

Western University
Scholarship@Western

MacDonald Franklin OSI Research Centre

8-2007

Posttraumatic Stress Disorder and Associated Risk Factors in Canadian Peacekeeping Veterans with Health-Related Disabilities

Don Richardson

Western University, Don.Richardson@sjhc.london.on.ca

James A. Naifeh

Jon D Elhai

University of South Dakota

Follow this and additional works at: <https://ir.lib.uwo.ca/osircpub>

 Part of the [Psychiatric and Mental Health Commons](#)

Citation of this paper:

Richardson, Don; Naifeh, James A.; and Elhai, Jon D, "Posttraumatic Stress Disorder and Associated Risk Factors in Canadian Peacekeeping Veterans with Health-Related Disabilities" (2007). *MacDonald Franklin OSI Research Centre*. 33.
<https://ir.lib.uwo.ca/osircpub/33>

Posttraumatic Stress Disorder and Associated Risk Factors in Canadian Peacekeeping Veterans With Health-Related Disabilities

J Don Richardson, MD, FRCPC¹, James A Naifeh, MA², Jon D Elhai, PhD³

Objectives: This study investigates posttraumatic stress disorder (PTSD) and its associated risk factors in a random, national, Canadian sample of United Nations peacekeeping veterans with service-related disabilities.

Methods: Participants included 1016 male veterans (age < 65 years) who served in the Canadian Forces from 1990 to 1999 and were selected from a larger random sample of 1968 veterans who voluntarily and anonymously completed a general health survey conducted by Veterans Affairs Canada in 1999. Survey instruments included the PTSD Checklist-Military Version (PCL-M), Center for Epidemiological Studies-Depression Scale (CES-D), and questionnaires regarding life events during the past year, current stressors, sociodemographic characteristics, and military history.

Results: We found that rates of probable PTSD (PCL-M score > 50) among veterans were 10.92% for veterans deployed once and 14.84% for those deployed more than once. The rates of probable clinical depression (CES-D score > 16) were 30.35% for veterans deployed once and 32.62% for those deployed more than once. We found that, in multivariate analyses, probable PTSD rates and PTSD severity were associated with younger age, single marital status, and deployment frequency.

Conclusions: PTSD is an important health concern in the veteran population. Understanding such risk factors as younger age and unmarried status can help predict morbidity among trauma-exposed veterans.

(Can J Psychiatry 2007;52:510–518)

Information on funding and support and author affiliations appears at the end of the article.

Clinical Implications

- Understanding risk factors in veterans can help predict significant psychiatric morbidity.
- Peacekeeping veterans can present with significant symptoms of PTSD years after deployment.
- Veterans deployed to peacekeeping missions present with increased rates of PTSD and depression.

Limitations

- The sample, composed only of men with service-related disabilities, limits generalizations.
- Diagnosis was not confirmed by a clinical diagnostic interview.
- A cross-sectional survey might establish an inherent association but not causality.

Key Words: *posttraumatic stress disorder, risk factors, peacekeeping*

Voluminous literature has been published on risk factors for PTSD among combat and war zone veterans; however, little work on the associations with PTSD has been conducted with peacekeepers—an important military population with ongoing chronic stressors.

In the post-1990s, with the end of the Cold War and a rise in intrastate conflict, ethnic cleansing, and global terrorism, the United Nations Security Council established more complex peacekeeping missions to help implement comprehensive peace agreements.¹ Traditional peacekeeping changed to more closely resemble traditional warfare, and the terms peacemaking or peace enforcement have been used to more accurately reflect the recent UN involvements in countries such as Rwanda, Somalia, Bosnia, Kosovo, and the former Yugoslavia. This new role of the UN peacekeeper in conflict zones may produce even more stress than traditional peacekeeping or even traditional warfare. The peacekeeping principles of impartiality and restraint in the use of force^{2,3} may not lend themselves well to traditional military training. In fact, soldiers often relay that the most stressful event of a peacekeeping mission was not the inability to defend their personal safety; rather, it was witnessing many extreme atrocities they were helpless to prevent, such as the death of civilians, including children.^{4,5}

Many studies have investigated the mental health consequences of combat and war zone exposure, including those resulting from the First and Second World Wars, the Korean War,^{6,7} the Vietnam War,^{8–11} the Gulf War,¹² and more recently, from combat duty in Afghanistan and Iraq.¹³ However, we have limited studies specifically investigating PTSD in peacekeeping veterans, especially those with documented health problems.

PTSD is one of the significant psychiatric conditions resulting from exposure to trauma such as war zone exposure, and the few available studies have demonstrated that an estimated 3% to 20% of peacekeepers have PTSD.^{14–19} The large variation in PTSD rates may be a function of the time lapse between the end of a mission and the start of a mental health evaluation. It may also be related to the nature and frequency of potentially traumatic events, which vary tremendously within each peacekeeping mission, from benign observer operations (for example, in Sinai) to highly dangerous peace-enforcement missions (such as the Somalia and Bosnia missions).²⁰

PTSD and depression often occur together,^{21–24} and more than 50% of PTSD patients have diagnosable major depressive disorder.²¹ In the veteran population, possibly owing to delayed treatment seeking, comorbid depression rates might be much higher than reported.^{25,26} There are several explanations for the association of PTSD with major depressive disorder. A history of preexisting major depressive disorder could be a risk factor for developing PTSD in veterans exposed to one or more traumatic events; PTSD may also increase the risk that veterans will develop depression.²⁷ However, when PTSD and depression occur together, it may reflect a shared vulnerability²⁸ or independent sequelae to trauma exposure.²⁹ Despite the different explanations and significant overlap of symptoms between PTSD and depression, Franklin and Zimmerman³⁰ found that this comorbidity continued, even with controlling for the overlapping, diagnostic symptoms.

