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Deployment-Related Psychiatric and Behavioral Conditions and Their Association with Functional Disability in OEF/OIF/OND Veterans

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Abstract

Understanding the factors that influence veterans' functional outcome after deployment is critical to provide appropriately targeted care. Mild traumatic brain injury (mTBI) and posttraumatic stress disorder (PTSD) have been related to disability, but other psychiatric and behavioral conditions are not as well examined. We investigated the impact of deployment-related psychiatric and behavioral conditions on disability among 255 OEF/OIF/OND service members and veterans. Structured clinical interviews assessed TBI and the psychiatric conditions of depression, PTSD, anxiety, and substance use. Self-report questionnaires assessed disability and the behavioral conditions of sleep disturbance and pain. Over 90% of participants had a psychiatric and/or behavioral condition, with approximately half presenting with ≥ 3 conditions. Exploratory factor analysis revealed 4 clinically relevant psychiatric and behavioral factors which accounted for 76.9% of the variance: (a) depression, PTSD, and military mTBI (deployment trauma factor); (b) pain and sleep (somatic factor); (c) anxiety disorders, other than PTSD (anxiety factor); and (d) substance abuse or dependence (substance use factor). Individuals with the conditions comprising the deployment trauma factor were more likely to be substantially disabled than individuals with depression and PTSD, but no military mTBI, *OR* = 3.52; 95% CI [1.09, 11.37]. Depression, PTSD, and a history of military mTBI may comprise an especially harmful combination associated with high risk for substantial disability.

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Operation Enduring Freedom (OEF), Operation Iraqi Freedom (OIF), and Operation New Dawn (OND) US service members and veterans face a host of challenges re-entering civilian life after military service. Disability in occupational functioning, social functioning, and quality of life has been related to psychiatric symptoms in returning veterans (Erbes, Kaler, Schult, Polusny, & Arbisi, 2011; Pietrzak, Goldstein, Malley, Johnson, & Southwick, 2009; Pittman, Goldsmith, Lemmer, Kilmer, & Baker, 2012; Schnurr, Lunney, Bovin, & Marx, 2009). This cohort of veterans could potentially have many years of productive contribution to society ahead, or in some cases, significant, costly disability.

The etiology of the reintegration problems and degree of disability faced by veterans is likely due to a number of interacting factors. Mild traumatic brain injury (mTBI; Hoge et al., 2008; Terrio et al., 2009) and posttraumatic stress disorder (PTSD; Hoge et al., 2004; Seal et al., 2009; Thomas et al., 2010) are among the most frequent and challenging consequences of the recent conflicts in Iraq and Afghanistan. TBI occurs in roughly 10%–23% of soldiers returning from OEF/OIF/OND, and the majority of these injuries are mild in nature (Cifu et al., 2013; Hoge et al., 2008; Terrio et al., 2009). Similarly, PTSD is estimated to occur in 12%–30% of service members and veterans returning from OEF/OIF/OND deployments (Higgins et al., 2014; Hoge et al., 2004; Seal et al., 2009; Thomas et al., 2010). Previous studies have found that mTBI occurs much more frequently in combination with PTSD than in isolation (Lew et al., 2009), and that PTSD is more common and severe among veterans who sustain a TBI compared to other injuries (Hoge et al., 2008; Schneiderman, Braver, & Kang, 2008). These findings suggest that the co-occurrence of mTBI and PTSD may be more detrimental to functional outcome than either diagnosis alone.

Critically, OEF/OIF/OND veterans represent a clinically complex group with multiple comorbidities above and beyond mTBI and PTSD. High co-prevalence of other psychiatric (e.g., depression, substance misuse, and anxiety disorders) and behavioral disorders (e.g., chronic pain and sleep disorders) has been documented (Hoge et al., 2008; Schneiderman et al., 2008). The high number of overlapping symptoms shared by mTBI and PTSD (Bryant, 2011; Stein&McAllister, 2009), and other psychiatric and behavioral diagnoses, can complicate the diagnosis and treatment of each of these issues.

