



Does a History of Mild Traumatic Brain Injury Increase Suicide Risk In Veterans with PTSD?



VA HEALTH CARE Defining EXCELLENCE in the 21st Century

Sean M. Barnes, Ph.D.^{1, 2}, Kristen H. Walter, Ph.D.³, & Kathleen M. Chard, Ph.D.^{3, 4}

¹ VISN 19 Mental Illness Research, Education, and Clinical Center (MIRECC), ² Department of Psychiatry, University of Colorado School of Medicine, ³ Cincinnati Veterans Affairs Medical Center, ⁴ University of Cincinnati School of Medicine

ABSTRACT

Research shows that posttraumatic stress disorder (PTSD) and mild traumatic brain injury (mTBI) independently increase suicide risk; however, scant research has investigated whether mTBI increases suicide risk above and beyond the risk associated with PTSD alone. The current research compared suicide risk factors among a matched sample of Operation Enduring Freedom and Operation Iraqi Freedom (OEF/OIF) military personnel and Veterans with PTSD alone or PTSD and a history of an mTBI. Differences in the assessed risk factors were small and suggest that if PTSD and mTBI are associated with elevation in suicide risk relative to PTSD alone, the added risk is likely mediated or confounded by PTSD symptoms severity. This finding highlights the importance of screening and treating military personnel and Veterans for PTSD.*

INTRODUCTION

- US active duty military personnel and Veterans have been found to be significantly more likely to die by suicide than civilians (e.g., US Department of Defense, 2011; Kaplan et al., 2007).
- In order to ensure safety and optimize care for our military personnel and Veterans it will be critical to gain a better understanding of the factors that influence the likelihood that a Veteran or active duty service member will die by suicide.
- Posttraumatic stress disorder (PTSD) and mild traumatic brain injuries (mTBI) frequently co-occur among military personnel and research shows that each in isolation is related to increased suicide risk.
 - 5-25% of Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) military personnel and Veterans* report symptoms consistent with PTSD (Hoge et al., 2004, 2006; Schell & Marshall, 2008; Seal et al., 2007).
 - 15-23% of OEF/OIF Veterans have sustained a TBI (Hoge et al., 2008; Tanielian & Jaycox, 2008; Terrio et al., 2009).
 - 33-42% of individuals with a history of a TBI also have PTSD (Hoge et al., 2008; Lew et al., 2007).
- Research has shown that Veterans with PTSD are approximately 2 to 4 times more likely to die by suicide than Veterans without PTSD (Bullman & Kang, 1994; Ilgen et al., 2010).
- Similarly, research suggests that individuals with a history of mTBI are approximately 2 to 3 times more likely to die by suicide than individuals without a history of mTBI (Brenner et al., 2011; Teasdale & Engberg, 2001).
- It remains unknown whether Veterans with both PTSD and mTBI are at a higher risk of suicide than Veterans with PTSD alone.
- In order to assess the suicide risk associated with mTBI above and beyond that associated with PTSD, the current research compares suicide risk factors among OEF/OIF Veterans with PTSD and a history of an mTBI to Veterans with PTSD alone.
- Researchers have found that after adjusting for PTSD symptoms, mTBI is not associated with postdeployment symptoms or outcomes, suggesting that PTSD likely mediates or confounds the relation between mTBI and long-term outcomes (Hoge et al., 2008; Marx et al., 2009; Pietrzak et al., 2009; Polusny et al., 2011; Schneiderman et al., 2008).
- Based on the assumption that this mediational or confounding relation also describes the way mTBI and PTSD relate to suicide risk, we hypothesized that Veterans with a history of mTBI would show more severe PTSD symptoms, but would otherwise report similar level of suicide risk as individuals with PTSD alone.

PARTICIPANTS

- Patients in this study were 92 male OEF/OIF Veterans identified via medical record review of consecutive referrals for outpatient PTSD treatment between 2006 and 2010 at a Midwestern VA Medical Center.
 - All patients met diagnostic criteria for PTSD due to a combat-related trauma. 46 patients had also sustained an mTBI, defined as alteration of consciousness for less than 24 hours, loss of consciousness for less than 30 minutes, or posttraumatic amnesia for less than 24 hours.
 - Patients with PTSD and a history of mTBI were matched to patients with PTSD and no mTBI with regard to ethnicity and age (+ or - 1 year).
 - Mean age of the sample was 30.3 years (*SD* = 8.2).
 - Self-reported racial background: 93.3% Caucasian, 4.4% African American, and 2.2% Native American.

MEASURES

- *Clinician Administered PTSD Scale (CAPS;* Blake et al., 1998)
 - Enables clinicians to evaluate the frequency and severity of each of the 17 PTSD symptoms. In the current research it was used to diagnose PTSD.
- *Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I;* First et al., 1996)
 - Was utilized to detect current and/or lifetime presence of co-morbid psychiatric disorders.
- *Beck Depression Inventory (2nd ed.; BDI-II;* Beck, Steer, & Brown, 1996)
 - Self-report measure assessing depressive symptoms.
- *PTSD Checklist Stressor Specific Version (PCL-S;* Weathers, Huska, & Keane, 1991)
 - Instructs patients to rate the severity of their PTSD symptoms in relation to a specific stressor (i.e., index combat trauma used on CAPS).
- Psychosocial Intake Interview
 - The following variables were assessed via the clinics standard intake interview: suicidal ideation, suicidal intent, past attempts, pain, pain tolerance, hopelessness, emotional support, marital status, and employment. See the chart below for operationalization of these variables.