Many risk factors have been identified for PTSD, including pretrauma risk factors, such as a family and (or) personal history of mental illness, and past trauma, including childhood abuse.³¹ Although women are twice as likely to develop PTSD, men are more likely to be exposed to traumatic events and vastly outnumber women in the military, especially in trades that involve combat.^{21,32}

Peritraumatic risk factors for PTSD include the type and severity of the trauma. Trauma severity is a stronger predictor when the trauma involves combat.³¹ Bodily injury in combat veterans, regardless of severity, is another major risk factor.³³ A recent Canadian study¹⁸ examining the impact of trauma severity demonstrates a significant relation between the number of operational deployments and the development of PTSD. This dose–response effect was confirmed in a recent reanalysis of PTSD prevalence among US Vietnam veterans¹¹ and in US soldiers deployed in Afghanistan.¹³ Of particular importance in peacekeeping operations, soldiers are expected to show restraint and neutrality, which, in turn, can increase both their sense of helplessness and their feelings of being unable to control a situation during a traumatic event—identified as significant peritraumatic risk factors.^{31,34,35}

Abbreviations used in this article

ANOVA	analysis of variance
CES-D	Center for Epidemiological Studies-Depression Scale
CF	Canadian Forces
CI	confidence interval
OR	odds ratio
PCL-M	PTSD Checklist-Military Version
PTSD	posttraumatic stress disorder
SD	standard deviation
SE	standard error
UN	United Nations
VAC	Veterans Affairs Canada

Posttrauma risk factors for PTSD include inaccessible treatment, stigmatization, ongoing life stressors, and a lack of social support.^{31,36,37} Deployed soldiers are frequently exposed to long separations from their families and friends, and the financial strain on soldiers and their families can add to the distress they face during and after a deployment.³⁸ This concept is important and applies to the veteran population, especially to those with service-connected health disabilities. Further, there is a significant association between soldiers diagnosed with psychiatric conditions and high attrition rates in the military.³⁹

Canada has a proud history of peacekeeping. Since 1947, the CF have completed more than 72 international operations.⁴⁰ Currently, more than 3000 CF personnel are deployed overseas on operational missions,⁴⁰ and a significant number will develop psychiatric conditions related to deployment and will require psychiatric care. This study investigates PTSD and its associated risk factors and depression in a random, national, Canadian sample of UN peacekeeping veterans with service-related disabilities. VAC provides health care benefits and other resources to veterans with service-connected health disabilities and (or) difficulties reintegrating into civilian life. The issue of veterans with PTSD is important but not well-studied in peacekeepers, especially in those who are medically ill; thus, it is important to study risk factors for the disorder to help identify and screen veterans returning to civilian life. From the literature and evidence that posttrauma risk factors are most detrimental to PTSD development,³¹ we expected to find significant pre- and peritrauma risk factors for PTSD but also to find that posttrauma risk factors would add most variance to predicting PTSD severity and a probable diagnosis in peacekeeping veterans.

Methods

Participants and Procedure

Participants consisted of 1016 male veterans serving in the CF from January 1990 to October 1999. The veterans in this study were selected from a random, national, stratified sample of 1968 CF male veterans (age < 65 years) who had served or were actively serving in the CF and were in receipt of or entitled to a disability pension from VAC after their release from the CF as a result of a service-related medical condition. The sample was obtained from an anonymous general health survey, completed by mail in October 1999 and consisting of 2760 VAC clients from a total membership of 18 443. The response rate for the survey was 71.30% (1968/2760).⁴¹ At the time of the survey, the most common disability pension from VAC was for musculoskeletal conditions; only about 4% of disability pensions were for psychiatric conditions, and of these, one-half were for PTSD. The post-1990 sample was derived by including all veterans (in the sample) who were

still serving in the CF; for veterans who were no longer serving, we used the release date and years of service to determine whether the veteran had served in the required time frame. We chose the post-1990 sample because at this time peacekeeping changed significantly from benign observer operations to highly dangerous peace-enforcement missions.²⁰ Veterans consented to the study, and we had Institutional Review Board approval to use the data.

Instruments

The survey inquired about sociodemographic characteristics, military service history, significant life events during the past year, and current stress. Life events were calculated by summing the number of affirmative responses to various significant stressful life experiences during the past year (“a family member seriously ill or injured,” “a serious illness or disability,” “death of a close friend,” “changed or lost job,” “death in the family,” “changed residence,” “having a person move into or out of the house,” and “being separated from a spouse for reasons other than work”). Scores ranged from 0 to 8.

