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Stress exposure and the risk for the onset of alcohol use disorders and nicotine dependence in deployed military personnel: The role of prior internalizing disorders

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HIGHLIGHTS

- Investigation of prior internalizing disorders (PIDs), stress exposure (SE) and SUDs
- Overall associations between measures of SE and SUD onset were weak
- Specific combinations of SE and PIDs predicted alcohol use disorders onset
- One combination of SE and PIDs was inversely related to nicotine dependence onset

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ABSTRACT

Objective: This prospective study aimed to investigate whether prior internalizing disorders (PIDs) moderate the relationship between stress exposure (SE) and the onset of alcohol use disorders (AUDs) and nicotine dependence (ND) in deployed military personnel.
Methods: 358 male soldiers were examined directly before and 12 months after return from deployment using standardized interviews. Combat experiences, concerns about family disruptions, and difficult living and working environment were assessed as different aspects of SE. PID diagnoses (mood disorders (PMDs), anxiety disorders (PADs)) and substance use disorders were defined according to the DSM-IV-TR.
Results: PMDs were related to a stronger association between concerns about family disruptions and the risk of AUD onset (OR = 7.7, 95% CI 1.8–32.8, p = 0.006). The number of PID diagnoses (OR per diagnosis: 1.7, 95% CI 1.0–2.8, p = 0.036) and PADs (OR: 2.6, 95% CI 1.1–6.3, p = 0.038) were further related to a stronger association between difficult living and working environment and the risk of AUD onset. With regard to ND, PMDs were related to a weaker association between difficult living and working environment and the risk of ND onset (OR = 0.4, 95% CI 0.2–0.8, p = 0.013).
Conclusions: PIDs might be related to an increased risk for the onset of AUDs but not ND following SE. This effect is probably restricted to specific constellations of PADs, PMDs, comorbid PIDs and specific aspects of SE. These critical constellations of PIDs and SE might be a promising target for future research and could contribute to the development of preventive measures to reduce the risk of AUDs following SE.

1. Introduction

A wealth of research has identified stress exposure (SE) such as natural catastrophes and military deployment in conflict areas as a strong risk factor for the increase of substance use (SU) and the development of substance use disorders (SUDs) (DiMaggio, Galea, & Li, 2009; Fear & Wessely, 2009; Forgas, Meyer, & Cohen, 1996; Jacobson et al., 2008). Many studies have addressed the potential mechanisms underlying this association. On a behavioral level, there is some empirical support for the self-medication hypothesis suggesting that individuals use substances to cope with adverse emotional states and psychological symptoms that occur in reaction to SE (Garland, Pettus-Davis, & Howard, 2013; Khantzian, 1997; Magid et al., 2009). It has also been suggested that the link between SE and SUD risk can partially be explained by the effects of SE on individual trait factors such as stress reactivity and behavioral control (Lijffijt, Hu, & Swann, 2014).

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Importantly, despite noteworthy evidence for a relationship between SE and subsequent SUD, several studies do not find an association between SE and SUD risk (Hooper et al., 2008; Keyes, Hatzenbuehler, Grant, & Hasin, 2012; North et al., 2005; Vlahov et al., 2006). This could be partially attributable to a methodological factor since several studies examined exposure to a stressful events in general instead of taking into account type and severity of concrete perceived stressors which can vary between individuals experiencing SE (Jones et al., 2013; Vogt et al., 2011a, 2011b; Welch et al., 2014). Probably even more importantly, the heterogeneity in findings might indicate the relevance of moderating factors in the relation between SE and the risk for SUDs. So far, several studies in the field of stress-related disorders have identified prior mental disorders as a contributing factor for the occurrence of psychopathology after SE (LeardMann et al., 2009; Ozer, Best, Lipsey, & Weiss, 2003; Wittchen et al., 2013). With regard to the risk of SUDs, there is some evidence that especially prior internalizing disorders (PIDs) might be relevant for the association between SE and the risk for SUD. First, individuals with PIDs are more vulnerable for psychopathological symptoms following SE (Beekman et al., 1998; Brewin, Andrews, & Valentine, 2000; Costello et al., 2002) which might increase the likelihood of self-medication processes and thus lead to SUDs. Beyond the contribution of symptoms of specific diagnoses, this seems to be the case also for the severity of psychopathology (Pietrzak, Goldstein, Southwick, & Grant, 2011; Sartor et al., 2011). Second, like SUDs, PIDs are related to an increased activity of the HPA axis and other stress systems (Comeau, Stewart, & Loba, 2001). This activity could be further increased by the effects of SE promoting the sensitization of motivational systems related to substance use (Allen, Kennedy, Cryan, Dinan, & Clarke, 2014; Brielmaier, McDonald, & Smith, 2012; Spanagel, Noori, & Heilig, 2014). Third, several internalizing disorders are associated with certain underlying trait factors such as anxiety sensitivity and emotion regulation that are related to the risk of SUDs (Stewart & Kushner, 2001). Taken together, these findings suggest that PIDs could be related to a higher susceptibility for the development of SUDs after SE. Knowledge on the role of PIDs for the risk of SUDs following SE would allow the identification of high-risk groups for the development of SUDs after SE as well as the implementation of targeted preventive interventions.

