PTSD Comorbidity and Suicidal Ideation Associated With PTSD Within the Ohio Army National Guard

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Objective: To study the relation between posttraumatic stress disorder (PTSD) psychiatric comorbidity and suicidal ideation in a representative sample of Ohio Army National Guard soldiers.

Method: Using retrospective data collected on the telephone from a random sample of 2,616 National Guard soldiers who enrolled in a 10-year longitudinal study (baseline data collected November 2008–November 2009), we examined (1) the prevalence of other psychopathologies among those with *DSM-IV*–diagnosed PTSD compared to those without PTSD and (2) the association between PTSD comorbidity and suicidal ideation (reporting thoughts of being better off dead or hurting themselves). All analyses were carried out using logistic regression.

Results: Of guard members with PTSD in the last year, 61.7% had at least 1 other psychopathology; 20.2% had at least 2 other co-occurring conditions. The most common co-occurring psychopathology was depression. While those with PTSD overall were 5.4 (95% CI, 3.8–7.5) times more likely to report suicidality than those without PTSD, those who had at least 2 additional conditions along with PTSD were 7.5 (95% CI, 3.0–18.3) times more likely to report suicidal ideation at some point in their lifetime than those with PTSD alone.

Conclusions: Soldiers with PTSD were at increased risk for suicidality, and, among those with PTSD, those with at least 2 additional conditions were at the highest risk of suicidal ideation. Future research should address the mechanisms that contribute to multimorbidity in this population and the appropriate treatment methods for this high-risk group.

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Community-based assessments of mental illness suggest that people with a lifetime history of posttraumatic stress disorder (PTSD) compared to those without are more likely to have another psychiatric condition and that few of those with PTSD have this condition alone.[1–4] While the therapeutic challenges resulting from this degree of Axis I comorbidity indicate a need to further understand PTSD comorbidity, recent work also suggests that this co-occurrence may be associated with suicidality.[5,6]

In 2007, completed suicide was the second leading cause of death among those aged 25 to 34 years and the third most common cause among those aged 15 to 24 years in the United States.[7] In military populations, the need to better understand the link between PTSD comorbidity and suicidality, one of the greatest predictors of suicide,[8] is particularly acute given the high prevalence of PTSD comorbidity[2,9] and high rates of suicide.[10–12] However, there is no consensus on the interrelations among PTSD, PTSD comorbidity, and suicidal ideation in military populations. A recent study by Guerra and Calhoun[9] examined Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) veterans and found that while PTSD was associated with suicidality, the increase of comorbid conditions among those with PTSD was not associated with suicidality. In contrast, Jakupcak et al[13] examined treatment-seeking OIF/OEF veterans and found that the risk of suicidality was higher among those with PTSD and at least 2 other psychiatric conditions compared to those with PTSD alone.

This lack of clarity suggests a need to understand the relation between PTSD, other psychiatric conditions, and suicidal ideation. In particular, work is needed to examine this relation in populations such as National Guard soldiers. Compared to their active-duty counterparts, reserve component soldiers often experience unique stressors that may negatively affect their mental health. For example, reserve forces are often deployed separately from their unit, maintain a civilian job while deployed, and have a time-limited amount of health care insurance after deployment.[14–16] Additionally, since the first Gulf War, reserve forces have played an ever-increasing role in combat, contributing approximately 27% of combat forces in OIF/OEF as of 2007.[17]

This article uses the baseline data from a 10-year prospective cohort study of a random representative sample of the Ohio Army National Guard (OHARNG) to examine the prevalence of psychiatric comorbidity among those with PTSD and the relation between PTSD comorbidity and suicidal ideation.

METHOD

The National Guard Bureau and the institutional review boards of University Hospitals Case Medical

Clinical Points

- When depression or alcohol dependence accompanies PTSD, view this clinical presentation as being accompanied by high risk for suicidality.
- Always look for co-occurring depression and alcohol dependence in PTSD.
- These 2 co-occurring illnesses increase the risk of suicidality more than 7-fold.

Center, University of Toledo, University of Michigan, Ann Arbor Veterans Administration Medical Center, Columbia University, and the Office of Human Research Protections of the US Army Medical Research and Materiel Command approved the study protocol. Verbal informed consent was obtained from all participants.