Current stress was calculated by summing scores for responses provided to the statements (“I am trying to take on too many things at once,” “There is too much pressure on me to be like other people,” “Too much is expected of me by others,” “I don’t have enough money to buy the things I need,” “My work around the home is not appreciated,” “My friends are a bad influence,” “I would like to move but I cannot,” “My neighbourhood or community is too noisy or too polluted,” “I have a parent, a child or partner who is in very bad health and may die,” “Someone in my family has an alcohol or drug problem,” and “People are too critical of me or what I do”). A 3-point Likert response format (0 = not true, 1 = somewhat true, 2 = very true) was used. The statements were derived from Statistics Canada’s National Population Health Survey.⁴² Scores ranged from 0 to 22, with higher scores reflecting a higher degrees of current stress.

To measure symptoms of PTSD, the PCL-M⁴³ was used. The PCL-M is a 17-item, DSM-IV–based, PTSD symptom measurement tool with a 5-point Likert response format (from 1 = not at all, to 5 = extremely) that assesses the extent to which symptoms of PTSD related to any stressful military experience have been experienced over the previous month. The PCL-M has been widely used as a continuous measure in research studies to identify cases of PTSD.^{13,23,44} Consistent with previous research studies and with the PCL-M authors’ findings,⁴³ the PCL-M cut-off score of 50 was used to establish the presence of probable PTSD. Weathers and colleagues⁴³ found that this cut-off score yields PTSD diagnostic sensitivity of 0.82 and specificity of 0.83 in a combat veteran sample. This cut-off score was also used in a study by

	Never deployed, %	Deployed once, %	Deployed more than once, %
Probable PTSD (PCL-M \geq 50)	3.99 ^{a,b}	10.92 ^a	14.84 ^b
Probable clinical depression (CES-D \geq 16)	21.74 ^{c,d}	30.35 ^c	32.64 ^d

Percentages within a row that share a superscript (^{a, b, c, d}) indicate a statistically significant difference between percentages.

^a*P* = 0.001
^b*P* < 0.001
^c*P* = 0.013
^d*P* = 0.003

Forbes and colleagues,²³ who found an 80% diagnostic power in detecting PTSD.

To assess symptoms of depression, the 20-item, self-report CES-D was used.⁴⁵ Likert-scaled, using 4 points, its cut-off score of 16 indicates high-end depressive symptoms and identifies individuals with clinically significant depression.⁴⁶ Demonstrating excellent reliability, with internal consistency of 0.84 to 0.90,⁴⁵ it also shows good test-retest reliability (0.51 for 2 weeks and 0.67 for 4 weeks).⁴⁵ Adequate construct validity is reported, with moderate correlations with the Hamilton Depression Rating Scale and the Raskin Rating Scale for Depression (0.44 to 0.54) at admission and higher correlations after 4 weeks of treatment (0.69 to 0.75).⁴⁵ Depression severity is measured by summing item responses (reverse-scoring 4 items).

Results

Descriptive and Diagnostic Analyses

Participants' ages ranged from 20 to 65 years (mean 45.86, SD 10.03). The majority were either married or in common-law relationships (85.28%, *n* = 863), while 14.72% (*n* = 149) were single. Education level primarily constituted those who completed at least some college or other postsecondary education (53.91%, *n* = 530) or graduated from high school (29.09%, *n* = 286). In Canadian currency, the yearly household income of the sample was as follows: less than \$20 000 (5.68%, *n* = 49), \$20 000 to \$39 999 (31.44%, *n* = 271), \$40 000 to \$59 999 (33.76%, *n* = 291), and \$60 000 or more (29.12%, *n* = 251).

The number of unique deployments ranged from 0 to 5 (mean 1.18, SD 1.00). Only 27.17% (*n* = 276) of veterans had never been deployed, while most had 1 (39.67%, *n* = 403), 2 (23.03%, *n* = 234), 3 (8.37%, *n* = 85), 4 (1.38%, *n* = 14), or 5 (0.39%, *n* = 4) unique deployments. Out of 30 military theatres, most were deployed to Cyprus (36.81%, *n* = 374), the former Yugoslavia (25.20%, *n* = 256), Egypt (15.16%, *n* = 154), the Golan Heights in Israel, (11.81%, *n* = 120), the Persian Gulf (5.61%, *n* = 57), and Somalia–Rwanda (4.82%, *n* = 49). The majority of participants (72.83%, *n* = 740) were not

currently serving in the military. Of those who were serving, 19.98% (*n* = 203) were in the regular force and 7.19% (*n* = 73) were in the reserves.

The number of life stressors reported by participants ranged from 0 to 8 (mean 1.58, SD 1.42). Current stress ratings ranged from 0 to 16 (mean 3.50, SD 3.13).

The CES-D total score, measuring depression, ranged from 0 to 58 (mean 12.95, SD 11.41). With a CES-D cut-off score of 16,⁴⁶ 28.77% of the sample (*n* = 292) met criteria for probable clinical depression. Rates of probable clinical depression by deployment history were as follows: never deployed (21.74%, *n* = 60), deployed once (30.35%, *n* = 122), and deployed more than once (32.64%, *n* = 110) (see Table 1).

PTSD symptom severity was indicated by the PCL-M total score, which ranged from 17 to 85 (mean 28.52, SD 14.98). With a cut-off score of 50,⁴³ 10.33% of the sample (*n* = 105) met criteria for probable PTSD. Rates of probable PTSD by deployment history were as follows: never deployed (3.99%, *n* = 11), deployed once (10.92%, *n* = 44), and deployed more than once (14.84%, *n* = 50) (see Table 1).

