findings vary considerably between studies suggesting that there might be factors that could be relevant for associations between PTSD symptoms, AUD and ND.

First, recent studies have argued that hyperarousal is not a uniform symptom cluster and can better be described with two distinct clusters of dysphoric and anxious arousal symptoms as proposed in a recently suggested five factor model of PTSD (Armour, Carragher, & Elhai, 2013; Elhai & Palmieri, 2011; Pietrzak, Tsai, Harpaz-Rotem, Whealin, & Southwick, 2012). Dysphoric arousal includes symptoms like restlessness and agitation while anxious arousal describes more fear-based symptoms as exaggerated startle response and hypervigilance (Table 1). Several studies suggest that the use of psychoactive substances, especially alcohol, does not necessarily reduce these fear-based symptoms (Stevens et al., 2008) and that some individuals even experience an increase in these symptoms in consequence of chronic substance use (Kushner, Abrams, & Borchardt, 2000) which might result in a decreased probability to use these substances. Thus, the two distinct arousal clusters could be differentially related to the risk for SUD (Harpaz-Rotem, Tsai, Pietrzak, & Hoff, 2014) which might at least partially explain the heterogeneity in previous findings on associations between hyperarousal symptoms, AUD and ND. Second, there is noteworthy evidence that associations between PTSD, AUD and ND are partially attributable to the existence of additional comorbid disorders. For example, Pietrzak, Goldstein, Southwick, and Grant (2011) showed that associations between PTSD and both AUD and ND were reduced in magnitude when controlling for other mental disorders. This is supported by findings suggesting that SUD are linked to psychopathology in general rather than to the specific influence of PTSD (Sartor et al., 2010), and that self-medication of PTSD symptoms is more common when criteria for other disorders are also met (Leeies, Pagura, Sareen, & Bolton, 2010). Only one of the abovementioned studies on the relation between PTSD symptom clusters fully controlled for Axis-I comorbidity (Greenberg et al., 2012). Other studies only controlled for depression (Cook et al., 2009; Joseph et al., 2012; Weaver & Etzel, 2003; Zahradnik et al., 2011) or did not consider comorbidity at all (Baschnagel et al., 2008; Kirby et al., 2008; Pietrzak et al., 2010; Taft et al., 2007). As these studies have been conducted in different samples with varying probabilities of