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Chad M. Lemaire
Baylor College of Medicine & Legacy Community Health Services

David P. Graham
Baylor College of Medicine & Department of Veterans Affairs Medical Center

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Research report

Factors associated with suicidal ideation in OEF/OIF veterans

Chad M. Lemaire [a,b], David P. Graham [a,c,d,e,*]

[a] The Menninger Department of Psychiatry and Behavioral Sciences, Baylor College of Medicine, Houston, TX, USA
[b] Legacy Community Health Services, Houston, TX, USA
[c] Neurorehabilitation: Neurons to Networks TBI Center of Excellence, Rehabilitation Research and Development Service, Michael E. DeBakey Department of Veterans Affairs Medical Center, Houston, TX, USA
[d] Houston Center for Quality of Care and Utilization Studies, Health Services Research and Development Service, Michael E. DeBakey Department of Veterans Affairs Medical Center, Houston, TX, USA
[e] Mental Health Care Line, Michael E. DeBakey Department of Veterans Affairs Medical Center, Houston, TX, USA

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ABSTRACT

Background: The purpose of this project was to examine factors associated with suicidal ideation in returning Iraq and Afghanistan war veterans.

Methods: A cross-sectional review of 1740 veterans' initial mental health screening evaluations. One-hundred and thirteen (6.5%) OEF/OIF veterans reported active suicidal ideation at the time of the interview.

Results: Prior exposures of physical or sexual abuse and having a history of a prior suicide attempt(s) were associated with the presence of current suicidal ideation, as were having a diagnosis of a psychotic disorder, a depressive disorder, or posttraumatic stress disorder (PTSD). Deployment concerns related to training (protective), the deployment environment, family concerns, deployment concerns, post-deployment support (protective), and post-deployment stressors were also associated with current suicidal ideation. Logistic regression analysis revealed the major risk factors were having a prior suicide attempt, female gender, and a depressive disorder diagnosis; while more perceived current social support was a protective factor. Logistic regression analysis also revealed having comorbid PTSD and depression carried a higher odds ratio for risk than did having either PTSD or depression alone; and that the PTSD avoidance symptom-cluster was associated with more risk than either the re-experiencing or hyper-arousal symptom clusters for current suicidal ideation.

Limitations: As a cross-sectional retrospective medical chart review, limitations include limited generalizability and causal relationships cannot be evaluated.

Conclusions: Further investigation of these risk factors is warranted to aid in suicide risk assessment and in the development of targeted interventions to mitigate the identified risk factors and bolster the identified protective factor.

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1. Introduction

Suicidal thoughts and behaviors are encountered on a daily basis in mental health care. In 2006, suicide was the 11th leading cause of death in the United States, accounting for 33,289 deaths (Centers for Disease Control and Prevention, 2006). The Blue Ribbon Work Group, chartered to promote improvement in veteran suicide prevention efforts, found inconsistent reporting of veteran suicide rates across various studies (Report of the Blue Ribbon Work Group on Suicide Prevention in the Veteran Population, 2008). Although many studies report similar rates of suicide for veterans and demographically matched members of the general US

* Corresponding author. Michael E. DeBakey VA Medical Center (116A), Mental Health Care Line, 2002 Holcombe Blvd., Houston, Texas, 77030, USA. Tel.: +1 713 794 8700; fax: +1 713 794 7083.
E-mail address: david.graham@va.gov (D.P. Graham).

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population, some report lower rates of suicide among veterans and others higher rates (Miller et al., 2009). A fourteen year summary of active duty military deaths in the years 1980 through 1993 found that suicide was the third leading major cause of death among males and the fourth leading cause of death among females (Helmkamp and Kennedy, 1996). More recently, suicide has been cited as the second leading cause of death in the U.S. military (Ritchie et al., 2003). One study found that although veterans of Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) as a group did not have significantly different rates of suicide than the general population, subgroups including those with mental disorders may be more vulnerable (Kang and Bullman, 2008). A recent study of 272 OEF/OIF veterans reported 12.5% had contemplated suicide in the 2 weeks preceding the survey (Pietrzak et al, 2010a). Studies are investigating suicide risk factors in the veteran population (Guerra et al., 2010), and the Army recently entered into an agreement with the National Institute of Mental Health to collaborate on a 5-year, $50-million prospective study of suicidal thoughts and behavior among soldiers (Kuehn, 2009).