Although our knowledge of these disorders has advanced, the field is constrained by regarding them as independent clinical entities. Each condition on its own may have a negative effect, but cumulatively the impact may well result in increased disability after deployment. We propose that the identification, diagnosis, and treatment of veterans who suffer from deployment-related injuries and behavioral consequences must be informed by recognizing the frequency of different disorders, the high prevalence of comorbidity, and their combined impact upon disability. Further, examining the pattern of co-occurrence of these disorders and how they impact functional outcome is an essential step in assisting veterans' reintegration into civilian life after return from military service (Beder, Coe, & Sommer, 2011; Sayer et al., 2010).

The current study investigated the prevalence of a history of military mTBI and psychiatric and behavioral conditions, and how these different disorders impacted disability in a sample of returning OEF/OIF/OND veterans. A secondary objective was to conduct an empirical,

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exploratory factor analysis to determine how these diagnoses grouped together and the extent to which these groups of diagnoses were related to disability.

Method

Participants and Procedure

The sample of 255 was drawn from 284 OEF/OIF/OND veterans consecutively studied at the VA Boston TBI Center of Excellence, the Translational Research Center for TBI and Stress Disorders (TRACTS). Participants were recruited from the Boston Metropolitan area via a fulltime recruitment specialist who attended Yellow Ribbon Events, Task Force Meetings, and other events involving U.S. Air Force, Marine, Army, National Guard, and Reserve units. Participants were not specifically recruited from medical or mental health clinics; however, a minority of participants also contacted our recruitment specialist in response to flyers posted in our VA (Veterans Affairs) medical center. The Institutional Review Board of Human Studies Research at the VA Boston Healthcare System approved all procedures. All participants provided informed consent and completed an extensive evaluation lasting 8–10 hours. Participants were reimbursed $210 for their time and travel costs. Exclusion criteria included prior serious medical or neurological illness (unrelated to TBI), active suicidal and/or homicidal ideation requiring intervention, and a current diagnosis of bipolar disorder or psychotic disorder (except psychosis NOS due to trauma-related hallucinations) according to the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., *DSM-IV*; American Psychiatric Association [APA], 1994). The initial group of 284 was reduced by 18 participants who had not deployed, 10 who reported a premilitary history of moderate or severe TBI, and 1 with an incomplete psychological assessment, yielding the sample of $N = 255$.

Primary summary data for the total sample, including demographics, military information, and psychiatric and behavioral conditions are presented in Table 1. This study employed a convenience sample; however, there were no significant differences in age, gender, or branch of service between our sample and the OEF/OIF/OND veterans utilizing VA Health Care (U.S. Department of Veterans Affairs, 2012). Additionally, there was no significant difference in race between our sample and active duty enlisted members and selected reserve members (U.S. Department of Defense, 2012). Thus, the present sample is representative of the OEF/OIF/OND cohort in general demographic characteristics. By contrast, the psychological, neurological, and employment status of the sample may be more specific to our particular cohort of veterans.

Measures

Demographics, military service branch, and number and duration of deployments were determined using self-report questionnaires. Combat exposure was assessed with the Deployment Risk and Resilience Inventory (King, King, Vogt, Knight, & Samper, 2006) Combat Experiences Scale (CES). It has been shown to have adequate reliability and validity in veterans of recent wars (Guyker et al., 2013). In our sample, CES scores ranged from 0 to 64 and Cronbach's α was .92.

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The Boston Assessment of TBI-Lifetime (BAT-L; Fortier et al., 2014), a validated, semistructured clinical interview with strong interrater reliability ($\kappa > .80$), was administered by doctoral-level psychologists to document a history of TBI. A history of military mTBI was defined as a period of self-reported loss of consciousness ≤ 30 minutes, posttraumatic amnesia ≤ 24 hours, or altered mental status ≤ 24 hours following a credible injury mechanism (U.S. Department of Veterans Affairs and U.S. Department of Defense, 2009) acquired during military service.