In contrast to those who were never deployed, participants who were deployed at least once were significantly more likely to have probable PTSD ($\chi^2 = 16.49$, *df* 1, *P* < 0.001, $\phi = 0.13$, *n* = 1016) and probable clinical depression ($\chi^2 = 9.14$, *df* 1, *P* = 0.003, $\phi = 0.10$, *n* = 1015). There was no difference in probable PTSD or clinical depression between participants who were deployed only once and those who were deployed multiple times (Table 1). Additionally, self-reported depressive symptoms were significantly greater among those with probable PTSD (mean 33.71, SD 11.02) than without (mean 10.56, SD 8.71) ($F_{1,1014} = 627.21$, *P* < 0.001, Cohen's *d* = 2.03).

Univariate Analyses

The univariate relation between pretrauma (age and education), peritrauma (number of deployments), and posttrauma (marital status, serving status, number of life stressors, and current stress) variables with the PCL-M total score were

Table 2 Final sequential regression of pretrauma, peritrauma, and posttrauma variables on PCL-M total score

Variables	B	β	<i>P</i>
Pretrauma			
Age	-0.232	-0.159	< 0.001
Education	-1.028	-0.035	0.20
High school or less = 1			
At least some college = 2			
Peritrauma			
Number of deployments	2.534	0.172	< 0.001
Posttrauma			
Marital status	1.492	0.036	0.20
Married = 1			
Not married = 2			
Serving status	3.182	0.097	0.001
Serving = 1			
Not serving = 2			
Life stressors	1.758	0.168	< 0.001
Current stress	1.867	0.396	< 0.001

evaluated with Pearson correlations for continuous variables and ANOVA for categorical variables. An adjusted alpha level of 0.01 was used to protect against type I error. Significant individual associations were found for younger ages ($r = -0.26$, $P < 0.001$), an increased number of deployments ($r = 0.20$, $P < 0.001$), unmarried status ($F_{1,1010} = 22.99$, $P < 0.001$, Cohen's $d = 0.42$), more life stressors ($r = 0.33$, $P < 0.001$), and greater current stress ($r = 0.50$, $P < 0.001$).

Next, we evaluated the univariate relation between the same pretrauma, peritrauma, and posttrauma variables with probable PTSD (PCL-M cut-off = 50), using ANOVA for continuous variables and chi-square analyses for categorical variables. After we adjusted alpha for multiple comparisons ($\alpha = 0.01$), significant univariate associations with probable PTSD included age ($F_{1,1014} = 35.51$, $P < 0.001$, Cohen's $d = 0.60$), number of deployments ($F_{1,1014} = 22.94$, $P < 0.001$, Cohen's $d = 0.49$), marital status ($\chi^2 = 7.70$, $df 1$, $P = 0.006$, $\phi = 0.09$, $n = 1862$), life stressors ($F_{1,971} = 47.90$, $P < 0.001$, Cohen's $d = 0.73$), and current stress ($F_{1,981} = 127.55$, $P < 0.001$, Cohen's $d = 1.12$). Participants classified as having probable PTSD were younger (mean age 40.43 years, compared with 46.49 years), deployed more times (mean 1.62 times, compared with 1.13), unmarried (16.79%, compared with 9.27%), reported more life stressors (mean 2.51 life stressors, compared with 1.48) and higher levels of current stress (mean 6.65 stress levels, compared with 3.14).

Multivariate Analyses

We examined the multivariate association between PTSD symptom severity and pretrauma, peritrauma, and posttrauma variables, using sequential linear regression. The PCL-M total score served as the dependent variable, while the same pretrauma, peritrauma, and posttrauma variables as reported above were entered sequentially in predictor blocks. Pretrauma variables were entered first (Model 1), followed by peritrauma (Model 2) and posttrauma (Model 3) variables. Small amounts of missing continuous data were replaced with series means, and listwise removal of cases owing to missing categorical data resulted in 96 excluded cases, with 920 remaining. Model 1 pretrauma variables accounted for a small but significant amount of the PCL-M's total variance, ($F_{2,918} = 34.49$, $P < 0.001$, $R^2 = 0.07$). Model 2 peritrauma variables incrementally added variance in predicting PCL-M total scores above Model 1 ($F_{change,1,917} = 37.53$, $P < 0.001$), adding a modest 3.7% variance. The addition of posttrauma variables in Model 3 significantly added variance above Model 2 ($F_{change,4,913} = 80.90$, $P < 0.001$), adding 23.4% variance. The final model (see Table 2) accounted for 34.0% of the variance in, and correlating 0.58 with, PCL-M total scores ($F_{7,913} = 67.27$, $P < 0.001$). Age was the only significant pretrauma predictor variable ($P < 0.001$), with number of deployments significant as a peritrauma predictor ($P < 0.001$) and serving status ($P = 0.001$), number of life stressors ($P < 0.001$), and current stress ($P < 0.001$) significant as posttrauma predictors.