Many previous studies have investigated potential risk factors for suicidal ideation in the veteran population. Much of the literature relating demographic factors to suicide in veterans supports what has been found in the general population. With regard to gender, most data for veterans agrees with the general population with males being at higher risk for suicide completion than females, though females attempt suicide more often (Allen et al., 2005; Desai et al., 2008; Zivin et al., 2007). Most studies in veterans concur with general population studies that Caucasians are at higher risk for suicide (Allen et al., 2005; Desai et al., 2005; Desai et al., 2008; Kaplan et al., 2007; Zivin et al., 2007), though one study reported that the proportion of deaths due to suicide in a VA medical center were similar in African American and White patients (Thompson et al., 2002). With regard to age, the data is more scattered with studies showing increased risk among younger veterans only (Zivin et al., 2007), older veterans only (Desai et al., 2005), and biphasic associations with both younger and older veterans (Desai et al., 2008). Finally, one study reported finding no association between suicide rates and marital status (Desai et al., 2005).

Having a diagnosable mental illness has been shown to increase the risk of suicide (Department of Veterans Affairs Office of Inspector General, 2007). Most studies have found that depression increases suicidal thoughts in veterans (Desai et al., 2005; Freeman et al., 2000; Guerra et al., 2010; Hendin and Haas, 1991; Kang and Bullman, 2008; Kramer et al., 1994; Pietrzak et al., 2010a; Waller et al., 1999). Bipolar disorder has similarly been found to increase the risk of suicidal thoughts and behaviors (Waller et al., 1999). With regard to substance use disorders, some studies have found an increased risk of suicidal ideation in veterans (Kang and Bullman, 2008; Waller et al., 1999; Zivin et al., 2007). Similarly, some studies have found that PTSD increases the risk of suicidal ideation in veterans (Guerra et al., 2010; Jakupcak et al., 2009; Kramer et al., 1994; Pietrzak et al., 2010a). However, conflicting reports exist as two studies reported co-morbid diagnoses of PTSD and depression within a veteran population were associated with lower suicide rates (Pfeiffer et al., 2009; Zivin et al., 2007). There is further evidence that even sub-threshold PTSD symptoms may be a risk factor for suicidal ideation, comparable to that of a diagnosis of full PTSD (Marshall et al., 2001). Past research found that in a population of Vietnam–era Veterans diagnosed with PTSD that the re-experiencing PTSD symptom cluster was significantly associated with suicidal ideation, but the other two PTSD symptom clusters (avoidance/numbing and increased arousal) were not (Bell and Nye, 2007). Recently, there has been interest in evaluating resilience among active duty military personnel and veterans. A recent study showed that increased post-deployment social support was negatively associated with suicidal ideation in OEF/OIF veterans (Pietrzak et al., 2010a).

Though predicting which individuals are at risk of actually completing suicide remains a challenging and complex task, identifying risk factors for suicidal ideation, a known correlate with suicide completion (Department of Veterans Affairs Office of Inspector General, 2007), can assist greatly in helping a practitioner determine when a patient may need further screening and more focused interventions. To date, there is limited data regarding these factors in the OEF/OIF veteran population with only one study (Pietrzak et al., 2010a) having examined the OEF/OIF veteran population. The purpose of this study was 1) to investigate the associations of currently recognized risk factors for suicidal ideation in a cross-section of OEF/OIF veterans, 2) to more closely evaluate the effects of co-morbid PTSD and depression in this population, and 3) to evaluate the relative contribution of the 3 PTSD symptom clusters for suicidal ideation. We have included an evaluation of the Deployment Risk and Resilience Inventory (DRRI, King et al., 2003, 2006) for associations with suicidal ideation. The DRRI is a self-report research inventory of risk and resilience measures associated with military deployment. The DRRI assesses 14 risk and resilience factors that fall into 3 categories: 2 pre-deployment/pre-war factors, 10 deployment/war-zone factors, and 2 post-deployment/post-war factors.