The Clinician Administered PTSD Scale (CAPS; Blake et al., 1990) using the DSM-IV standard scoring rule of 3 (Weathers, Ruscio, & Keane, 1999) was administered by doctoral-level psychologists to determine the presence and history of PTSD. Weathers, Keane, and Davidson (2001) reported moderate interrater reliability ($\kappa = .58$). In our sample, CAPS total scores ranged from 0 to 125 and Cronbach's α was .94. Psychologists also administered the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID; First, Spitzer, Gibbon, &Williams, 1996; Lobbestael, Leurgans, & Arntz, 2011; Williams et al., 1992) nonpatient edition to assess for mood disorders, anxiety disorders, and substance use disorders, and to screen for psychotic disorders. Interrater reliability for the SCID is well documented (http://www.scid4.org/psychometric/). Both BAT-L diagnoses and psychiatric assessments were reviewed at weekly diagnostic consensus meetings consisting of at least three doctoral-level psychologists and a psychiatrist.

The Pittsburgh Sleep Quality Index (PSQI; Carpenter & Andrykowski, 1998), which has previously been validated in TBI populations (Fichtenberg, Putnam, Mann, Zafonte, & Millard, 2001; Fichtenberg, Zafonte, Putnam, Mann, & Millard, 2002) was used to determine the presence of sleep disturbance. The recommended global score cutoff of >5 was used to define sleep disturbance. In our sample, PSQI global scores ranged from 0 to 20 and Cronbach's α was .79. Pain was assessed using the Short Form McGill Pain Questionnaire (SFMPQ; Grafton, Foster, & Wright, 2005; Melzack, 1987), which has been used previously in mild to moderate TBI (Bay & de-Leon, 2011; Walker, McDonald, Ketchum, Nichols, & Cifu, 2013). Current pain was diagnosed when the current overall level of pain was rated as mild or greater.

The World Health Organization (WHO) Disability Assessment Schedule II (WHODAS; WHO, 2010) was used to determine the presence of functional disability. The WHODAS has six subdomains: Understanding and Communicating, Getting Around, Self-Care, Getting Along with People, Life Activities, and Participation in Society. The WHODAS has been shown to have high internal consistency, stable factor structure, and high test-retest reliability (Strauss, Sherman, & Spreen, 2006), and with TBI (Soberg, Finset, Roise, & Bautz-Holter, 2012). The *DSM-5* (APA, 2013) recommends the WHODAS for assessment of disability in clinical settings. WHODAS subdomain and overall scores range from 0 to 100, with higher scores indicating worse functioning. Each item contributes to its respective subdomain score equally, and each subdomain score is divided by the total possible points. Every subdomain score contributes equally to the overall score. For participants who were not currently working or in school ($n = 44$), the Life Activities subdomain raw score was divided by 16 potential points (four total questions), rather than 32 potential points (eight

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total questions), in accordance with the guidelines offered by the WHO (2004). In our sample, WHODAS overall total scores ranged from 0 to 69.5 and Cronbach's α was .96.

We employed the Validity-10 Scale (Vanderploeg et al., 2014), which is embedded in the Neurobehavioral Symptom Inventory (NSI; Cicerone & Karlmar, 1995), to examine possible symptom exaggeration on self-report measures. Total scores >22 on the Validity-10 scale indicate possible invalid responding.

Data Analysis

Descriptive statistics for demographics, military service, and clinical characteristics for the final sample were calculated. One-way ANOVAs and χ^2 tests were performed to examine possible differences between participants with and without a history of military mTBI. Due to time constraints during testing, 12 participants did not complete the NSI, 12 did not complete the CES, 10 did not complete the PSQI, 18 did not complete the SFMPQ, and 15 did not complete the WHODAS. Two participants did not indicate their level of education. These individuals were therefore excluded from relevant analyses.