Table 3 Final sequential logistic regression analysis of probable PTSD as a function of pretrauma, peritrauma, and posttrauma variables

Variables	B	SE	Wald ^a	P	OR
Pretrauma					
Age	-0.072	0.015	21.406	< 0.001	0.931
Education	0.005	0.260	0.000	0.99	1.005
High school or less = 1					
At least some college = 2					
Peritrauma					
Number of deployments	0.678	0.129	27.44	< 0.001	1.970
Posttrauma					
Marital status	-0.029	0.330	0.008	0.93	0.971
Married = 1					
Not married = 2					
Serving status	0.755	0.310	5.945	0.015	2.128
Serving = 1					
Not serving = 2					
Life stressors	0.232	0.086	7.265	0.007	1.261
Current stress	0.252	0.037	47.430	< 0.001	1.286
^a df 1					

Multivariate prediction of probable PTSD was evaluated by means of sequential logistic regression, with the same pretrauma, peritrauma, and posttrauma predictor variables described above entered sequentially in blocks. The pretrauma Model 1 accounted for a significant but modest proportion of the variance ($\chi^2 = 31.91$, $df\ 2$, $P < 0.001$, Nagelkerke's $R^2 = 0.07$, $n = 921$). The peritrauma Model 2 contributed a small but significant amount of variance above Model 1 (χ^2 change = 23.39, $df\ 1$, $P < 0.001$, R^2 change = 0.05, $n = 921$). The posttrauma Model 3 contributed a significant and moderately large amount variance above Model 2 (χ^2 change = 88.33, $df\ 4$, $P < 0.001$, R^2 change = 0.18, $n = 921$). The final model predicted 30.9% variance in probable PTSD classification, with (alpha of 0.01) younger age ($P < 0.001$), number of deployments ($P < 0.001$), number of life stressors ($P = 0.007$), and greater current stress ($P < 0.001$) significant (see Table 3). Classification of probable PTSD was significantly predicted by age (7% less likely with each increase in year), number of deployments (97% more likely with each deployment), no longer serving (112% more likely than if still serving), life stressors (26% more likely with each stressor endorsed), and current stress (29% more likely with each 1-point increase).

Discussion

This study attempted to increase our understanding of the psychiatric impact of modern peacekeeping and risk factors for developing PTSD. The observed rates of probable PTSD of 10.92% in veterans deployed once and 14.84% in those deployed more than once is consistent with results from other studies^{13,19,47,48} and further demonstrates the mental health impact of operational deployment. The observed dose-response relation between deployment (serving as a proxy indicator of the peritraumatic risk factor of trauma severity) and probable PTSD is consistent with other studies of combat veterans.^{11,13} Consistent with other studies,^{13,19} veterans with probable PTSD and greater PTSD severity were more likely to be younger and have a history of more deployments. These findings are also consistent with the literature demonstrating that the lack of social support is a posttrauma risk factor for developing PTSD³¹ because individuals with probable PTSD and greater PTSD severity were more likely to be unmarried (serving as a proxy indicator of decreased social support).

The rate of probable PTSD of 3.99% in veterans who had never been deployed was also elevated when compared with the rate of PTSD of 1.7% for men in the general Canadian population.^{49,50} This increased rate in veterans who have never been deployed may identify the inherent risk of working

within the military, such as the potential impact of traumatic exposure during military exercises or another preexisting risk factor. However, the higher observed rate of probable PTSD in our sample of veterans who had been deployed, compared with the rate of PTSD found in a Statistics Canada survey,¹⁸ may also reflect a sample bias in our survey, which consisted of veterans with service-related medical disabilities. Even though the most common service-related medical disability was musculoskeletal in nature, this injury type might also contribute to symptoms of PTSD.³³

The study also identified that those veterans who have been deployed suffer from increased rates of depression. This may support the hypothesis that trauma exposure is associated with an increased risk of other mental health conditions, such as major depressive disorder.^{13,51,52} As expected, and consistent with previous studies,^{13,53} self-reported depressive symptoms were significantly greater among those with probable PTSD. Further evaluation of the data would be necessary to determine whether increased rates of depressive symptoms observed in this sample were independent of PTSD-induced effects and independent of the musculoskeletal conditions and associated pain that also often present with comorbid depression.⁵⁴ The high rate of depression may also be related to the delays often involved in seeking medical–professional help, due to the significant military-instilled mental health stigma.¹³ When new veterans ultimately present seeking treatment, they have often been suffering for many years and have frequently already developed the common mental disorders associated with PTSD, such as depression, alcohol–substance abuse, and other anxiety disorders.^{21,23,25,55}

This study has important clinical implications because many veterans have identified significant symptoms of PTSD years after their deployment, and therefore, their response to treatment might be significantly affected by the severity and chronicity of PTSD.⁵⁶ Understanding such risk factors can help predict morbidity among trauma-exposed veterans. Veterans with PTSD also show higher functional impairment, compared with veterans without PTSD.⁵⁷ The high rates of depression have a significant impact on treatment because depression must be aggressively treated to help patients respond more effectively to psychotherapy.⁵⁸

There are several limitations within this study. Although representative of peacekeeping veterans with service-connected medical disabilities, the results cannot be generalized to the entire military veteran population because the sample included only veterans with pensions for service-connected medical disabilities. Veterans who might have been deployed but not pensioned by VAC for medical conditions were not included; therefore, it was impossible to determine the rates and potential risk of developing psychiatric conditions such as PTSD resulting from specific deployments. Another potential

limitation is that, even though self-rating measures such as the PCL-M have been extensively used in research to identify cases of PTSD,^{13,23,41,44,59} the diagnosis of PTSD in this study was not confirmed by a diagnostic clinical interview. Because this was an anonymous survey, another limitation is that we did not have access to the data on the nonresponders. Despite a response rate of more than 70%, it is possible that those who responded to the survey are slightly different, demographically and (or) symptomatically, from those who did not respond.