We expect that substance use, major depression, bipolar disorder, and PTSD will all be associated with increased risks of suicidal ideation in OEF/OIF veterans as has been reported in other veteran populations. We also anticipate, when evaluating PTSD symptom clusters, that re-experiencing symptoms will show an increased risk for suicidal ideation, in accords with recent findings in the Vietnam-era veteran population (Bell and Nye, 2007). Finally, regarding DRRI measures, we expect higher rates of combat exposure, perceived threat, and post-deployment stress to be associated with suicidal ideation; and more current post-deployment support to be negatively associated with suicidal ideation.

2. Methods

2.1. Data source

All returning OEF/OIF veterans registering with the Houston Veterans' Affairs Medical Center are routinely scheduled for a mental health screening and evaluation with clinicians in the Trauma Recovery Program (TRP). Each veteran was clinically assessed for PTSD, substance use, depression, and overall functioning by professional mental health psychologists, social workers, and psychiatrists. Psychological evaluations were semi-structured clinical interviews and included a measure of risk and protective factors pre, during, and post deployment.

Evaluations are centrally stored in the veteran's medical record through the VA's electronic Clinical Patient Record System. TRP maintains a demographic database of all OEF/OIF veterans that includes the date of the initial screening and evaluation. Following IRB approval, this secure database was used to identify records of 1740 veterans initially screened between May 24, 2004 and March 26, 2008.

2.2. Study sample and design

As part of a broader cross-sectional retrospective review of the delimited 4-year period, findings indicated that screenings were conducted for 1740 OEF/OIF veterans. Records were examined plus or minus 30 days from the date of the evaluation. Professional mental health clinicians were recruited to conduct the record reviews. Clinical raters met with the Investigators for several hours of training with the electronic medical record. Inter-rater reliability was established initially for four clinicians on 10 electronic records, with Intra-class Correlations (IC) for the demographic and diagnosis variables = 0.988 (95% CI: .980–.994), $p<0.001$. Two additional raters were later added for additional demographic and diagnostic data extraction and, following training, were analyzing data consistently with the original raters (IC = 0.980 (95% CI:0.970–0.988), $p<0.001$).

2.3. Variables

2.3.1. Suicidal ideation and prior suicide attempts

The clinical suicide evaluation directly specified the presence/absence of any current suicidal ideation and any history of prior suicide attempts.

2.3.2. Demographics

Age at time of screening, Gender, Ethnicity, Marital Status, and Education. The presence/absence of the following issues was also documented: military sexual trauma, physical abuse (pre-military), sexual abuse (pre-military).

2.3.3. Clinical diagnosis

Dichotomous presence/absence of following diagnostic categories: psychotic disorders (schizophrenia, schizoaffective disorder, and psychotic disorder NOS), depressive disorders (major depressive disorder, depressive disorder NOS, and dysthymia), bipolar disorders (bipolar disorder I or II, bipolar disorder NOS, and cyclothymic disorder), other anxiety disorders (anxiety disorder NOS, obsessive–compulsive disorder, generalized anxiety disorder), panic disorder (with or without agoraphobia), substance use disorders (abuse or dependence for alcohol, tobacco, cannabis, and cocaine). Those diagnoses not listed in the final evaluation coding were defaulted to not being present.

2.3.4. Deployment Risk and Resiliency Inventory (DRRI)

The DRRI (King et al., 2003, 2006) is a self-report research inventory of risk and resilience measures associated with military deployment. The DRRI assesses 14 risk and resilience factors that fall into 3 categories: 2 pre-deployment/pre-war factors, 10 deployment/war-zone factors, and 2 post-deployment/post-war factors. The DRRI has recently been shown to have strong internal consistency, and both criterion and discriminative validity for OIF veterans (Vogt et al., 2008) as well as the original Gulf War I veterans (King et al., 2003). The intention of the developers was that each of the 14 measures could be used as a "stand-alone" instrument or all-together for a more comprehensive evaluation to better identify risks and/or protective factors to post-deployment, health-related sequelae. A full description of each scale can be found in King et al. (2003, 2006) and Vogt et al. (2008).

