Volume 172 May 2007 Number 5

MILITARY MEDICINE

ORIGINAL ARTICLES

MILITARY MEDICINE, 172, 5:451, 2007

Post-Traumatic Stress Disorder and Depression in Health Care Providers Returning from Deployment to Iraq and Afghanistan

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Objective: This study examines risk factors for post-traumatic stress disorder (PTSD), depression, and mental health care use among health care workers deployed to combat settings. Methods: Anonymous surveys were administered to previously deployed workers at a military hospital. PTSD and depression were assessed by using the PTSD Checklist and the Patient Health Questionnaire depression scale, respectively. Deployment exposures and perceived threats during deployment were also assessed. Results: There were 102 respondents (36% response rate). Nine percent (n = 9) met the criteria for PTSD and 5% (n = 5) met the criteria for depression. Direct and perceived threats of personal harm were risk factors for PTSD; exposure to wounded or dead patients did not increase risk. Those who met the criteria for PTSD were more likely to seek mental health care after but not before their deployment. Conclusions: For health care workers returning from a warfare environment, threat of personal harm may be the most predictive factor in determining those with subsequent PTSD.

Introduction

The war in Iraq and Afghanistan has resulted in serious injury to thousands of soldiers and civilians. Those injuries were stabilized and treated by U.S. military health care providers deployed close to combat. Although the effects of military deployment on health care workers have been examined, most studies involved deployments where exposure to combat and threat of personal injury were not present.[1,2] Moreover, those studies examined symptoms of depression and anxiety but not the presence of post-traumatic stress disorder (PTSD).

The role of observed injury of others in association with PTSD remains unclear. Nurses deployed to Vietnam who subsequently developed PTSD were studied decades after wartime return.[3] Those nurses experienced significant physiological responses to scripts describing work with injured soldiers. Because many also had been exposed to personal threat during their wartime experiences, PTSD might have developed in response to observed injuries, personal threat experiences, or an interaction of the two. Civilian nurses who practice in hospital settings and routinely work with seriously injured trauma victims have higher levels of general anxiety but not elevated levels of PTSD symptoms.[4] One study of Turkish health care workers found that those exposed to a traumatic event reported PTSD symptoms at twice the rate for those without reported exposure to trauma.[5] That study did not distinguish between the specific aspects of trauma exposure (direct threat versus witnessing of trauma) and did not set criteria for the presence of PTSD.

Among deployed military health care providers, the experiences of enlisted medical technicians are most similar those of civilian first responders. Both groups observe injuries or death of trauma victims and both may also be exposed to personal threat of injury. Studies of firefighters and rescue workers have generally found rates of PTSD ranging from 13% to 18%, 1 to 4 years after large-scale response events.[6–8] Studies of firefighters have found inconsistent reports of relative stress from direct threat or injury versus observed injury of others.[9–11] The similar rates of PTSD found in those studies, with different levels of personal threat and exposure to injury of others, indicate multiple associations between PTSD and exposures to trauma.

Between 12% and 20% of combat soldiers returning from Iraq have probable PTSD, and between 7% and 15% have probable depression.[12] Only 21% to 27% of those who met strict criteria for a mental disorder had seen a mental health professional during the year before screening. Soldiers cited concerns over career impact as a major reason for not seeking treatment.

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Presented at the Annual Meeting of the American Psychiatric Association, May 25, 2005. Atlanta, GA.

This manuscript was received for review in July 2006. The revised manuscript was accepted for publication in November 2006.

In this study, we examined health care providers from one military hospital who had deployed to Iraq or Afghanistan. Demographic risk factors, deployment exposures, and perceived personal threat during deployment were examined as risk factors for PTSD and depression. Reported use of mental health care before, during, and after deployment was examined for those who met screening criteria for PTSD or subclinical PTSD and those who did not.