Conclusion

PTSD and depression are important health concerns in the veteran population. Understanding such risk factors for PTSD as younger age and unmarried status can help predict morbidity among trauma-exposed veterans. Because many veterans are no longer serving in the military but living and working in the community as civilians, it is important that primary care physicians and psychiatrists become knowledgeable about the emotional impact of peacekeeping deployment, inquire about military service, and screen for possible PTSD.

Funding and Support

The authors have no financial affiliations relevant to the subject of this article.

Acknowledgement

We thank Veterans Affairs Canada for providing access to the data cited within this article. Information was extracted from a survey conducted in October 1999 by the Review of Veterans' Care Needs project, Veterans Affairs Canada. The views expressed in this manuscript are those of the authors and do not necessarily represent the views of the Veterans Affairs Canada.

References

1. United Nations. How has peacekeeping evolved? [Internet]. New York (NY): United Nations; 2006 [cited 2006 Jul 12]. Available from: <http://www.un.org/Depts/dpko/dpko/faq/q4.htm>.
2. Stedman SJ. The new interventionists. *Foreign Affairs*. 1993;72(5):1–16.
3. Hillen J. Blue helmets: the strategy of UN military operations. Washington (DC): Brassey's; 1998.
4. Lamerson C, Kelloway E. Towards a model of peacekeeping stress: traumatic and contextual influence. *Can Psychol*. 1996;37(4):195–204.
5. Roberts P. War and peace—a field study in Bosnia of troops on a siege under fire. In: Presentation at the 16th Annual Meeting of the International Society for Traumatic Stress Studies. San Antonio, Texas, USA, November 16–19, 2000.
6. Lipton MI, Schaffer WR. Post traumatic stress disorder in the older veterans. *Mil Med*. 1986;151:522–524.
7. Stenger CA. American prisoners of war in WWI, WWII, Korea, Vietnam, Persian Gulf, and Somalia. Washington (DC): Veterans Health Services and Research Administration, Department of Veterans Affairs Advisory Committee on Former Prisoners of War; 2000.
8. Kulka RA, Schlenger WE, Fairbank JA, et al. Trauma and the Vietnam War generation: report of findings from the National Vietnam Veterans Readjustment Study. New York (NY): Brunner/Mazel; 1990.
9. Hendin H, Haas A. Suicide and guilt as manifestations of PTSD in Vietnam combat veterans. *Am J Psychiatry*. 1991;148:586–591.
10. Bremner JD, Southwick SM, Darnell A, et al. Chronic PTSD in Vietnam combat veterans: course of illness and substance abuse. *Am J Psychiatry*. 1996;153(3):369.