2.4. Data analysis

Sociodemographic variables were evaluated by the Kruskal–Wallis test for categorical variables and analysis of variance (ANOVA) for continuous variables as each variable related to the presence or absence of suicidal ideation, including for all 14 DRRI scales.

Logistic regression was performed using a forward stepwise method. Variable selection followed the recommendations of Hosmer and Lemeshow (2000). The logistic regression's dependent variable was the presence of current suicidal ideation. Models were evaluated using the following sets of independent variables: 1) the socio-demographic and full set of clinical diagnostic and DRRI variables, 2) a comparison of depression, PTSD, and both to a neither reference group, and 3) the three PTSD symptom clusters. Co-linearity diagnostics were reviewed to evaluate for possible interactions. If an interaction was found, each potential interaction term was added individually and evaluated for retention.

All data analyses were performed using SPSS for Windows version 15.0 (SPSS, Inc., Chicago, IL). As a total of 5 statistical tests were run (1 ANOVA, 1 Kruskal–Wallis, and 3 forward stepwise logistic regressions), we applied the Bonferroni correction with a final alpha of $p \leq .01$ to prevent increasing the risks of making type 1 errors.

3. Results

Please refer to Table 1 for the socio-demographic comparisons between those with and without suicidal ideation at the time of evaluation and Table 2 for comparisons of those with and without each clinical diagnosis for participants with suicidal ideation at the time of evaluation. No statistically significant differences between those with and without suicidal ideation at time of evaluation were noted for age, gender, ethnicity, marital status or education (Table 1). However, those with suicidal ideation showed a larger percentage with pre-military physical abuse, pre-military sexual abuse, prior suicide attempt(s), psychotic disorders, depressive disorders, and PTSD. Those with suicidal ideation were trending statistically towards higher percentages with panic disorders and endorsing current cocaine use than did those without active suicidal ideation (Table 2). We suggest restraint in interpreting the cocaine use result given its extremely wide confidence interval, and at best consider this finding preliminary.

The DRRI scales were evaluated for associations with the presence of current suicidal ideation. Neither pre-deployment scale was associated with current suicidal ideation. Four deployment scales were statistically significant in their association with current suicidal ideation: Training/Preparation (a protective factor), Deployment Environment, Family/Life Concerns, and Deployment Concerns. Three deployment scales

Table 1
Demographics and the percentages (categorical variables) or the mean (standard deviations, continuous variables) for the two groups: those with versus those without current suicidal ideation at the time of the initial evaluation.

		With suicidal ideation		No suicidal ideation	*F* or *U* statistic
Variable	*N*	% or Mean (SD)	*N*	% or Mean (SD)	*p*-value
Age					$F=0.002$
Age	113	29.4 (8.4)	1603	29.4 (7.5)	$=0.967$
Gender					$U=86{,}256$
Male	95	84.1%	1424	88.8%	$=0.125$
Female	18	15.9%	179	11.2%	
Ethnicity					$U=86{,}512$
White	49	43.4%	811	50.8%	$=0.426$
African American	41	36.3%	415	26.0%	
Hispanic	19	16.8%	294	18.4%	
Other	4	3.5%	77	4.8%	
Marital status					$U=84290$
Married	53	46.9%	679	42.5%	$=0.205$
Separated	12	10.6%	84	5.3%	
Divorced	11	9.7%	240	15.0%	
Widowed	1	0.9%	6	0.4%	
Never married	36	31.9%	589	36.9%	
Education					$U=83726.5$
High school	39	34.8%	524	33.0%	$=0.251$
Some college	66	58.9%	864	54.4%	
College or more	7	6.3%	199	12.5%	

were statistically trending towards significance (*p*-value less than 0.05, but not meeting Bonferroni corrected alpha of $p \leq 0.01$): General Harassment, Post-Battle Aftermath exposures, and perceived Nuclear/Biological/Chemical Exposures. Both post-deployment scales, post-deployment support (a protective factor) and post-deployment life events, were statistically significant in their association with current suicidal ideation. Please refer to Table 3 for details.

