

Association of PTSD and Depression With Medical and Specialist Care Utilization in Modern Peacekeeping Veterans in Canada With Health-Related Disabilities

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Objective: We examined the relative associations between posttraumatic stress disorder (PTSD) and depression severity with medical and specialist care use in modern peacekeeping veterans with health-related disabilities.

Method: The participants consisted of 1016 male veterans who served in the Canadian Forces from 1990 to 1999, selected from a larger random sample of 1968 veterans who voluntarily completed an anonymous 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, and questionnaires of health problems and service use, sociodemographic characteristics, and military history.

Results: Among peacekeeping veterans with health disabilities, “probable” PTSD (PCL-M score ≥ 50) was associated with significantly more medical service use (primary and specialty care combined), with a mean of 16.4 times (SD = 17.4) compared with 6.0 times (SD = 6.6), $p < .001$, for veterans without PTSD. We found that in multivariate analyses, general medical care intensity (i.e., number of visits) was related to increased health problems, greater probable PTSD diagnosis, and greater depression symptom severity. We also found that depression severity accounted for health care use intensity and that PTSD only added a small amount of incremental variance above that.

Conclusions: The observed association between PTSD (diagnosis and severity) and medical care utilization stresses the importance of PTSD screening in primary care settings, especially in patients with a history of military service. This association is also useful for clinicians and hospital administrators in understanding potential medical and psychiatric needs for military veterans.

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The end of the Cold War, in part symbolized by the dismantling of the Berlin Wall in 1989, brought increased instability to the international stage and a rise in intrastate conflict, ethnic cleansing, and global terrorism. The United Nations (UN) Security Council then established larger and more complex peacekeeping missions, often to help implement comprehensive peace agreements.¹ The result has been more hazardous, difficult, and ambiguous UN military operations. In the 1990s, at the same time that the Canadian Armed Forces were downsizing, they were also participating in significantly more numerous operations. From 1945 to 1989, the Canadian Forces were deployed abroad on 24 operational missions. From 1990 to 2002, the Canadian Forces were further deployed on 79 operational missions.²

Understanding health care utilization, especially in military veterans, can be helpful for clinicians and medical program administrators within the Veterans Affairs (VA) system, and for policy makers in allocating treatment resources for veterans. There is a growing literature examining health care utilization in military veterans; however, we currently have limited knowledge on health care use in modern peacekeeping veterans, especially veterans in receipt of a service-connected disability pension. Studying this topic in disabled veterans is important be-

cause such samples are more likely than general veteran samples to be ill and use health care resources. In fact, previous research has demonstrated that veterans seeking or receiving VA disability resources are more symptomatic, and some research finds greater health care use even among veterans not necessarily diagnosed with medical conditions.^{3,4}

A growing body of research demonstrates that PTSD and trauma exposure are associated with increased health care service use and costs.^{5,6} Specifically, Fontana and Rosenheck⁷ demonstrated that greater combat exposure intensity was associated with increased health service use. Numerous other studies⁸⁻¹³ found that PTSD was associated with increased usage of medical services. In the veteran population, several recent studies of veterans primarily from older war eras^{4,9,14,15} have actually found medical care utilization to be related to PTSD. Conversely, studies on age have not demonstrated an association with primary care service use⁹ or specialist care use¹⁶ in veterans with PTSD. Studies of veterans have demonstrated associations between increased medical care utilization and greater depression severity and health problems^{9,17} and that PTSD predicts service use above and beyond depressive symptoms that are commonly found with PTSD.⁶ However, a more recent study did not find a similar relationship for either depression severity or health problems in a regression model accounting for other relevant predictor variables.¹⁵

In this study, we examined the relative effects of PTSD and depression severity on health care utilization among a random, national Canadian sample of UN peacekeeping veterans who served after 1990 and were determined by VA Canada as having a service-related disability. VA Canada provides health care benefits and other resources to veterans with service-connected disabilities. This population of veterans is important to study, given their medically ill nature and their reliance on the VA for their health care needs. Based on this literature, we expected to find significant relationships between medical service utilization and greater PTSD and comorbid depression severity in veterans.

METHOD

Participants and Procedure

The participants consisted of 1016 male veterans who served in the Canadian Forces from January 1990 to October 1999. The veterans in this study were selected from a random, national stratified sample of 1968 Canadian Forces veterans (age < 65 years) who had served or were actively serving in the Canadian Forces and were in receipt of or entitled (after their release from the Canadian Forces) to a disability pension from Veterans Affairs Canada, based on a service-related medical condition. The sample was obtained from an anonymous general

health survey that was completed by mail in October 1999 and consisted of 2760 Veterans Affairs Canada clients from a total of 18,443 clients. The response rate for the survey was 71.30% (1968/2760).¹⁸ At the time of the survey, the most common disability pension with Veterans Affairs was for musculoskeletal conditions; only approximately 4% of disability pensions were for psychiatric conditions and 2% were for PTSD. The post-1990 sample was derived by including all veterans in the sample who were still serving in the Canadian Forces, and if the veteran was no longer serving, we used the release date and years of service to determine if the veteran had served in the required time frame. The use of this archival dataset was approved by the institutional review board of the University of South Dakota.