11. Dohrenwend BP, Turner JB, Turse NA, et al. The psychological risks of Vietnam for US veterans: a revisit with new data and methods. *Science*. 2006;313(18):979–982.
12. Wolfe J, Erickson DJ, Sharkansky EJ, et al. Course and predictors of posttraumatic stress disorder among Gulf War veterans: a prospective analysis. *J Consult Clin Psychol*. 1999;67:520–528.
13. Hoge CW, Castro CA, Messer SC, et al. Combat duty in Iraq and Afghanistan: mental health problems and barriers to care. *N Engl J Med*. 2004;351:13–22.
14. Passey G, Crockett D. Psychological consequences of Canadian UN peacekeeping. Unpublished paper. Vancouver (BC): Department of Psychiatry, University of British Columbia; 1999.
15. MacDonald C, Chamberlain K, Long N, et al. Mental health, physical health, and stressors reported by New Zealand defence force peacekeepers: a longitudinal study. *Mil Med*. 1998;163(7):477–481.
16. Deahl M, Srinivasan M, Jones N, et al. Preventing psychological trauma in soldiers: the role of operational stress training and psychological debriefing. *Br J Med Psychol*. 2000;73(pt1):77–85.
17. Gibson R. The development of the Canadian deployment impact scale for assessing PTSD: a psychometric study. Calgary (AB): University of Calgary; 1997.
18. Statistics Canada. Canadian Community Health Survey Cycle 1.2—Mental health and well-being (Canadian Forces Supplement). Ottawa (ON): Statistics Canada; 2002.
19. Litz BT, Orsillo SM, Friedman M, et al. Post-traumatic stress disorder associated with peacekeeping duty in Somalia for US military personnel. *Am J Psychiatry*. 1997;154:178–184.
20. Traumatic stress and peacekeepers [Internet]. National Center for PTSD: Department of Veterans Affairs; 2006 [cited 2006]. Available from: http://www.ncptsd.va.gov/facts/specific/fs_peacekeepers.html?printable=yes.
21. Kessler RC, Sonnega A, Bromet E, et al. Posttraumatic stress disorder in the national comorbidity survey. *Arch Gen Psychiatry*. 1995;52:1048–1060.
22. Shalev AY, Freedman S, Peri T, et al. Prospective study of post-traumatic stress disorder and depression following trauma. *Am J Psychiatry*. 1998;155(May):630–637.
23. Forbes D, Creamer M, Hawthorne G, et al. Comorbidity as a predictor of symptom change after treatment in combat-related posttraumatic stress disorder. *J Nerv Ment Dis*. 2003;191:93–99.
24. Brady K, Killeen T, Brewerton T, et al. Comorbidity of psychiatric disorders and posttraumatic stress disorder. *J Clin Psychiatry*. 2000;61(Suppl 7):22–32.
25. Keane TM, Wolfe J. Comorbidity in post-traumatic stress disorder: an analysis of community and clinical studies. *J Appl Soc Psychol*. 1990;20:1776–1788.
26. Southwick S, Yehuda R, Giller EJ. Characterization of depression in war-related posttraumatic stress disorder. *Am J Psychiatry*. 1991;148:179–183.
27. Bromet EJ, Schulberg HC. Epidemiologic findings from disaster research. In: Hales RE, Frances AJ, editors. *American Psychiatric Association annual review*. Washington (DC): American Psychiatric Press; 1987:676–689.
28. O'Donnell ML, Creamer M, Pattison P. Posttraumatic stress disorder and depression following trauma: understanding comorbidity. *Am J Psychiatry*. 2004;161:1360–1396.
29. Breslau N, Davis G, Peterson E, et al. A second look at co-morbidity in victims of trauma: the post-traumatic stress disorder-major depression connection. *Biol Psychiatry*. 2000;48(9):902–909.
30. Franklin CL, Zimmerman M. Posttraumatic stress disorder and major depressive disorder: investigating the role of overlapping symptoms in diagnostic comorbidity. *J Nerv Ment Dis*. 2001;189:548–551.
31. Brewin CR, Andrews B, Valentine JD. Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *J Consult Clin Psychol*. 2000;68:748–766.
32. Breslau N, Kessler RC, Chilcoat HD, et al. Trauma and posttraumatic stress disorder in the community: the 1996 Detroit area survey of trauma. *Arch Gen Psychiatry*. 1998;55:626–632.
33. Koren D, Norman D, Cohen A, et al. Increased PTSD risk with combat-related injury: a matched comparison study of injured and uninjured soldiers experiencing the same combat events. *Am J Psychiatry*. 2005;162:276–288. Available from: <http://ajp.psychiatryonline.org/cgi/content/abstract/162/2/276>.
34. Yehuda R. Risk factors for posttraumatic stress disorder. Washington (DC): American Psychiatric Press; 1999.
35. Litz B. The psychological demands of peacekeeping. *PTSD Clinical Quarterly*. 1996;6(1):1–8.
36. Ozer EJ, Best SR, Lipsey TL, et al. Predictors of posttraumatic stress disorder and symptoms in adults: a meta-analysis. *Psychol Bull*. 2003;129:52–73.
37. Yehuda R, McFarlane AC, Shalev AY. Predicting the development of posttraumatic stress disorder from the acute response to a traumatic event. *Biol Psychiatry*. 1998;44:1305–1313.
38. Deployment, Stress, and Intention to Stay in the Military [Internet]. Rand Corporation; 2006 [cited 2006 Oct]. Available from: http://www.rand.org/pubs/research_briefs/RB9150/index1.html.
39. Hoge CW, Lesikar SE, Guevara R, et al. Mental disorders among US military personnel in the 1990s: association with high levels of health care utilization and early military attrition. *Am J Psychiatry*. 2002;159:1576–1583.
40. Current Operations [Internet]. 2006 [cited 2006 Dec]. Available from: http://www.dnd.ca/site/operations/current_ops_e.asp.
41. Asmundson GJG, Stein MB, McCreary DR. Posttraumatic stress disorder symptoms influence health status of deployed peacekeepers and nondeployed military personnel. *J Nerv Ment Dis*. 2002;190:807–815.
42. National Population Health Survey [Internet]. 1994 [cited 2007 Jan]. Available from: http://www.statcan.ca/english/sdds/instrument/3225_Q1_V1_E.pdf.
43. Weathers FW, Litz BT, Herman DS, et al. The PTSD checklist: reliability, validity, & diagnostic utility. Presented at: Annual meeting of the International Society for Traumatic Stress Studies; 1993 October; San Antonio (TX).
44. Richardson JD, Elhai J, Pedlar D. Association of PTSD and depression with medical and specialist care utilization in modern peacekeeping veterans in Canada with health-related disabilities. *J Clin Psychiatry*. 2006;67:1240–1245.
45. Radloff LS. The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*. 1977;1:385–401.
46. Weissman M, Sholomskas D, Pottenger M. Assessing depressive symptoms in five psychiatric populations. A validation study. *Am J Epidemiol*. 1977;106:203–214.
47. Lundin T, Otto U. Swedish UN soldiers in Cyprus: their psychological and social situation. *Psychother and Psychosom*. 1992;57:187–193.
48. Passey G, Crockett D. Psychological consequences of Canadian UN peacekeeping in Croatia and Bosnia. Paper presented at the 11th annual meeting of the International Society for Traumatic Stress Studies. November, 1995. Boston (MA). In: *Proceeding of the 1995 meeting of the International Society for Traumatic Stress Studies*. Northbrook (Ill): ISTSS; 1995.
49. Van Ameringen MA. The prevalence of PTSD in Canada. Presented at: American Psychiatric Association annual meeting; 2003 May 17–22, 2003; San Francisco (CA).
50. Stein MB, Walker JR, Hazen AL, et al. Full and partial posttraumatic stress disorder: findings from a community survey. *Am J Psychiatry*. 1997;154:1114–1119.
51. Jordan BK, Schlenger WE, Hough R, et al. Lifetime and current prevalence of specific psychiatric disorders among Vietnam veterans and controls. *Arch Gen Psychiatry*. 1991;48:207–215.
52. Centers for Disease Control. Health status of Vietnam veterans. *JAMA*. 1988;259:2701–2719.
53. Forbes D, Bennett N, Biddle D, et al. Clinical presentations and treatment outcomes of peacekeeper veterans with PTSD: preliminary findings. *Am J Psychiatry*. 2005;162(11):2188–2190. Available from: <http://ajp.psychiatryonline.org/cgi/content/abstract/162/11/2188>.
54. Asmundson GJG, Wright KD, McCreary DR, et al. Post-traumatic stress disorder in United Nations peacekeepers: an examination of factor structure in peacekeepers with and without chronic pain. *Cogn Behav Ther*. 2003;32:26–37.
55. Brady K, Pearlstein T, Asnis GM, et al. Efficacy and safety of sertraline treatment of posttraumatic stress disorder: a randomized controlled trial. *JAMA*. 2000;283:1837–1844.
56. Friedman M, Davidson J, Mellman T, et al. Pharmacotherapy. In: Foa EB, Keane TM, Friedman MJ, editors. *Effective treatments for PTSD: practice guidelines from the International Society for Traumatic Stress Studies*. New York (NY): The Guilford Press; 2000. p. 328.
57. Zatzick DF, Marmar CR, Weiss DS, et al. Posttraumatic stress disorder and functioning and quality of life outcomes in a nationally representative sample of male Vietnam veterans. *Am J Psychiatry*. 1997;154(12):1690–1695. Available from: <http://ajp.psychiatryonline.org/cgi/content/abstract/154/12/1690>.
58. Davidson J, Van Der Kolk B. A pharmacological treatment of post-traumatic stress disorder. In: Van Der Kolk B, McFarlane A, Weisaeth L, editors. *Traumatic stress: the effects of overwhelming experience and mind, body and society*. New York (NY): The Guilford Press; 1996. p. 521.
59. Barrett DH, Doebbeling CC, Schwartz DA, et al. Posttraumatic stress disorder and self-reported physical health status among US military personnel serving during the Gulf War period: a population-based study. *Psychosomatics*. 2002;43(3):195–205. Available from: <http://psy.psychiatryonline.org/cgi/content/abstract/43/3/195>.