Study Population and Sampling

This study population was drawn from all serving members of the OHARNG between June 2008 and February 2009 who had addresses listed with the Guard (N = 12,225). After an alert letter was sent to all Guard members, 1,013 (8.3%) opted to not participate in the study. After eliminating those individuals who did not have a telephone number listed with the Guard (1,130; 10.1%) or incorrect numbers (3,568; 31.8%), we had 6,514 (58.1%) possible participants. Of these, 187 (2.8%) were not eligible (eg, too young or retired), 1,364 (20.9%) did not wish to participate, 31 (0.4%) were disqualified (eg, did not speak English), and 2,316 (35.6%) were not contacted before the cohort closed. Official enrollment (N = 2,616) and consent to participate in the study began in November 2008 and ended November 2009. Participants were compensated for their time.

Telephone Interview and Psychopathology Assessments

The computer-assisted telephone interview was field tested in November 2008. All assessments of psychopathology included questions to assess *Diagnostic and Statistical Manual of Mental Disorders,* Fourth Edition (*DSM-IV*) criteria. Additionally, questions on timing were included to assess whether or not the symptoms were present in the past 30 days, present in the past year, or ever present in the person's lifetime.

To assess self-perceived social support as well as collect information on traumatic events experienced during deployment, we used an adapted form of the Deployment Risk and Resilience Inventory.[18] We used a modified form of the Life Events Checklist from the Clinician-Administered PTSD Scale[19,20] to collect the frequency of traumatic events throughout their lifetime. The scale was modified to include additional questions used in other population-based studies to allow for comparisons.[21]

To assess PTSD, we used the PTSD Checklist-Civilian Version.[22] PTSD symptoms were asked in relation to 2 traumas: the self-identified "worst" traumatic event from outside the person's most recent deployment and the self-identified "worst" traumatic event experienced during their most recent deployment.[19,20,23] To be diagnosed with PTSD, a person had to experience criteria A1 and A2 (experiencing a traumatic event and intense fear, hopelessness, and horror due to a trauma) as well as meet criterion B (at least 1 symptom of reexperiencing the trauma), criterion C (at least 3 symptoms of avoidance of the trauma), criterion D (at least 2 symptoms of hyperarousal), criterion E (duration of 1 month), and criterion F (significant impairment).[24] To have PTSD, a person had to meet all *DSM-IV* criteria related to a specific traumatic event and then have PTSD either from the traumatic event that occurred during their most recent deployment or from an event outside their most recent deployment.

We used the Patient Health Questionnaire-9 (PHQ-9)[25] to assess any depressive disorder. To be diagnosed with depressive disorder (including major depressive disorder [MDD]), a person had to have at least 2 or more co-occurring symptoms on the PHQ-9, with at least 1 being depressed mood or anhedonia.[25,26]

To assess generalized anxiety disorder (GAD), we used the GAD-7.[27] To be diagnosed with GAD, a person had to have co-occurring symptoms with a score greater than or equal to 10, have symptoms for at least 6 months, and report functional impairment.[27]

The Mini-International Neuropsychiatric Interview[28] was used to assess alcohol dependence and alcohol abuse. A lifetime history of alcohol abuse occurred if the individual met criterion A (at least 1 symptom of maladaptive pattern of substance use leading to impairment or distress) and criterion B (never met the classification for alcohol dependence).[28] A lifetime history of alcohol dependence was present if the individual met at least 3 symptoms of maladaptive pattern of substance abuse leading to impairment or distress.[28]

To have suicidal ideation in their lifetime, individuals had to report feeling that they had ever had thoughts of being better off dead or wanting to hurt themselves as determined from the PHQ-9.[25,26]

Clinical Interview

All psychopathology assessments were tested against a clinical reappraisal undertaken on a subsample of the study population (N = 500), and we found the assessments reliable and valid in this population. Participants recruited for this subsample were interviewed again using the full Structured Clinical Interview for *DSM-IV* Axis I Disorders and were compensated for their time. In our clinical reappraisal, we found the assessments had high specificity (ranging from 0.80 for alcohol abuse and 0.98 for generalized anxiety disorder) and were unlikely to classify individuals with a condition when they did not actually have the condition. The reliability estimates were similarly as high, with the Cronbach α ranging from 0.57 for alcohol abuse to 0.95 for PTSD from the most recent deployment (M.T., unpublished data, March 2011).