A multiple linear regression analysis was performed to analyze the contribution of a history of military mTBI, current psychiatric diagnoses, and current behavioral issues to disability. Separate multiple regression analyses were also conducted for each of the six WHODAS domains, using the same independent variables described above. For each regression, a square-root transformation of the functional status score was applied to meet the regression assumptions of linearity and normality of residuals. We computed a correlation matrix to examine the simple associations between each of the independent variables (Supplemental Table A).

An exploratory factor analysis was performed to determine which psychiatric and behavioral conditions, all coded as presence or absence of the condition, shared common variance. SPSS (version 20) and SAS (version 9.3) software were used for all analyses. We used the bootstrap method to adjust the *p* value for multiple comparisons (proc multtest in SAS; UCLA Statistical Counseling Group, 2014).

Results

Participants with a history of military mTBI were significantly more likely to report increased combat exposure and had more psychiatric and behavioral conditions than veterans without a history of military mTBI (see Table 1). History of military mTBI increased the odds of a PTSD diagnosis by 300% and depressive disorders, pain, and sleep disturbance by at least 140%.

The average WHODAS score was 17.11 (*SD*=16.60), which suggests that overall the TRACTS cohort had worse functioning than approximately 80% of the general international population (WHO, 2010). Linear regression models, presented in Table 2, revealed that symptom exaggeration, depressive disorder, PTSD, pain, and sleep disturbance were all significantly related to disability. A history of military mTBI was not significantly related to

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disability. Regression analyses for the WHODAS subscales were similar to those found with the WHODAS total score (Table 3).

To investigate how these diagnoses were related, an exploratory factor analysis (eigenvalue > 0.88) with the individual psychiatric and behavioral conditions was conducted. Loadings from the rotated solution are presented in Table 4. The four factor solution selected accounted for 76.9% of the total variance. They were labeled (a) deployment trauma (depressive disorder, PTSD, and military mTBI), (b) somatic (pain and sleep disturbance), (c) anxiety (any non-PTSD anxiety disorder), and (d) substance use (alcohol or other substance abuse/dependence).

We established each study participants' clinical profile based on the conditions comprising each factor. Figure 1 displays the total number of participants who were diagnosed with the conditions that comprise these factors, which are not mutually exclusive. As shown, 40 (16.9%) participants were diagnosed with the three co-occurring conditions comprising the deployment trauma factor (i.e., depressive disorder, PTSD, and military mTBI), 130 (55.1%) reported conditions comprising the somatic factor, 39 (16.5%) were diagnosed with the conditions comprising the substance use factor, and 50 (21.2%) were diagnosed with the conditions comprising the anxiety factor.

Exploratory analyses were conducted to determine whether the empirically derived clinical factors were differentially associated with disability. To ensure the deployment trauma factor's association to disability was not simply a matter of burden of illness, or driven by the individual or pairwise components of the deployment trauma factor, we conducted a series of post hoc *t* tests. Participants in the deployment trauma group were compared to nondeployment trauma participants with three or more comorbidities and to participants with pairwise components of the deployment trauma factor (Table 5 and Supplemental Table B). When compared to nondeployment trauma participants with three or more comorbidities, participants in the deployment trauma group reported significantly worse general functioning (i.e., WHODAS total score). Additionally, when compared to participants with PTSD and a military mTBI, but no depressive disorder, participants in the deployment trauma group reported worse general functioning overall and in all subdomains except Getting Around. Finally, when compared to participants with depressive disorder and PTSD, but no military mTBI, participants in the deployment trauma group reported numerically worse general functioning which was not, however, statistically lower ($p = .113$). Participants in the deployment trauma group reported significantly greater disability in Self-Care and Getting Along with People, with worse scores on every WHODAS subscale. Of note, participants in the deployment trauma group did report significantly more combat exposure than participants with current PTSD and depression only; however, adjustment for combat exposure provided nearly identical results as reported in Table 5.