Prospective studies on the role of PIDs for the risk of SUDs following SE are scarce. So far, one study investigated consequences of a terrorist attack and revealed no moderating effect of PIDs on the association between SE and alcohol use (Hasin, Keyes, Hatzenbuehler, Aharonovich, & Alderson, 2007). However, this study did not investigate SUDs. Using a large sample of deployed military personnel, another study found an increased risk for the onset of alcohol-related problems but not for heavy drinking in individuals with a history of posttraumatic stress disorder and depression (Jacobson et al., 2008). To our best knowledge, studies that investigated the moderating effect of PIDs on the association between SE and SUD diagnoses are lacking to date.

Given this background, this prospective study aims to investigate whether prior anxiety disorders (PADs), mood disorders (PMDs) and the total number of PID diagnoses (PADs and PMDs combined) moderate the association between stressors related to military deployment and the onset of alcohol use disorders (AUDs) and nicotine dependence (ND).

2. Methods

2.1. Participants and procedure

Data stem from the prospective-longitudinal component of a German study program on mental health consequences of military deployment (Wittchen et al., 2012a, 2012b). As the low percentage of about 5% female soldiers in the German ISAF contingents would not allow meaningful analyses, only male soldiers were sampled in this study component. From a total of 4200 soldiers from the 26th and 27th contingents of the German ISAF mission in Afghanistan in 2011/2012, a stratified random sample of 895 soldiers was drawn. Combat units as a high risk group for adverse mental health consequences of deployment were sampled with a higher probability to ensure sufficiently high rates of diagnostic outcomes for statistical analyses (Wittchen et al., 2012a, 2012b). 117 soldiers were not eligible because of vacation, training or sick leave at the time of assessment. Of the remaining 778 soldiers, 618 finally participated. The first examination (Time 1) was conducted directly before deployment (1–12 weeks). The second assessment (Time 2) was carried out about 12 months after return from deployment. Throughout the whole study procedure, pseudonymity of participants was assured. The

Table 1
Demographic, military, mental health and substance-related baseline sample characteristics.

	Follow-up sample (n = 358)		Subsample lost to follow-up (n = 260)		p
	n	%	n	%	
Age, mean (SD)	27.2 (6.3)		26.0 (5.3)		0.013
Marital status					
Umarried	262	73.4	203	78.1	
Married	78	21.9	49	18.9	
Separated/divorced	17	4.8	8	3.1	0.144
Military rank					
Enlisted	160	45.3	135	52.3	
Non-commissioned officers	159	45.0	117	45.4	
Commissioned officers	34	9.6	6	2.3	0.003
Any previous deployment	150	41.9	99	38.1	0.339
Prior anxiety disorder (LT)	58	13.1	34	61.2	0.283
Prior anxiety disorder (12M)	27	7.5	21	8.1	0.806
Prior affective disorder (LT)	78	21.8	46	17.7	0.211
Prior affective disorder (12M)	48	13.4	23	8.9	0.081
No. of prior internalizing disorders (LT), mean SD	0.4 (0.8)		0.4 (0.8)		0.190
No. of prior internalizing disorders (12M), mean SD	0.2 (0.5)		0.2 (0.5)		0.483
Alcohol use disorder (LT)	115	32.1	76	29.3	0.443
Alcohol use disorder (12M)	24	6.7	22	8.5	0.413
No of prior alcohol use disorder symptoms (LT), mean (SD)	1.1 (1.9)		1.2 (2.0)		0.866
Nicotine dependence (LT)	52	14.5	28	10.8	0.171
Nicotine dependence (12M)	48	13.4	24	9.2	0.112
No of prior nicotine dependence symptoms (LT), mean (SD)	1.2 (1.4)		1.0 (1.2)		0.102

LT = individuals met the criteria at some point in their lives, 12M = individuals met the criteria in the past 12 months.