Methods

Participants

After review and approval by the institutional review board at Naval Medical Center San Diego (San Diego, California), military personnel on staff were provided an anonymous, Internet-based questionnaire that indicated the voluntary nature of their participation, provided discussions of risks, benefits, and alternatives to participation, and provided a contact point for any questions or concerns. To preserve confidentiality and anonymity, the institutional review board waived the requirement for written informed consent. Exact dates of deployment were not obtained, because these might provide a means to identify individual personnel when combined with their demographic characteristics. All staff members were asked to participate regardless of whether or not they had been deployed to a combat zone. Questionnaire responses were collected during the period from September 1, 2004, to March 8, 2005.

Assessment of Probable PTSD, Subclinical PTSD, and Probable Depression

The presence of probable PTSD was assessed with the 17-item PTSD Checklist (PCL) of the Department of Veterans Affairs.[13–18] The PCL lists all intrusion, avoidance, and arousal symptoms of PTSD outlined in the Diagnostic and Statistical Manual of Mental Disorders.[19] Respondents rated, "how much you have been bothered by each problem in the past month." Reponses included "not at all," "a little bit," "moderately," "quite a bit," and "extremely." The responses were summed to create a severity scale (range of 17–85, with higher numbers indicating greater number or severity of symptoms). Respondents were scored positive for probable PTSD if they reported at least one intrusion symptom, three avoidance symptoms, and two hyperarousal symptoms, each present at the level of moderate or higher during the past month, and also received a PCL symptom severity score of ≥50.[12] Respondents were scored positive for subclinical PTSD if they were positive for symptom criteria but received a PCL symptom severity score of <50.

Probable depression was assessed by using the Patient Health Questionnaire depression scale.[20,21] Probable depression was defined as five or more of the nine symptoms present "more than half the days" or "most days" in the past 2 weeks, with one of the symptoms being depressed mood or anhedonia. When compared with structured clinical evaluations in primary care settings using this method, the Patient Health Questionnaire depression scale demonstrated 73% sensitivity, 98% specificity, and test/retest reliability correlation of 0.84.[20,21]

Direct Exposures and Perceptions of Threat During Deployment

Respondents were asked to describe how frequently they engaged in combat or were fired upon by enemy forces or observed or cared for wounded or dead opposition forces, wounded or dead friendly forces, or wounded or dead civilians. Respondents were also asked how often during deployment they experienced physical danger, fear of death, or fear of exposure to chemical or biological weapons. Response choices for exposures and threat perceptions were "not applicable," "never," "once," "more than once," and "frequently." Those who responded "frequently" were compared with those who endorsed lower levels of exposure or threat perception.

Mental Health Service Use

Respondents were asked to report how many times they had seen a psychiatrist, psychologist, or social worker during the following periods of time: "before enlistment or commissioning," "in the year before deployment," "during deployment," and "since returning from deployment." Respondents who reported six or more visits during each period were considered to be in ongoing mental health treatment. Rates of mental health visits and ongoing mental health treatment are reported for those who met the criteria for probable or subclinical PTSD and those who did not.

Statistical Analyses

All analyses were performed by using SPSS software (version 12.02; SPSS, Chicago, Illinois). Demographic variables selected for examination were age (≥35 years versus <35 years), education level (college degree or higher versus less than college degree), race (Caucasian versus other), and gender. Demographic variables were first examined together as risk factors for probable PTSD, subclinical PTSD, and probable depression by using binary logistic regression. Each deployment exposure and perceived threat was then examined while controlling for the selected demographic variables, to determine risks for probable PTSD, subclinical PTSD, and depression. Odds ratios (ORs), 95% confidence intervals (CIs), and p values are reported for all logistic regression models. Fisher's exact test was used to compare rates of exposure and rates of PTSD, subclinical PTSD, and depression in enlisted medical technicians versus other deployed personnel and to compare rates of mental health care use between those who met the criteria for PTSD or subclinical PTSD versus those who did not meet the criteria for either condition.