RESULTS

Comparison of Categorical Suicide Risk Factors

Variable	<i>n</i>	<i>F</i>	χ^2	<i>p</i>	ϕ	1- β
Suicidal Ideation			2.75	.10	.18	.84
mTBI	44	11				
No mTBI	44	5				
Drug Problem			0.93	.34	-.10	.60
mTBI	46	4				
No mTBI	46	7				
Alcohol Problem			0.79	.37	-.09	.46
mTBI	46	13				
No mTBI	46	17				
Major Depressive Disorder			2.14	.14	.15	.83
mTBI	46	25				
No mTBI	46	18				
Any Co-Morbid Axis I			1.26	.26	.12	.66
mTBI	46	34				
No mTBI	46	29				
Lack of Emotional Support			0.76	.38	-.10	.51
mTBI	35	9				
No mTBI	35	6				
Unemployed, Disabled, or Retired			1.46	.23	-.13	.62
mTBI	45	9				
No mTBI	45	14				

Note. All chi-square tests on one degree of freedom; ϕ = effect size, .1 = small effect, .3 = moderate effect, .5 = large effect; 1- β = achieved power.

Comparison of Continuous Suicide Risk Factors

Variable	<i>M (SD)</i>	<i>t</i>	<i>df</i>	<i>p</i>	95% CI		Cohen's <i>d</i>	1- β
					<i>LL</i>	<i>UL</i>		
CAPS Total		2.19	84	.03	.64	13.00	0.46	.56
mTBI	74.02 (16.21)							
No mTBI	67.20 (13.12)							
CAPS B-reexperiencing		1.80	88	.08	-.26	5.24	0.38	.43
mTBI	20.02 (7.03)							
No mTBI	17.53 (6.06)							
PCL-S		1.38	82	.17	-.17	0.91	0.30	.27
mTBI	61.86 (11.04)							
No mTBI	58.19 (12.89)							
BDI-II		1.07	84	.29	-2.14	7.12	0.23	.19
mTBI	31.56 (11.06)							
No mTBI	29.07 (10.53)							
Pain Tolerance		-1.79	22	.09	-2.79	0.20	0.73	.40
mTBI	5.96 (2.09)							
No mTBI	7.25 (1.36)							

Note. CAPS = *Clinician Administered PTSD Scale*; CAPS B-reexperiencing = *DSM-IV* Criterion B reexperiencing symptoms; PCL-S = *PTSD Checklist Stressor Specific Version*; BDI-II = *Beck Depression Inventory-II*; PCL-S scores were transformed for analysis, but results displayed were converted to original scale; CI = confidence interval for the difference between groups; Cohen's *d* = effect size, .2 = small effect, .5 = medium effect, .8 = large effect. 1- β = achieved power.

CONCLUSION

- There were no statistically significant differences in regard to rates of suicidal ideation, depressive symptoms, hopelessness, pain, pain tolerance, lack of emotional support, marital status, employment, drug or alcohol problems, or other comorbid Axis I disorders.
- These findings suggest that the answer to the question "Does a history of mild traumatic brain injury increase suicide risk in Veterans is PTSD?" is "no, with one exception." Extending past research, patients with histories of mTBI reported more severe PTSD symptoms than patients with PTSD alone, based on CAPS scores. The increased severity of PTSD symptoms may be indicative of some additional suicide risk based on research showing that PTSD-symptom severity is directly associated with suicide risk (Freeman, Roca, & Moore, 2000; Hendin & Haas, 1991).



The contents of this presentation do not necessarily represent the views of the Department of Veterans Affairs or the United States Government.
 (1) This material is based upon work supported in part by the Department of Veterans Affairs, Veterans Health Administration, Office of Research and Development (and as applicable Biomedical Laboratory Research and Development, Clinical Science Research and Development including the Cooperative Studies Program, Rehabilitation Research and Development Service, and Health Services Research and Development).
 (2) If VA provided no direct research funding, but the research involved the use of other VA resources (e.g., facilities or patients), the publications, or presentations must contain a similar acknowledgment. For example, "This material is the result of work supported with resources and the use of facilities at the (name and location of VA medical center)."

Operationalization of Variables Assessed via Psychosocial Interview

Variable	Interview question	Response options
Suicidal ideation	Have you had thoughts about death or about killing yourself?	Yes/No
Suicidal intent	Have you ever intended to commit suicide?	Yes/No
Past Suicide Attempts	Have you ever attempted suicide?	Yes/No
Pain	On a scale of 0 to 10, with 0 as <i>no pain</i> and 10 as the <i>worst pain possible</i> how would you rate your current pain?	0-10
Pain Tolerance	On the same scale of 0 to 10, what level of pain would be tolerable to you?	0-10
Hopelessness	Who or what gives you strength and hope?	<i>nothing</i> = no hope
Emotional Support	Do you have an emotional support system?	Yes/No
Marital Status	Are you married?	Single, divorced, or widowed = <i>unmarried</i>
Employment	Are you employed?	Having part-time job, full-time job, or being enrolled in school = <i>employed</i>

*This research was recently published in volume 57 of Rehabilitation Psychology.

*The current sample included both active duty military personnel and Veterans. In order to increase readability we will refer to both as Veterans.