Finally, we performed the three logistic stepwise regressions (see Table 4). The first model was evaluating the general case with all variables as potential explanatory factors. The final stepwise model revealed 4 factors strongly associated (three with increased risk, one with lower risk) with the presence of current suicidal ideation: having a prior suicide attempt (OR 4.71, 95% CI: 1.87–12.16, $p=0.001$), female gender (OR 3.18, 95% CI: 1.51–6.72, $p=0.002$), the presence of a depressive disorder diagnosis (OR 3.79, 95% CI: 1.87–7.71, $p<0.001$), and having sources of current social support (OR 0.94, 95% CI: 0.91–0.97, $p<0.001$).

The second logistic regression examined the comparison of depressive disorders and PTSD regarding suicidal ideation. When compared to a group diagnosed with neither depressive disorders nor PTSD, having depressive disorders alone (OR 15.20, 95% CI: 7.05–32.80, $p<0.001$), PTSD alone (OR 10.02, 95% CI: 4.02–24.97, $p<0.001$), or co-morbid depressive disorder and PTSD (OR 18.83, 95% CI: 8.85–40.10, $p<0.001$), all were associated with the presence of current suicidal ideation.

Finally, our third logistic regression examined the comparison of the presence of each PTSD symptom cluster for their relative association to current suicidal ideation. The avoidance cluster was the only one to meet statistical significance (OR 2.49, 95% CI: 1.43–4.35, $p=0.001$). The re-experiencing cluster trended towards statistical significance (OR 2.05, 95% CI: 1.04–4.03, $p=0.037$) but did not meet the Bonferroni correction alpha of ≤ 0.01.

4. Discussion

Our review of risk and protective factors associated with suicidal ideation in returning OEF/OIF veterans takes advantage of having a fairly large database of returning veteran intake evaluations for analysis. These findings may help practitioners focus on some of the factors that may be increasing or decreasing the risk of suicidal thoughts and behaviors in the returning veteran population. Somewhat surprising given the substantial associations noted in the literature, other than replicating the well-known findings that prior suicide attempts (Bebbington et al., 2010) and being of female gender as both being associated with higher rates of suicidal ideation (Fairweather-Schmidt et al., 2010), no demographic data (including age, ethnicity, marital status, and level of education) evaluated had an association with current suicidal ideation. These findings are consistent with two recent studies in OEF/OIF veterans that found no significant differences across most of the same demographic factors for those with versus without suicidal ideation (Jakupcak et al., 2009; Pietrzak et al., 2010a).

The clinical diagnoses of psychotic disorders, depressive disorders and PTSD were associated with suicidal ideation, as were having previous suicide attempts. Of these, depressive disorders carried the most elevated risk followed by PTSD. This was consistent with two recent studies in OEF/OIF veterans that showed elevated risk of suicidal ideation with diagnoses of either PTSD or major depressive disorder (Jakupcak et al., 2009; Pietrzak et al., 2010a). In our sample, having co-morbid depressive disorders and PTSD increased the risk of current suicidal ideation even more than having either diagnosis alone. This is in keeping with prior studies (Marshall et al., 2001; Oquendo et al., 2003), and Sher has coined the term "post-traumatic mood disorder" noting that a number of studies suggest these co-morbid diagnoses differ from either alone, including increasing the risk of suicidality (Sher, 2005, 2009).

Table 2
The percentage of cases with suicidal ideation for two groups: those with and without each co-morbid condition.