Results

One hundred two responses were received from personnel recently deployed to a combat area (36% response rate among 278 personnel who had recently deployed to combat areas, based on hospital personnel records). Demographic information is provided in Table I. The mean duration of deployment was 7.88 months (SD, 4.49 months). Respondents were predominantly male (66.3%), 45% had at least a college education, 63% were Caucasian, and 67% were married. The mean age was 34.3 years (SD, 8.50 years). There were 25 physicians, 5 nurses, 59 enlisted medical technicians, and 13 other health care providers. Although detailed demographic data are not available for the nonrespondents, the percentages of enlisted medical technicians were similar in the two groups (58% of respondents versus 64% of the total group of deployed personnel).

TABLE I

DEMOGRAPHIC CHARACTERISTICS OF THE SAMPLE (N = 102)

Age, mean ± SD (years)	34.30 ± 8.50
Male gender, *n* (%)	80 (82.5)
Race *n* (%)	
Caucasian	64 (62.7)
African American	10 (9.8)
Hispanic	18 (17.6)
Asian	16 (15.7)
Other	4 (3.9)
Rank, *n* (%)	
Junior enlisted (E1–E4)	22 (22.4)
Mid-grade enlisted (E5–E6)	28 (28.6)
Senior enlisted (E7–E9)	11 (11.2)
Junior officers (O1–O3)	10 (10.2)
Mid-grade officers (O4–O5)	20 (20.4)
Senior officers (O6 and above)	7 (7.1)
Education level, *n* (%)	
High school or GED	14 (14.3)
Some college	40 (40.8)
Bachelor's degree	9 (9.2)
Some graduate studies	1 (1.0)
Graduate degree	34 (34.7)
Occupation, *n* (%)	
Physician	25 (24.5)
Dentist	0 (0)
Nurse	5 (4.9)
Physician assistant	2 (2.0)
Psychologist	2 (2.0)
Enlisted medical technician	59 (57.8)
Other provider or administrator	9 (8.8)

Not all respondents answered all demographic questions; percentages are of total respondents answering each question. Respondents were allowed to endorse multiple racial or ethnic choices; for analysis, all who endorsed Caucasian were compared with all who did not make that endorsement. GED, general equivalency diploma.

Nine percent (n = 9) of deployed respondents met the full criteria for probable PTSD, 7% (n = 7) met the criteria for subclinical PTSD, and 5% (n = 5) met the criteria for depression. All who met the criteria for depression also met the criteria for probable PTSD or subclinical PTSD. Among enlisted medical technicians (n = 59), 11.9% (n = 7) met the criteria for probable PTSD, 10.2% (n = 6) met the criteria for subclinical PTSD, and 5.1% (n = 3) met the criteria for depression. Among other health care personnel (n = 43), 4.7% (n = 2) met the criteria for probable PTSD, 2.3% (n = 1) met the criteria for subclinical PTSD, and 4.7% (n = 2) met the criteria for depression. The differences in rates between enlisted medical technicians and other health care providers were not statistically significant.

Deployment Exposures and Perceived Threat

Twenty-eight percent (n = 28) reported frequent exposure to combat or enemy fire, 56% (n = 57) reported frequent exposure to injured or dead enemy forces, 62% (n = 63) reported frequent exposure to injured or dead friendly forces, and 46% (n = 47) reported frequent exposure to injured or dead civilians. Thirty-eight percent (n = 39) reported frequent perception of personal danger, 23% (n = 23) reported frequent concern regarding their potential death, and 18% (n = 18) reported frequent concern regarding chemical or biological weapons. Compared with other deployed personnel, enlisted medical technicians were more likely to report frequent exposure to combat or enemy fire (35.6% versus 16.3%; Fisher's exact p = 0.043) and were more likely to report frequent concern regarding their potential death (30.5% versus 11.6%; Fisher's exact p = 0.031). There were no differences between deployed enlisted medical technicians and other personnel in rates of exposure to injured or dead enemy forces, friendly forces, or civilians and no differences in perception of personal danger or concern regarding biological or chemical weapons.

Demographic Risk Factors for PTSD and Depression

When demographic variables (age, race, gender, and education level) were examined together to control for the effect of each against the others, non-Caucasian race was the only demographic factor associated with increased risk of probable PTSD (OR, 9.24; 95% CI, 1.46–58.40; Wald χ^2 = 5.59, df = 1, p = 0.018) and depression (OR, 11.95; 95% CI, 1.02–139.57; Wald χ^2 = 3.91, df = 1, p = 0.048). Age, race, gender, and education level were not associated with increased risk of subclinical PTSD.