Statistical Analyses

We first compared the distribution of characteristics (ie, gender, age, education) of our sample to the OHARNG

Table 1. Characteristics of the Ohio Army National Guard Study Participants[a]

Characteristic	Total (N = 2,616) n	%	Ohio National Guard 2008 Profile (N = 10,778) n	%	*P* Value
Gender					.16
Male	2,228	85.2	9,293	86.2	
Female	388	14.8	1,485	13.8	
Age					<.01
17–24 y	878	33.6	4,043	37.5	
25–34 y	848	32.5	3,746	34.8	
35–44 y	634	24.3	2,143	19.9	
45+ y	250	9.6	846	7.8	
Race					<.01
White	2,295	87.8	9,512	88.3	
Black	195	7.5	1,083	10.0	
Other	123	4.7	183	1.7	
Income					
≤ $60,000	1,498	59.1	…	…	
> $60,000	1,038	40.9	…	…	
Education					
High school graduate/GED or less	727	27.8	…	…	
Some college or technical training	1,234	47.2	…	…	
College/graduate degree	655	25.0	…	…	
Marital status					<.01
Married	1,227	47.0	4,154	38.5	
Divorced/separated/widowed	252	9.6	657	6.1	
Never married	1,134	43.4	5,967	55.4	
Rank					<.01
Officer	342	13.1	1,028	9.5	
Enlisted, cadets, and civilian employees	2,273	86.9	9,750	90.5	
Most recent deployment location					
Never deployed	939	36.1	…	…	
Nonconflict area	872	33.5	…	…	
Conflict area	793	30.5	…	…	
No. of lifetime deployments					
0–1	1,756	67.4	…	…	
2–3	682	26.2	…	…	
4+	169	6.5	…	…	
Total no. of all traumatic events experienced					
0	141	5.4	…	…	
1–5	887	33.9	…	…	
6–11	831	31.8	…	…	
12+	757	28.9	…	…	

[a]Some percentages will not add up to the total due to missing values. All tests were conducted using a 2-tailed χ^2 test.
Abbreviation: GED = general equivalency diploma.

using 2-tailed χ^2 tests. We also described the prevalence of individual psychopathologies (PTSD, any depressive disorder, GAD, alcohol abuse, and alcohol dependence) and the prevalence of no conditions, at least 1 condition, and the co-occurrence of any of the conditions in 3 time frames: in the past month, in the past year, and ever in the person's lifetime.

To answer our first question, we used logistic regressions to examine the association between PTSD and psychiatric comorbidity. We compared the prevalence of other conditions within the past year (co-occurring depression, GAD, alcohol abuse, alcohol dependence, no other diagnosis, 1 other diagnosis, 2 other diagnoses, then 3 other diagnoses) among those with PTSD and without PTSD. We then examined these comparisons separately for men and women.[29]

Table 2. Prevalence of Disorders in the Ohio Army National Guard Sample[a]

Condition	Past Month n	%	Past Year n	%	Ever in Lifetime n	%
PTSD	136	5.2	188	7.2	249	9.5
Depressive disorder	167	6.4	365	14.0	560	21.4
Generalized anxiety disorder	45	1.7	53	2.0	75	2.9
Alcohol abuse	68	2.6	139	5.3	628	24.0
Alcohol dependence	91	3.5	183	7.0	615	23.5
No disorder	2,224	85.0	1,932	73.9	1,099	42.0
At least 1 condition	304	11.6	496	19.0	1,060	40.5
At least 2 conditions	88	3.4	188	7.2	457	17.5

[a]One hundred forty-one people (5.4%) never had a trauma and were coded as never having PTSD for these statistics; 14 people (0.5%) refused or did not answer the PTSD symptoms and were coded as missing. One hundred eighteen people (4.5%) reported never having drunk alcohol in their life and therefore were coded as not having the condition. The combinations of conditions include those who never had a trauma and therefore were not at risk for PTSD.
Abbreviation: PTSD = posttraumatic stress disorder.