Variable	*N* with co-morbidity	% Suicidal with co-morbidity	*N* without co-morbidity	% suicidal without co-morbidity	*p*-value
Prior exposures					
MST	23	13.0%	1691	6.5%	0.210 NS
Physical abuse	216	10.6%	1716	6.0%	0.010**
Sexual abuse	117	16.2%	1599	5.9%	<0.001**
Prior suicide attempt	111	32.2%	1525	5.8%	<0.001**
Psychiatric co-morbid conditions					
Psychotic	11	36.4%	1705	6.4%	<0.001**
Bipolar	10	20.0%	1706	6.5%	0.086 NS
Depressive	690	13.5%	1026	1.9%	<0.001**
PTSD	497	12.9%	1219	4.0%	<0.001**
Other anxiety	378	7.4%	1338	6.4%	0.466 NS
Panic	107	12.1%	1609	6.2%	0.017*
Adjustment	88	4.5%	1628	6.7%	0.428 NS
TBI	387	8.0%	1327	6.2%	0.208 NS
Using alcohol	886	7.1%	825	6.1%	0.382 NS
Using tobacco	523	7.6%	1184	6.0%	0.202 NS
Using cannabis	72	6.9%	1629	6.6%	0.900 NS
Using cocaine	16	18.8%	1685	6.5%	0.049*

*: *p*-value ≤ 0.05, but not meeting Bonferroni correction alpha ≤ 0.01.
**: *p*-value significant, meeting Bonferroni correction alpha ≤ 0.01.
NS: non-significant.
MST: Endorses Military Sexual Trauma.
Physical abuse: refers to pre-military.
Sexual abuse: refers to pre-military.
Psychotic: refers to diagnoses of schizophrenia, schizoaffective disorder, or psychosis NOS.
Bipolar: refers to diagnoses of bipolar I, bipolar II, and cyclothymia.
Depressive: refers to diagnoses of major depressive disorder, dysthymia, and depression NOS.
PTSD: refers to a clinical diagnosis of Post Traumatic Stress Disorder.
Other Anxiety: refers to diagnoses of generalized anxiety disorder, obsessive-compulsive disorder, and anxiety NOS.
Panic: refers to diagnoses of panic disorder with or without agoraphobia.
Adjustment: refers to any adjustment disorder diagnosis.
TBI: Traumatic Brain Injury screen was rated as positive, suggesting ongoing post-concussive syndrome/mild TBI.
Using alcohol, tobacco, cannabis, and cocaine: refers to subject endorsing current use of these substances at the time of the initial screening evaluation.

It was unexpected that some other psychiatric diagnoses were not associated with current suicidal ideation. It is clear that bipolar disorders were not well represented here (only 11 veterans), much as psychotic diagnoses were not ($n = 10$). The restricted sample of these diagnoses may be limiting our ability to determine an impact on the dependent variable. Similarly, those veterans who endorsed current cocaine use only trended towards a positive association, but a limited sample ($n = 16$) again may be a factor limiting our ability to detect an association. As such, our findings may not generalize to suicidal ideations associated with acute substance intoxication.

We found that meeting criteria for the PTSD avoidance symptom cluster was significantly associated with suicidal ideation at the time of interview, with the re-experiencing symptom cluster trending towards significance. Either of these clusters had a greater than two-fold increase in their association with the presence of current suicidal ideation. This supports recently published work (Guerra et al., 2010; Pietrzak et al., 2010b; Shea et al., 2010) showing that avoidance symptoms are associated with psychosocial difficulties. A potential explanation for the avoidance symptom cluster being significant in our data is that there is overlap between avoidance/numbing symptoms and depression. There is a growing body of evidence suggesting that PTSD and generalized anxiety disorder have more in common with major depression than other anxiety disorders (Gamez et al., 2007). This is an important consideration, as depressive disorders carried more of the risk for our outcome variable of suicidal ideation than did PTSD in this sample. Also, our results differed some from the Bell and Nye study (2007), which showed that re-experiencing was the only PTSD symptom cluster significant for increasing the odds ratio of suicidal ideation in Vietnam veterans. Potential explanations for the differing results include different populations (veteran era versus OEF/OIF), a much larger sample size in our study, and our use of clinical interview data in this retrospective cross-sectional study compared to Bell & Nye's use of standardized scales.

The findings on the DRRI suggest that having more current social support is protective against current suicidal ideation. This supports a prior finding (Pietrzak et al., 2010a) in the literature. Our data show that while both post-deployment scales assessing recent social stressors and social support are individually associated with suicidal ideation, the presence of social support was the one factor retained in the logistic regression. This suggests that with sufficient support, most stressors may not be considered excessive or uncontrollable, allowing for improved coping mechanisms. This is in line with the findings of Pietrzak et al. (2010a), which provided a thorough detailing of how interventions meant to improve social support and resilience may be helpful in preventing suicidal ideation.