Finally, we examined participants with a WHODAS overall score ≥ 45 ($n = 22$), indicating substantial disability (Von Korff et al., 2005). Forty percent of participants with the deployment trauma factor reported substantial disability compared to 15%–16% of participants with each of the other three factors. Further, approximately 75% of those who reported substantial disability had the conditions comprising the deployment trauma factor.

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Thus, individuals with the three deployment trauma conditions represented a disproportionate subgroup of the sample with substantial disability. To determine whether the individual and paired constituents of the deployment trauma factor were related to substantial disability, we examined these subgroups. Participants with the deployment trauma factor were 3.52 times more likely to report substantial disability than participants with depressive disorder and PTSD, but no military, mTBI 95% CI [1.09, 11.37]; $\chi^2(1, N = 63) = 4.59$; $p = .032$).

Discussion

This study demonstrated that there are several prevalent conditions that must be considered, in addition to mTBI and PTSD, in returning OEF/OIF/OND service members and veterans. Strikingly, over 90% of the sample was diagnosed with a current psychiatric or behavioral condition, and 50% had three or more psychiatric and behavioral comorbidities. Without other variables in the model, a history of military mTBI was associated with increased presence of mental health issues. PTSD was 300% more likely and depressive disorders, pain, and sleep disturbance were at least 140% more likely in this group. The association between mTBI and mental health issues is similar to previous findings (Taylor et al., 2012).

In addition to a high prevalence of psychiatric diagnoses, this sample also reported significant disability. Remarkably, the TRACTS cohort reported worse functioning on the WHODAS disability scale than approximately 80% of the worldwide sample (WHO, 2010) and endorsed difficulties in all functional domains. The impairments in completing tasks in major life domains can also be conceptualized as reintegration issues. We are not the first group to demonstrate that veterans struggle with difficulties in postdeployment functioning, particularly in social and occupational roles (Beder et al., 2011; Sayer et al., 2010). Identification of the psychiatric and behavioral factors that predict disability can guide strategic treatment to improve functional outcome.

Although participants diagnosed with the conditions that comprise the deployment trauma factor significantly differed from participants with the combination of PTSD and depression without mTBI on only two of the WHODAS subscales, they obtained nominally higher disability scores on all subscales and the total score. The specific combination of depressive disorder, PTSD, and mTBI may cause a unique vulnerability for compromised functional outcome/disability. Participants who were diagnosed with the conditions comprising the deployment trauma factor reported more disability than participants who were diagnosed with any three other co-occurring conditions. Interestingly, PTSD and depression, but not military mTBI, were associated with overall disability and specific areas of functioning. This is not completely unexpected, as a history of mTBI has previously been shown to be unrelated to general functioning (Lippa et al., 2014). As the current data support, however, mTBI may be a critical moderating factor in predicting functional status after deployment when other clinical conditions are present (e.g., PTSD, depression, among other psychiatric and behavioral comorbidities). Our findings suggest that the most concerning combination of diagnoses may actually be depression, PTSD, and mTBI. It is possible that the specific combination of these three diagnoses may be biologically significant and increase the risk for other clinical issues (e.g., sleep disturbance, substance abuse) and substantial disability.

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Perhaps not surprisingly, invalid NSI responding was associated with increased disability. Reduced effort has previously been associated with functional outcomes among veterans with mTBI (Lippa et al., 2014).

The primary limitation of this study was the relatively small subsample (n = 40, 16%) of individuals with the three conditions comprising the deployment trauma factor. Nevertheless, if this proportion represents a true estimate of the incidence at which these three conditions co-occur, there are hundreds of thousands of service members and veterans at risk for substantial disability. Given the potentially critical implications, cross validation and replication in larger epidemiological studies are warranted. Additionally, we did not have the statistical power to investigate the relationship between predeployment TBI and psychiatric diagnoses and functional outcome. Predeployment physical and psychiatric diagnoses likely play important roles in functional outcome, however, and should be investigated in future studies. Finally, as these data were cross sectional, we were unable to infer causality between our variables of interest. Future studies should explore physiological, genetic, neuropsychological, and environmental correlates of the deployment trauma factor and whether any of these correlates serve as risk or resiliency factors.