To answer our main question, we used logistic regression to examine the relation between comorbid presentation of PTSD and suicidal ideation. We compared a lifetime history of suicidal ideation among those with and without PTSD. Then, separately among those with PTSD, we examined the association between comorbid PTSD in the past year and suicidal ideation. The mode of survey administration resulted in the lack of collection on current alcohol use for 6% of participants. To determine how this may have affected our results, we ran sensitivity analyses assuming that these individuals all had an alcohol use disorder, that none did, or that a random proportion had an alcohol use disorder.

RESULTS

The characteristics of the baseline survey are described in Table 1. Similar to the OHARNG, our sample was predominantly male (85.2%) and white (87.7%). Our sample is slightly older than the OHARNG, and approximately half are married. Sixty-four percent had deployment experience, with the majority having between 1 and 3 deployments. The past month, past year, and lifetime prevalence of mental disorders in the total baseline sample (N = 2,616) is described in Table 2. The most common mental disorder in the past month and past year, respectively, was depression (6.4%, 14.0%), followed by PTSD (5.2%, 7.2%). The most common condition ever reported was alcohol abuse (24.0%) relative to alcohol dependence (23.5%), depression (21.4%), PTSD (9.5%), and GAD (2.9%). In the past month, past year, and lifetime, respectively, 85.0%, 73.9%, and 42.0% of the individuals had none of these disorders.

The 12-month psychiatric comorbidity in soldiers with and without PTSD and then separately for men and women is described in Table 3. In soldiers with PTSD, the most prevalent condition was depression (48.9%), followed by alcohol dependence (17.0%) and GAD (16.0%). Compared to those without PTSD, GAD was 21.6 times more likely to occur in those with PTSD, and depression was 7.6 times more likely. Whereas alcohol dependence was 3.1 times more

Table 3. Distribution of Mental Health Conditions Comparing Individuals With PTSD Within the Past Year to Those Who Did Not Have PTSD Within the Past Year

	PTSD (n = 188)		No PTSD (n = 2,414)		Odds Ratio	Confidence Interval	
	n	%	n	%		Upper	Lower
Overall (N = 2,602)							
Conditions							
Depressive disorder	92	48.9	269	11.1	7.6	5.6	10.4
Generalized anxiety disorder	30	16.0	21	0.9	21.6	12.1	38.7
Alcohol abuse	14	7.5	125	5.2	1.5	0.8	2.6
Alcohol dependence	32	17.0	149	6.2	3.1	2.1	4.7
Co-occurrence of other conditions							
No other disorder	72	38.3	1,922	79.6	0.2	0.1	0.2
One other condition	78	41.5	423	17.5	3.3	2.5	4.5
Two or more other conditions	38	20.2	69	2.9	8.6	5.61	13.2
Men (n = 2,215)	n = 145		n = 2,070				
Conditions	n	%	n	%			
Depressive disorder	67	46.2	216	10.4	7.4	5.2	10.5
Generalized anxiety disorder	27	18.6	16	0.8	29.4	15.4	56.0
Alcohol abuse	12	8.3	114	5.5	1.5	0.8	2.9
Alcohol dependence	29	20.0	139	6.7	3.5	2.2	5.4
Co-occurrence of other conditions							
No other disorder	56	38.6	1,647	79.6	0.2	0.1	0.2
One other condition	55	37.9	364	17.6	2.9	2.0	4.1
Two or more other conditions	34	23.5	59	2.9	10.4	6.6	16.6
Women (n = 387)	n = 43		n = 344				
Conditions	n	%	n	%			
Depressive disorder	25	58.1	53	15.4	7.6	3.9	14.9
Generalized anxiety disorder	3	7.0	5	1.5	5.1	1.2	22.1
Alcohol abuse	2	4.7	11	3.2	1.5	0.3	6.9
Alcohol dependence	3	7.0	10	2.9	2.5	0.7	9.5
Co-occurrence of other conditions							
No other disorder	16	37.2	275	79.9	0.1	0.1	0.3
One other condition	23	53.5	59	17.2	5.6	2.9	10.8
Two or more other conditions	4	9.3	10	2.9	3.5	1.03	11.4

Abbreviation: PTSD = posttraumatic stress disorder.