Instruments

To measure symptoms of PTSD, the PTSD Checklist-Military Version (PCL-M)¹⁹ was utilized. The PCL-M is a 17-item, DSM-IV-based PTSD symptom measurement tool with a 5-point Likert response format (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.^{18,20-22} Consistent with previous research studies^{20,21} and with the PCL-M's authors,¹⁹ the PCL-M cut-off score of 50 was used to establish the presence of "probable" PTSD. Weathers and colleagues¹⁹ found that this cut-off score yielded 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 recent study of combat-related PTSD²⁰ and in another study by Forbes and colleagues,²¹ who found an 80% diagnostic power in detecting PTSD.

To assess symptoms of depression, the Center for Epidemiological Studies-Depression Scale (CES-D)²³ was used. The CES-D is a 20-item self-report instrument to measure depression. It is Likert-scaled, using 4 points. A cut-off score of 16 indicates high-end depressive symptoms and identifies individuals with clinically significant depression.²⁴ Excellent reliability has been demonstrated, with internal consistency ranging from 0.84 to 0.90.²³ Good test-retest reliability (0.51 for 2 weeks and 0.67 for 4 weeks) has also been shown.²³ Adequate construct validity is reported, with moderate correlations with the Hamilton Rating Scale for Depression (HAM-D) and Raskin Scale for Depression (0.44 to 0.54) at admission, and higher after 4 weeks of treatment (0.69 to 0.75).²³ Depression severity is measured by summing item responses (reverse-scoring 4 items).

To measure health status, a 21-question self-report questionnaire on long-term health problems diagnosed by health professionals was administered, using a "yes"/"no" response format. Problem areas included food aller-

Table 1. Health Care Use (mean number of physician visits) Among Disabled Peacekeeping Veterans in the Year Prior to Survey Completion

Characteristic	Veterans Who Met PTSD Criteria (N = 105)		Veterans Who Did Not Meet PTSD Criteria (N = 911)		Analysis			
	Mean	SD	Mean	SD	F	df	p	R ²
Primary care physician	10.46	5.08	4.56	10.77	99.12	1,912	< .001	0.10
Medical specialist	6.24	8.73	1.49	2.66	61.69	1,509	< .001	0.11
Primary care physician or specialist	16.4	17.4	6.0	6.6	112.05	1,943	< .001	0.11

Abbreviation: PTSD = posttraumatic stress disorder.

gies, non-food allergies, asthma, arthritis or rheumatism, back problems (excluding arthritis), high blood pressure, migraine headaches, chronic bronchitis or emphysema, sinusitis, diabetes, epilepsy, heart disease, cancer, gastrointestinal ulcers, post-stroke complications, urinary incontinence, acne, dementia, cataracts, glaucoma, and other nonspecified health problems. Responses were combined to form a single score, therefore reflecting the number of diagnosed health problems.

To assess health service use, participants were presented with a list of health professionals, including “general practitioner” (family doctor, military doctor, military medic) and a variety of other medical specialists (internist, surgeon, gynecologist, psychiatrist, etc., but excluding dentist and chiropractor), and asked about treatment use (“yes/“no”) and the number of medical appointment visits in the past year. Of relevance to this study is that we examined medical care use (primary care plus specialist care use).

RESULTS

Descriptive Analyses

The few missing values on continuous variables were substituted with series means. The sample was comprised of 1016 men. The mean age was 45.86 (SD = 10.03) years. Most participants had completed secondary schooling (286/983, 29.1%) or had at least some post-secondary education (447/982, 45.5%). Most were married (863/1012; 85.3%). Household income was primarily between \$20,000 and \$50,000 (Canadian) (436/862, 50.6%). The majority was retired from military service (740/1016, 72.8%), with the remaining participants still serving in the regular forces (203/1016, 20.0%) or Reserves (73/1016, 7.2%). The number of humanitarian or peacekeeping mission deployments ranged from 0 to 5 (mean = 1.18, SD = 1.00) and was normally distributed, with the following frequencies: no deployments (276/1016, 27.2%), 1 deployment (403/1016, 39.7%), 2 deployments (234/1016, 23.0%), 3 deployments (85/1016, 8.4%), 4 deployments (14/1016, 1.4%), 5 deployments (4/1016, 0.4%).