In summary, this study demonstrated high rates of co-occurring psychiatric and behavioral diagnoses in returning service members and veterans. Indeed, roughly a quarter of participants fit into multiple clinical factors. The interacting effects of these multiple psychiatric and behavioral conditions in the cohort likely leads to additive, if not multiplicative, functional impairments in daily living, as demonstrated by increased disability. The combination of current depressive disorder, PTSD, and a history of military mTBI may represent a biologically significant clinical phenotype (deployment trauma factor) that increases the risk for other clinical issues (e.g., sleep disturbance, substance abuse) and substantial disability.

OEF/OIF/OND veterans represent a complicated, polymorbid population that does not fit into typical standard of care models, which target one diagnosis at a time. Given the tendency for enduring symptoms in one domain to thwart rehabilitative progress in other domains (Vanderploeg, Belanger, & Curtiss, 2009), OEF/OIF/OND veterans will not likely benefit from treatment of either cognitive or emotional symptoms in isolation. Rather, they require highly integrative interventions that will be appropriate for the range of treatment challenges they present.

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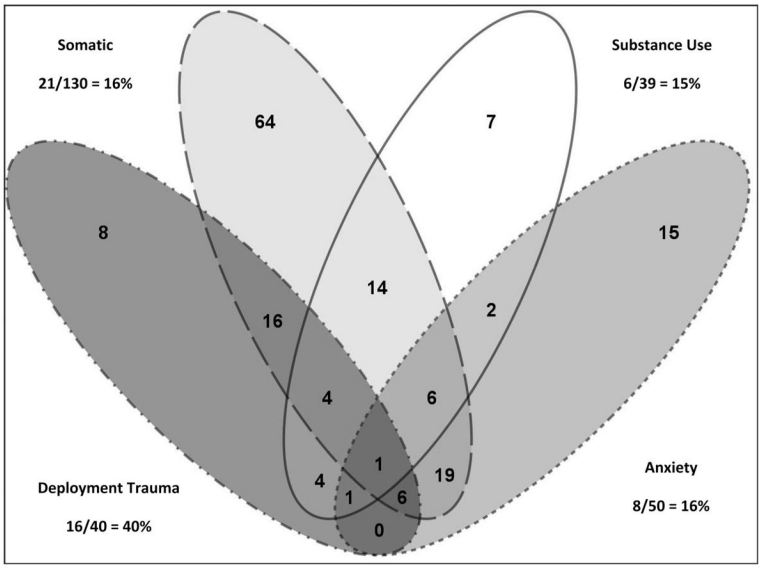

Figure 1.

Extracted factors and the percentage of participants who reported substantial disability. The factors were based on number of participants with the diagnosis comprising each factor. Substantial disability (numerator) was calculated as the number of participants who reported substantial disability (WHODAS ≥ 45) over the number of participants with the diagnosis comprising each factor (denominator).

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Table 1

Demographic, Current Psychiatric, and Behavioral Status for Total Sample and by TBI Status