Exposure Risk Factors for PTSD and Depression

Among all deployed health care workers (N = 102), when controlling for demographic variables, those reporting frequent personal engagement in direct combat or being fired upon by opposition forces were 17.02 times more likely to meet the criteria for probable PTSD (OR, 17.02; 95% CI, 1.86–156.01; Wald χ^2 = 6.30, df = 1, p = 0.012) but were not more likely to meet the criteria for subclinical PTSD or depression, compared with those reporting less frequent exposure. Those reporting frequent exposure to seriously injured or dead enemy forces, friendly forces, or civilians were not at increased risk for probable PTSD, subclinical PTSD, or depression.

Threat Perception Risk Factors for PTSD and Depression

Among all deployed health care providers, when controlling for demographic variables, those reporting frequent concern regarding being in danger were at 8.87 times greater risk of meeting the criteria for probable PTSD (OR, 8.87; 95% CI, 1.14–68.74; Wald χ^2 = 4.36, df = 1, p = 0.037) but were not at greater risk for subclinical PTSD or depression than were those reporting less frequent concern regarding danger. Those reporting frequent concerns over possible death or chemical/biological agents were not at increased risk for probable PTSD, subclinical PTSD, or depression.

Mental Health Care Use

Ten percent (n = 10) reported any mental health visits before enlistment, 14% (n = 14) reported any visits in the year before deployment, 16% (n = 16) reported any visits during deployment, and 32% (n = 33) reported any mental health visits since returning from deployment. Five percent (n = 5) reported ongoing mental health treatment before enlistment, 3% (n = 3) reported ongoing treatment in the year before deployment, none reported ongoing treatment during deployment, and 13% (n = 13) reported ongoing treatment after return from deployment.

Comparisons of mental health care use during each period of time among those who met the criteria for probable PTSD, subclinical PTSD, or neither condition are outlined in Table II. Because all deployed respondents who met the criteria for probable depression also met the criteria for subclinical or probable PTSD, a separate analysis of mental health care utilization was not performed based on the presence or absence of depression.

Discussion

This is the first study examining the risk factors for psychiatric illness and mental health care utilization among health care providers returning from combat areas in Iraq and Afghanistan. It is also one of few studies in which specific exposures and perceptions of threat are examined as risk factors for PTSD and depression. More than one-fourth of the deployed group reported frequent exposure to combat or enemy fire, more than one-third reported frequent perception of personal danger, and one-fifth had frequent concern regarding their own deaths. More than one-half of respondents reported frequent exposure to seriously injured or dead soldiers or civilians.

The rate of PTSD with the strict definition (9%) was lower than that of returning combat soldiers (12–20%)[12] and lower than rates seen for civilian first responders (13–18%).[6–8] When those with subclinical PTSD (7%) were included, the rates were comparable to previous studies. The rate of probable depression (5%) was lower than rates seen for combat veterans and lower than would be expected in the general population. This may be the consequence of selecting from a previously screened, younger, well-educated, physically healthy, fully employed population. All who met depression criteria within the deployed group also met the criteria for probable or subclinical PTSD; this finding is consistent with previous studies demonstrating a high rate of comorbidity between the two disorders.[8,22–25]

Non-Caucasian race was a risk factor for probable PTSD, suggesting that greater outreach or availability of services may be appropriate for non-Caucasian health care workers upon return from deployment to combat areas. Detailed examination of risk factors within individual ethnic groups should also be an area for further research in a larger population of health care workers.

Reported direct personal threat (being in combat or fired upon) and perceived sense of personal danger were associated with increased risk of PTSD. Reported frequent exposure to seriously wounded or dead soldiers and civilians was not associated with either PTSD or depression. This lack of association between witnessed injury and PTSD is consistent with the previous study of nurses working with seriously injured trauma survivors in hospital settings[4] but is inconsistent with studies of victims of terrorism and some studies of first responders.[9,10,22] This finding highlights the importance of screening for personal threats to life in addition to observed injury and illness when working with health care providers deployed to war, disasters, or humanitarian assistance missions.