Manuscript received November 2006, revised, and accepted January 2007.

¹Consultant Psychiatrist, Operational Stress Injury Clinic, Parkwood Hospital, St Joseph's Health Care London, London, Ontario; Consultant Psychiatrist, Veterans Affairs Canada, Hamilton District Office, Hamilton, Ontario.

²Doctoral Candidate in Clinical Psychology, Disaster Mental Health Institute, The University of South Dakota, South Dakota, United States.

³Assistant Professor, Disaster Mental Health Institute, Clinical Psychology Training Program, Department of Psychology, The University of South Dakota, South Dakota, United States.

Address for correspondence: Dr D Richardson, Operational Stress Injury Clinic, Parkwood Hospital, St Joseph's Health Care London, University of Western Ontario, 801 Commissioners Road East, London, ON N6C 5J1; Don.Richardson@sjhc.london.on.ca

Résumé : Le trouble de stress post-traumatique et les facteurs de risque associés chez les anciens combattants canadiens du maintien de la paix souffrant d'incapacités liées à la santé

Objectifs : Cette étude porte sur le trouble de stress post-traumatique (TSPT) et les facteurs de risque associés dans un échantillon national aléatoire d'anciens combattants canadiens des forces des Nations Unies chargées du maintien de la paix qui ont des incapacités liées au service.

Méthodes : Les participants comptaient 1 016 anciens combattants masculins (âge < 65 ans) qui ont servi dans les forces canadiennes de 1990 à 1999 et qui ont été sélectionnés à partir d'un échantillon aléatoire plus nombreux de 1 968 anciens combattants ayant répondu volontairement et anonymement à un sondage sur la santé générale, administré par le ministère des Anciens Combattants en 1999. Les instruments du sondage comprenaient la version militaire de la liste de contrôle du TSPT (PCL-M), l'échelle de dépression du centre d'études épidémiologiques (CES-D), et des questionnaires sur les événements marquants de l'année écoulée, les stressors actuels, les caractéristiques sociodémographiques et les antécédents militaires.

Résultats : Nous avons observé que les taux de TSPT probable (score à la PCL-M > 50) étaient de 10,92 % pour les anciens combattants déployés une fois et de 14,84 % pour ceux qui ont été déployés plus d'une fois. Les taux de dépression clinique probable (score à la CES-D > 16) étaient de 30,35 % pour les anciens combattants déployés une fois et de 32,62 % pour ceux qui ont été déployés plus d'une fois. Nous avons constaté que, dans des analyses multivariées, les taux de TSPT probable et la gravité du TSPT étaient associés avec le jeune âge, l'état de célibataire, et la fréquence de déploiement.

Conclusions : Le TSPT est un problème de santé important dans la population des anciens combattants. Comprendre les facteurs de risque comme le jeune âge et l'état de célibataire peut aider à prédire la morbidité chez les anciens combattants exposés à des traumatismes.