	Total (N = 255[a])		mTBI (n = 99)		No mTBI (n = 156)		
Variable	***n* or *M***	**% or *SD***	***n* or *M***	**% or *SD***	***n* or *M***	**% or *SD***	**χ^2 or *t***
Age	32.24	8.48	31.17	7.41	32.91	9.05	1.67
Males	227	89.0	92	92.9	135	86.5	2.53
Education (years)	13.87	1.90	13.67	1.82	13.99	1.94	1.28
Race							
White	178	69.8	71	71.7	107	68.6	3.91
Black	25	9.8	10	10.1	15	9.6	
Hispanic	41	16.1	16	16.2	25	16.0	
Other	7	2.7	2	2.0	5	3.2	
Unknown/missing	4	1.6	0	0.0	4	2.6	
Service Branch							
Army	67	26.4	34	34.7	33	21.2	8.95
Navy	7	2.8	3	3.1	4	2.6	
Marines	35	13.8	16	16.3	19	12.2	
Air Force	13	5.1	4	4.1	9	5.8	
National Guard	101	39.8	33	33.7	68	43.6	
Reserves	31	12.2	8	8.2	23	14.7	
Deployments							
Number	1.40	0.70	1.47	0.84	1.35	0.60	−1.26
Months	14.32	8.54	15.44	9.73	13.61	7.63	−1.59
Months since last	34.56	28.40	37.02	28.90	33.49	28.09	−0.97
Combat exposure	15.85	11.84	21.77	11.9	12.25	10.27	−6.60***
n of military mTBIs	0.65	1.32	0	0	1.69	1.66	
PTSD	146	57.3	76	76.7	70	44.9	25.18***
Depressive disorders	74	29.0	41	41.4	33	21.2	12.07***
Major	70	27.5	38	38.4	32	20.5	9.71**
Other	4	1.6	3	3.0	1	0.6	2.24

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	Total (N = 255[a])		mTBI (n = 99)		No mTBI (n = 156)		
Variable	***n* or *M***	**% or *SD***	***n* or *M***	**% or *SD***	***n* or *M***	**% or *SD***	**χ^2 or *t***
Anxiety disorders	50	19.6	15	15.2	35	22.4	2.04
Panicr	17	6.7	8	8.1	9	5.8	0.52
Social phobia	16	6.3	3	3.0	13	8.3	2.90
GAD	16	6.3	3	3.0	13	8.3	2.90
Other	15	5.9	6	6.1	9	5.8	0.01
Substance use disorders[b]	39	15.3	19	19.2	20	12.8	1.90
Alcohol	37	14.5	18	18.2	19	12.2	1.76
Other	7	2.8	2	2.0	5	3.2	0.32
Current pain	161	67.91	71	79.8	90	60.8	9.18**
30-day average pain	29.31	25.28	35.95	26.68	25.40	23.65	−3.13**
Sleep disturbance	182	74.3	78	83.9	104	68.4	7.21**
Sleep quality	9.36	4.75	10.82	4.90	8.47	4.43	−3.87***
n Psych/behav conditions	2.56	1.49	3.03	1.35	2.26	1.50	−4.17***
3+ comorbidities	130	51.0	67	67.7	63	40.4	18.05***

Note. The percentages displayed in this table are column percentages. TBI = traumatic brain injury; mTBI = mild traumatic brain injury; GAD = generalized anxiety disorder; Psych/behav = psychiatric or behavioral.

[a] *n* ranged from 237 to 255 due to missing data.

[b] Abuse or dependence.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

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Table 2

Multiple Linear Regression of WHODAS Total Score and Demographic, Psychiatric, and Behavioral Conditions

Variable	B	*SE*	β	*t*
Age	0.015	0.011	.062	1.34
Sex	0.113	0.311	.016	0.36
Education (years)	−0.033	0.052	−.029	−0.63
Combat exposure	0.001	0.009	.005	0.10
Symptom exaggeration	1.150	0.538	.099	2.13*
mTBI	0.330	0.212	.075	1.55
Depressive disorder	1.646	0.234	.349	7.05***
PTSD	1.009	0.235	.236	4.30***
Anxiety disorder	0.448	0.240	.084	1.86
Substance use disorder	0.180	0.260	.031	0.69
Pain	1.086	0.216	.238	5.04***
Sleep disturbance	0.814	0.232	.167	3.51**

Note. $n = 232$. $R^2 = .59$. Adjusted $R^2 = .57$. WHODAS = World Health Organization Disability Assessment Schedule II; mTBI = mild traumatic brain injury; PTSD = posttraumatic stress disorder.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

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Table 3

Standardized β for WHODAS Domains Associated with Demographic, Psychiatric, and Behavioral Conditions