Table 4. Lifetime History of Suicidal Ideation Among Those With Current PTSD and Those With PTSD Accompanied by Psychiatric Comorbidity

	History of Suicidal Ideation		Odds Ratio	Confidence Interval	
	n	%		Lower	Upper
Association with current PTSD					
No PTSD (n = 2,410)	200	8.3	Reference	…	…
Current case of PTSD (n = 187)	61	32.6	5.4	3.8	7.5
Association with PTSD accompanied by comorbidity					
Current PTSD only (n = 72)	13	18.1	Reference	…	…
Current PTSD + 1 (n = 78)	25	32.1	2.1	1.0	4.6
Current PTSD + 2 or more (n = 37)	23	62.2	7.5	3.0	18.3

Abbreviation: PTSD = posttraumatic stress disorder.

likely, alcohol abuse was reported to the same extent in those with and without current PTSD. Those with PTSD were very unlikely to have no other lifetime disorder. When we stratified by gender, results were largely comparable, but we did find that while male soldiers with PTSD were 29.4 times more likely to have GAD compared to males who did not have PTSD, female soldiers were only 5.1 times more likely.

Table 4 and Figure 1 display the association between a lifetime history of suicidal ideation and PTSD as well as comorbid PTSD. Those with PTSD (as compared to those without) were 5.4 times more likely to have a history of suicidal ideation. Soldiers with PTSD and at least 2 comorbid conditions had 7.5 times greater odds of reporting suicidal ideation compared to those with PTSD only.

There were no statistically significant or meaningful differences in the associations reported here in the sensitivity analyses.