Training for possible workplace threats may offer protection against subsequent psychological distress after exposure to similar threats.[26,27] Combat soldiers and civilian first responders are trained and experienced in responding effectively in situations of personal threat, whereas health care providers are trained and experienced in responding effectively when working with seriously injured or dying patients. Examination of the contributions of self-selection, training, and experience would be indicated to improve understanding of the protective roles of each.

Enlisted medical technicians were more likely than others to report frequent exposure to combat or enemy fire and were more likely to report frequent concern regarding their potential death. Although their rates of probable PTSD and depression were not statistically higher than those for other health care personnel, this might be attributable to the small sample size. Matters of self-selection, combat-oriented training, and experience might contribute to apparent resilience in this group.

Low rates of predeployment mental health care use suggest low levels of preexisting psychiatric symptoms before wartime exposures. Nearly all who met the criteria for probable PTSD were seen for at least one mental health visit and more than one-half were engaged in ongoing mental health treatment following deployment. Perceived barriers to mental health treatment are less prominent among this group of health care providers than among combat troops.[12] Rates of mental health care use among those who met the criteria for PTSD were higher than those for New York City residents with probable

TABLE II

RATES OF REPORTED MENTAL HEALTH VISITS AND ONGOING MENTAL HEALTH TREATMENT ACROSS TIME AMONG THOSE DEPLOYED TO A COMBAT THEATER (N = 102)

	No. (%)		
	Neither Subclinical nor Probable PTSD (n = 86)	Probable PTSD (n = 9)	Subclinical PTSD (n = 7)
Any before mental health visit			
Before enlistment	9 (10.5)	0 (0)	1 (14.3)
Year before deployment	12 (14.0)	1 (11.1)	1 (14.3)
During deployment	13 (15.1)	2 (22.2)	1 (14.3)
After deployment	22 (25.6)	8 (88.9)[a]	3 (42.8)
Ongoing mental health treatment[b]			
Before enlistment	5 (5.8)	0 (0)	0 (0)
Year before deployment	3 (3.4)	0 (0)	0 (0)
During deployment	0 (0)	0 (0)	0 (0)
After deployment	8 (9.3)	5 (55.6)[a]	0 (0)

[a] Fisher's exact test, $p < 0.01$, compared with respondents with no diagnosis.

[b] Ongoing mental health treatment was indicated by six or more reported visits during the period.

PTSD following the World Trade Center attacks in 2001[28] but similar to those found for the survivors of the 2001 terrorist attack on the Pentagon.[22]

Nearly one-half of those who met the criteria for subclinical PTSD reported at least one mental health visit, but none reported ongoing treatment. Previous studies of combat veterans found increases in rates of PTSD with the passage of time and noted that those with higher levels of initial symptoms were more likely to later meet criteria for PTSD.[29–31] Subclinical PTSD is also associated with higher levels of psychiatric comorbidity and lower levels of mental health functioning in veteran and civilian populations.[32,33] Follow-up evaluation is therefore warranted for health care workers meeting criteria for subclinical PTSD upon return from deployment.

This study is limited by the relatively small sample size and sampling technique. Because personal experiences during deployment are diverse, generalization of these findings to other groups of deployed health care workers should be performed with caution. Participation in this study was voluntary, and there is no way to determine bias regarding those who chose not to participate. Actual rates of probable PTSD and depression might therefore be higher or lower than those reported here. There might also be some distortion of experiences and perceptions because of recall bias. Because clinical interviews were not performed, the rates described may not represent true rates of illness.

In modern warfare settings, health care workers commonly experience personal threat and perceived threat to their personal safety. These exposures place health care workers at risk for PTSD. In contrast, frequent exposure to serious injuries in others was not a risk factor for probable PTSD in this population of military health care workers. In comparison with combat veterans, health care workers with PTSD were more likely to seek mental health care.

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