From a broader perspective, our findings suggest that the risks of PTSD (particularly avoidance symptoms), depression, concerns about being less prepared for deployment, concerns

Table 3
The mean and standard deviation of each completed Deployment Risk and Resiliency Inventory (DRRI) scale for cases with and without suicidal ideation.

DRRI Scale	*N*	Mean (SD) with suicidal ideation	*N*	Mean (SD) without suicidal ideation	*p*-value
Pre-deployment					
A: Life events (stressors)	69	3.6 (3.1)	1092	2.9 (2.9)	0.058 NS
B: Childhood experiences	71	52.3 (12.1)	1104	53.8 (11.2)	0.272 NS
Deployment					
C: Training/preparation	71	46.0 (10.5)	1106	50.0 (10.9)	0.002**
D: Deployment environment	70	65.2 (12.6)	1106	60.1 (13.2)	0.001**
E: Family/life concerns	71	31.1 (8.6)	1104	28.1 (8.5)	0.004**
F: Unit support	71	36.3 (12.0)	1103	39.0 (11.6)	0.056 NS
G1: General harassment	71	15.8 (6.1)	1102	14.3 (5.9)	0.033*
G2: Sexual harassment	71	8.0 (2.4)	1102	7.8 (2.2)	0.335 NS
H: Deployment concerns	70	53.6 (12.2)	1099	46.9 (12.6)	<0.001**
I: Combat exposure	69	7.7 (4.6)	1082	6.8 (4.7)	0.116 NS
J: Post-battle aftermath	68	8.6 (5.0)	1085	7.1 (5.2)	0.014*
K: NBC exposures	67	21.7 (8.8)	1080	19.4 (8.1)	0.027*
Post-deployment					
L: Social support	69	46.8 (10.4)	1082	55.4 (10.3)	<0.001**
M: Life events (stressors)	67	4.7 (2.8)	1074	2.8 (2.6)	<0.001**

*: *p*-value ≤ 0.05, but not meeting Bonferroni correction alpha ≤ 0.01.
**: *p*-value significant, meeting Bonferroni correction alpha ≤ 0.01.
NS: non-significant.

about the deployment environment, and concerns about their family and work back home may all be suggesting a related underlying concept. We can easily envision how a deployed soldier who perceives they are less prepared or equipped for their assignment, and who is having more concerns about what is going on back home with their job and family, may be more prone to having low mood, worries, and negative cognitions associated with a diagnosis of depression. When the avoidance symptoms of PTSD (isolation resulting from avoidance of persons/places/topics of conversation, emotional numbing, decreases in participation in prior pleasurable activities) are superimposed on this presentation, it is easy to see how the protective factor of a supportive network could be eroded. Our data is unable to speak to the point of actual causality, with the described exposures and cognitions causing the loss of the supportive network. However, this is a point that deserves further investigation so the relevant associated components can be better elucidated and possibly targeted for intervention.

It is worth noting that each component risk or exposure we identified does have a currently available intervention(s) that may help mitigate the associated risks. We will not repeat the discussion well documenting options for social support that Pietrzak et al. (2010a) have already delineated. Similarly, interventions for depression are a staple of mental health treatment involving medications and/or variety of therapies either in individual or group format (Davidson, 2010), and even by use of complimentary or alternative medicines (Freeman et al., 2010). Even PTSD has evidence supporting some medications (Baestien, 2010) and therapies including prolonged exposure therapy (Powers et al., 2010) and cognitive processing therapy (Veterans Health Administration, 2004; Monson et al., 2006; Resick et al., 2007; Foa et al., 2008). It would seem the larger system problem for reduction of suicidal ideation may be: 1) how to best identify the person needing the interventions as that individual may not actively seek out help themselves, 2) how to overcome barriers to treatment access, and 3) how to best coordinate and integrate these various treatments in a timely and efficacious manner.