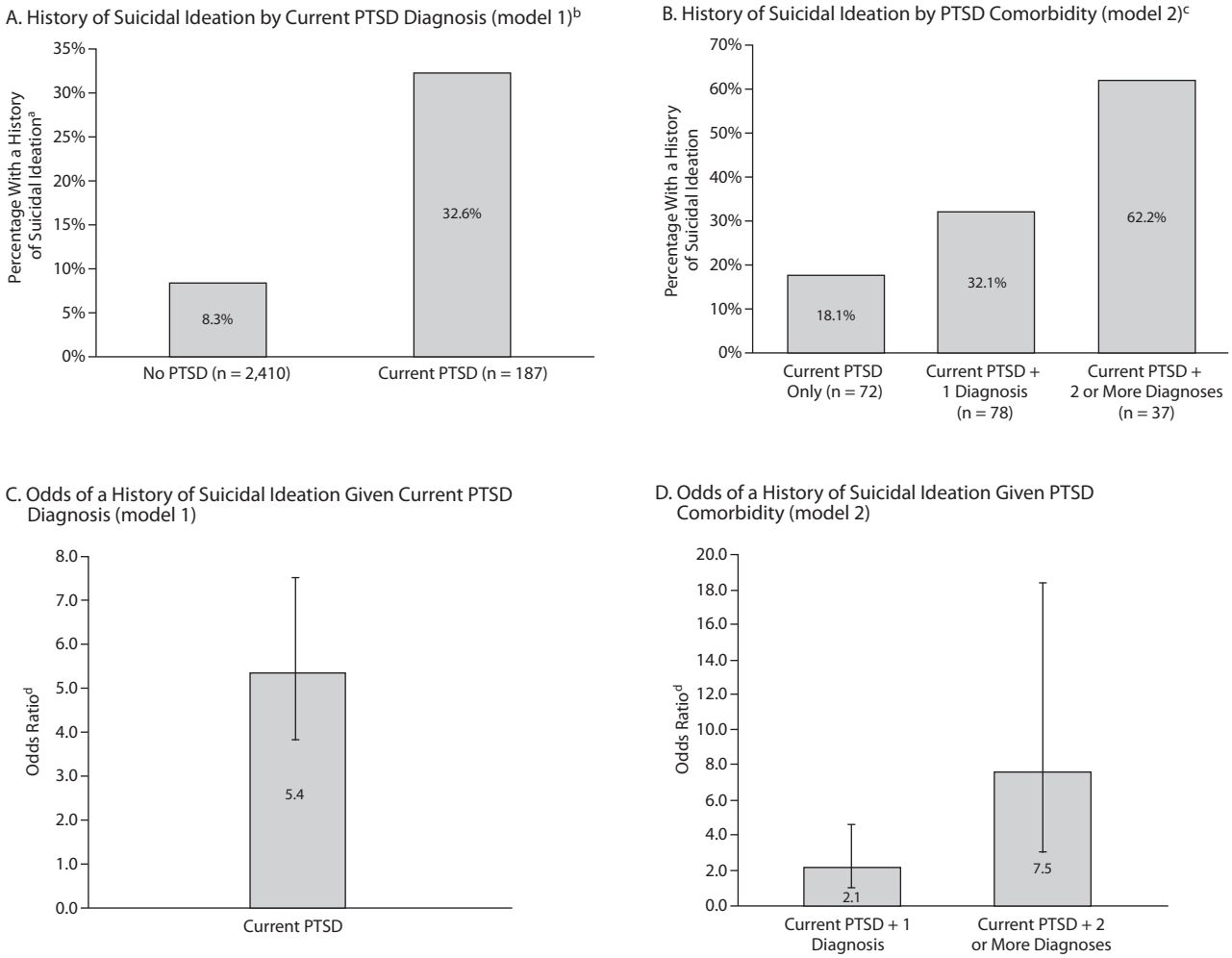
DISCUSSION

In a representative sample of OHARNG soldiers, we found that those with PTSD were more likely to report suicidal ideation. Among those with PTSD, comorbidity with more than 1 disorder was associated with a higher risk for suicidal ideation. The general association between PTSD and suicidal ideation in National Guard soldiers adds to the growing evidence for this association in military populations.[9,13,30] With respect to PTSD comorbidity, we found a specific association: among those with PTSD, those with 2 or more comorbid disorders were 7 times more likely to have ever reported suicidal ideation as compared to those with PTSD only. These results were consistent with work by Jakupcak et al,[13] who found that compared to veterans with PTSD alone, those with 2 or more additional conditions were more likely to report suicidal ideation.

Considering the prevalence of PTSD multimorbidity, the relation between PTSD with multiple disorders and suicidal ideation has particular clinical import. Within the past year, 61.7% of soldiers with PTSD had at least 1 other condition and 20.2% had at least 2 other conditions, a level comparable to other military populations.[2,31] In comparison, 2 or more conditions were present in only 2.9% of those without PTSD. The prevalence of multiple conditions among those with PTSD and the increased association of this group with suicidal ideation highlight a singular subgroup of clinical and therapeutic concern.

We found that the most common co-occurring condition with PTSD was depression, at 48.9% (46.2% among men and 58.1% among women). While we used a definition of depression that was not limited to MDD alone, several studies that examined MDD found a similarly high prevalence among those with PTSD.[1,32,33] In military populations, 56% of Israeli soldiers seeking PTSD treatment recently had major depressive disorder,[32] and 52% of a population-based sample of Australian Korean War veterans who had PTSD recently had MDD.[33] The increased risk of depression among those with PTSD (7.6-fold over those without PTSD) was comparable to 2 population-based military studies including the Millennium Cohort (4-fold increase in men and 3-fold increase in women for MDD) and the National Vietnam Veterans Readjustment Survey (10-fold increase for MDE).[2,34] The implications of this overlap have been reported in other studies, which found

Figure 1. Individuals With PTSD as Well as Those With PTSD Multimorbidity Were More Likely to Have a History of Suicidal Ideation[a]



[a]Lifetime prevalence.
[b]Model 1 result: compared to 200 of those without PTSD (n = 2,410), 61 of those with PTSD (n = 187) had a history of suicidal ideation.
[c]Model 2 result: compared to the 13 of those with only PTSD (n = 72), 25 of those with PTSD and 1 more condition (n = 78) and 23 of those with PTSD and 2 or more other conditions (n = 37) had a history of suicidal ideation.
[d]Logistic regression. Bar represents confidence interval.
Abbreviation: PTSD = posttraumatic stress disorder.

higher severity of PTSD symptoms, poor self-reported quality of life, and increased functional impairment and suicidal ideation among those with PTSD and depression compared to those with either condition alone.[3,33,34] Future research should focus on persons with co-occurring mood-anxiety disorders as a particularly vulnerable group.