Variable	UC	GA	SC	GAWP	LA	PS
Age	.052	.091	.030	.051	.044	.050
Sex	−.015	−.031	.033	.043	.040	.003
Education (years)	−.004	−.052	.058	−.008	.010	−.033
Combat exposure	.025	.005	.032	.050	−.059	.016
Symptom exaggeration	.115*	.174**	.059	.029	.084	.049
mTBI	.058	.110	.151*	.040	.029	.040
Depressive disorder	.223***	.265***	.358***	.340***	.280***	.365***
PTSD	.240***	−.066	.105	.317***	.159*	.279***
Anxiety disorder	.146**	.020	−.003	.073	.069	.042
Substance use disorder	.087	−.017	−.014	−.034	.029	.049
Pain	.218***	.261***	.134*	.088	.247***	.233***
Sleep disturbance	.147**	.156**	.085	.141**	.144*	.109*

Note. $n = 233$. Adjusted R^2: Understanding and Communicating (UC) = .45, Getting Around (GA) = .34, Self-Care (SC) = .29, Getting Along with People (GAWP) = .46, Life Activities (LA) = .33, Participation in Society (PS) = .54. WHODAS = World Health Organization Disability Assessment Schedule II; mTBI = mild traumatic brain injury; PTSD = posttraumatic stress disorder.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

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Table 4

Principal Factors Analysis of mTBI, Psychiatric Conditions, and Behavioral Conditions

Variable	Deployment trauma	Somatic	Anxiety	Substance use
mTBI	.644	.039	−.413	−.015
Depressive disorder	.767	.041	.121	.021
PTSD	.797	.064	.124	.173
Pain	.039	.910	−.043	.021
Sleep disturbance	.076	.904	−.013	−.073
Anxiety disorder	.121	−.045	.925	.017
Substance use	.095	−.041	.018	.986
% variance explained	23.8	23.6	15.1	14.4
Eigenvalue	1.89	1.58	1.05	0.88

Note. $N = 236$. mTBI = mild traumatic brain injury; PTSD = posttraumatic stress disorder.

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Table 5

Reported Disability in Participants With and Without the Components of the Deployment Trauma Factor

	Deployment trauma (*n* = 40)		Other trauma + 3 comorbidities (*n* = 106)			Depression + PTSD (*n* = 28)			PTSD + mTBI (*n* = 36)		
Variable	***M***	***SD***	***M***	***SD***	***t***	***M***	***SD***	***t***	***M***	***SD***	***t***
WHODAS											
Total	38.41	20.11	20.05	13.30	−5.11***	31.12	14.08	−1.61	19.08	11.52	−4.97***
UC	39.81	23.03	27.06	17.88	−3.42***	38.89	19.23	−0.17	26.59	15.66	−2.82**
GA	28.06	24.27	16.43	19.50	−2.89**	26.85	21.89	−0.20	18.68	22.06	−1.69
SC	18.75	17.17	4.88	9.17	−4.63***	7.64	10.73	−3.15**	5.88	10.87	−3.77***
GAWP	47.22	25.73	22.67	17.58	−5.32***	35.37	18.55	−2.03*	20.59	15.06	−5.32***
LA	40.10	27.70	24.08	20.68	−3.18**	34.61	22.83	−0.84	20.96	17.02	−3.51***
PS	48.09	26.22	21.99	17.42	−5.56***	37.04	20.15	−1.82	18.75	13.50	−5.93***

Note. The groups being compared to the deployment trauma (DT) group are not mutually exclusive. Some *n*s in this table differ from Supplemental Table B due to missing data. Statistics were computed only between the DT group and each of the other groups. The *p* values are adjusted for multiple comparisons using a bootstrap method. WHODAS = World Health Organization Disability Assessment Schedule II; UC = Understanding and Communicating; GA = Getting Around; SC = Self-Care; GAWP = Getting Along with People; LA = Life Activities; PS = Participation in Society.

* $p < .05$.

** $p < .01$.

*** $p < .001$.