Although this study adds to the sparse literature on risk and protective factors for suicidal ideation in returning OEF/OIF veterans, there are several limitations. The retrospective data extraction was obtained via electronic chart review of clinical screening intake interviews of returning OEF/OIF veterans, and this cross-sectional group, while being a specific group of interest for this study, lends itself to some methodological problems. First, the results may not generalize to other populations, including the general population, veterans from other eras, OEF/OIF veterans at other sites, or even active military personnel still in combat. Also, the risk factor analysis does not necessarily address causal relationships, and the interpretations of the results are speculative. The use of a non-standardized interview format is another potential limitation; the evaluations were clinical interviews and not formalized research evaluations. While interviewers used a template, not all questions were asked of all individuals, and there may have been occasions where some answers may not have documented in the chart and thus were unavailable for extraction. Further, not all possible substances of abuse were asked about (only tobacco, alcohol, cocaine, and cannabis), and there was no way to objectively evaluate for use retrospectively. Finally, there are many potential problems with suicide reporting in general, including inconsistent definitions for the range of suicidal behaviors, including ideation and attempts (Report of the Blue Ribbon Work Group on Suicide Prevention in the Veteran Population). Having evaluated all OEF/OIF veterans who presented to the VA, many as part of their initial enrollment and application for VA services, we consider our study population strengthened this project in that the sample was not drawn from a group solely seeking medical or mental health care. Therefore,

Table 4
The odds ratios, 95% confidence intervals for the odds ratios, and *p*-values, for variables associated with increased frequency of suicidal ideation at the time of clinical evaluation for 3 models: 1) general forwards stepwise logistic regression model; 2) comparison of effects of Depressive Disorders, PTSD, or co-morbid Depressive Disorders and PTSD compared to a group with neither Depressive Disorders or PTSD; and 3) assessment of affects for the three PTSD symptom clusters.

Variable	OR	95% CI	*p*-value
General logistic regression			
Prior suicide attempt	4.71	1.87–12.16	0.001**
Female gender	3.18	1.51–6.72	0.002**
Bipolar disorders	9.57	0.75–122.22	0.082 NS
Depressive disorders	3.79	1.87–7.71	<0.001**
DRRI-F: unit support	1.04	1.01–1.07	0.023*
DRRI-L: post-deployment social support scale	0.95	0.92–0.98	<0.001**
Constant	0.10	–	0.010**
Depressive disorders/PTSD diagnoses logistic regression			
No depressive disorder or PTSD (reference group)	–	–	–
Depressive disorders	15.20	7.05–32.80	<0.001**
PTSD	10.02	4.02–24.97	<0.001**
Co-morbid depressive disorders and PTSD	18.83	8.85–40.10	<0.001**
Constant	0.01	–	<0.001**
Effects from the three PTSD symptom clusters logistic regression			
Re-experiencing (B-symptoms) cluster	2.05	1.04–4.03	0.037*
Avoidance (C-symptoms) cluster	2.49	1.43–4.35	0.001**
Hyper-arousal (D-symptoms) cluster	1.10	0.55–2.20	0.791NS
Constant	0.03	–	<0.001**

*: *p*-value ≤0.05, but not meeting Bonferroni correction alpha ≤0.01.
**: *p*-value significant, meeting Bonferroni correction alpha ≤0.01.
OR: Odds Ratio.
CI: 95% Confidence Interval for the Odds Ratio.
Depressive disorders: refers to diagnoses of major depressive disorder, dysthymia, or depression NOS.
PTSD: Post Traumatic Stress Disorder.
DRRI: Deployment Risk and Resiliency Inventory.
NS: non-significant.

we do consider our data to be a fair representation of the general returning veteran population, not that of a selective subset such as only mental health or primary care users.

In conclusion, the three factors associated with increased suicidal ideation were a history of prior suicide attempts, female gender, and having a diagnosed depressive disorder; while the one factor associated with a decreased risk was the perception of having more current social support. Further investigation of these risk factors is warranted to aid in suicide risk assessment and in the development of targeted interventions to mitigate the identified risk factors and bolster the identified protective factor, especially as more OEF/OIF military personnel return from active duty.

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Conflict of interest

Neither author has any conflicts of interest.

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