In our sample, the second most prevalent condition among those with PTSD was alcohol dependence. Often reported along with alcohol abuse as the most common co-occurring condition with PTSD,[35] alcohol dependence had a high prevalence overall among those with PTSD (17.0%). This was primarily a concern among men with PTSD (20.0%). This prevalence of alcohol dependence was lower than that reported in the National Comorbidity Survey (men 52% and women 30%) but comparable to other military studies. Kulka et al[2] reported 22% of current alcohol abuse or dependence cases among those with PTSD in the National Vietnam Veterans Readjustment Survey, and 39% of those with PTSD had some form of alcohol disorder (abuse or dependence) in the Vietnam Experiences Study.[3] We found that, compared to those without PTSD, those with PTSD were 3.1 times more likely to have had alcohol dependence within the past year. In contrast to alcohol dependence, we found no increase in the prevalence of alcohol abuse among those with PTSD compared to the rest of the sample—alcohol abuse was reported to the same extent regardless of mental health or gender. Further research is necessary to examine the association between alcohol dependence and PTSD, as it may be a result of alcohol dependence preceding PTSD[3] but also may be a result of self-medication to deal with the symptoms of PTSD.[3,35,36] Regardless, the therapeutic concerns for this overlap are similar to those of other conditions and include diagnostic concerns[3] as well as treatment implications.[35–37]

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Clinicians and family members should be alert to the clinical relevance of presentations of PTSD complicated by major depressive episodes and/or alcohol dependence. These 2 types of comorbidity appear to increase the risk of suicidality more than 7-fold. It may be useful for clinicians to meet with family members at the time of the initial diagnostic assessment to inquire about these specific types of co-occurring illnesses.

This study has several limitations. We utilized retrospective and cross-sectional data. While we cannot tell if the psychopathologies predisposed suicidal ideation, the meta-analysis by Krysinska and Lester[30] reported evidence of both directional associations, and future work will examine the longitudinal aspects of PTSD and suicidal ideation. In addition, these psychopathologies are self-reported, which may lead to misdiagnosis given the retrospective and non-clinical nature of the data. Similar to the above limitation, longitudinal clinical data should be examined to see if these associations are robust. Regardless, in our validation testing using the clinical subsample, we found that the specificity of our assessment tools was high, and therefore those who were classified as probable cases were likely to have the condition in question. Moreover, we found no evidence of specificity differences by gender (except for alcohol abuse), race, or age for all mental health diagnoses (data available upon request) that argues that any misclassification would likely be non-differential, and therefore any associations are likely a conservative estimate. Due to the time limitation of the telephone survey, we were unable to collect more mental health conditions, and future work needs to examine the relation between PTSD comorbidity and suicidal ideation considering all Axis I and Axis II conditions. Given the robustness of sensitivity analysis, it is unlikely that the mode of survey administration had a substantial impact on absolute prevalences. However, it is possible that relative ranking of disorders with similar prevalences would be altered under different conditions.

The strengths of this work are due to the strong qualities of the OHARNG Mental Health Initiative. The study is a large, population-based sample of National Guard soldiers representative of OHARNG. Therefore, the conclusions may be generalizable to OHARNG and the Army National Guard.

CONCLUSION

In the OHARNG Mental Health Initiative, the majority of current persons with PTSD also had at least 1 other psychiatric condition; 20% had multiple conditions. PTSD multimorbidity was strongly associated with a history of suicidal ideation. Future work should examine all Axis I and Axis II conditions in relation to PTSD comorbidity and suicide risk. In addition, work should investigate the mechanisms linking PTSD with multiple conditions to suicidal ideation. Clinical implications include a need to monitor this high-risk group for indications of suicidal thoughts and examine effective methods of treatment for persons with PTSD multimorbidity.

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