Based on the established cut-off score of 50 on the PCL-M, 105 (10.3%) of 1016 participants met PTSD

criteria. The average CES-D severity level was 12.94 (SD = 11.41), and 292 (28.7%) of 1016 participants met the criteria for significant depression (using the established cutoff score of 16). The total number of health problems averaged 2.65 (SD = 1.78).

Primary or specialty medical care services were used in the past year by 945 of the participants (945/1014, 93.2%), averaging 7.06 visits (SD = 8.93). Specifically, participants averaged 5.17 visits (SD = 6.18) to their primary care physician and 1.98 visits (SD = 4.03) to their specialist physician.

Univariate Analyses

To examine differences in health care use for veterans with and without PTSD, we used logarithmic transformations of the total number of combined primary and specialty care service visits, since those variables evidenced substantial positive skewness (albeit without an excess of zero values), but were normalized after transformation. Specifically, veterans with probable PTSD saw their primary care physician a mean of 10.46 times (SD = 5.08) in the past year compared with a mean of 4.56 times (SD = 10.77) for veterans without probable PTSD, $F = 99.12$, $df = 1,912$; $p < .001$ ($R^2 = 0.10$, a “medium” effect). A similar pattern was observed for specialty medical care service in which veterans with probable PTSD saw their medical specialists a mean of 6.24 times (SD = 8.73) compared with a mean of 1.49 times (SD = 2.66) for veterans without probable PTSD, $F = 61.69$, $df = 1,509$; $p < .001$ ($R^2 = 0.11$, a “medium” effect). In total, veterans with probable PTSD used medical services (primary care physician or specialist) a mean of 16.4 times (SD = 17.4) compared with a mean of 6.0 times (SD = 6.6) for veterans without PTSD, $F = 112.05$, $df = 1,943$; $p < .001$ ($R^2 = 0.11$, a “medium” effect) (Table 1). We also found that depression severity was significantly related to the number of primary care plus specialty care visits, $r = 0.24$, $df = 1017$, $p < .001$ (a “small” effect).

Multivariate Analyses

We examined predictors of medical care utilization intensity (primary and specialty care use combined) using a sequential ordinary-least-squares regression model. In the

Table 2. Ordinary Least Squares Regression, Predicting 12-Month Primary and Specialty Service Use Intensity (log-transformed) Among Disabled Peacekeeping Veterans^a

Variable	<i>B</i>	<i>SE B</i>	β	<i>t</i>	Partial <i>r</i>
Step 1					
Age	.00	.00	-0.19	-6.63**	-0.20
No. of deployments	.01	.01	0.06	2.20*	0.07
No. of health problems	.05	.00	0.43	14.94**	0.43
Step 2					
Age	.00	.00	-0.11	-3.73**	-0.12
No. of deployments	.01	.01	0.04	1.35	0.04
No. of health problems	.04	.00	0.34	12.00**	0.35
Depression severity	.01	.00	0.30	10.34**	0.31
Step 3					
Age	.00	.00	-0.10	-3.56**	-0.11
No. of deployments	.01	.01	0.03	1.16	0.04
No. of health problems	.04	.00	0.34	11.69**	0.35
Depression severity	.01	.00	0.25	7.25**	0.22
Probable PTSD ^b	.06	.03	0.08	2.32*	0.07

^a*B* = nonstandardized regression coefficient, *SE B* = standard error of *B*, β = standardized regression coefficient, *t* = *t* statistic, partial *r* = partial correlation with service use intensity.

^b0 = "no PTSD"/1 = "probable PTSD."

**p* < .05.

***p* < .001.

Abbreviation: PTSD = posttraumatic stress disorder.

first step, we controlled for several covariates, including age, number of deployments, and number of health problems. In the second step, we included depression severity (CES-D) to assess its incremental contribution of variance to medical care use intensity. In the third step, we entered the probable PTSD diagnosis variable to assess its incremental variance contribution above depression and the step 1 covariates. We used the logarithmic transformation of the total primary plus specialty care use variable. We found that the first step contributed a significant amount of variance in primary/specialty care use, $F = 84.21$, $df = 3,1010$; $p < .001$ ($R^2 = 0.20$, a "medium" effect). The second step (adding depression) added a significant amount of variance, $F_{\text{change}} = 107.01$, $df = 1,1009$; $p < .001$ ($R^2_{\text{change}} = 0.08$, a "small" effect). The third step (adding PTSD) added only a small (but significant) amount of variance, $F_{\text{change}} = 5.38$, $df = 1,1008$; $p < .05$ ($R^2_{\text{change}} = 0.01$, a "small" effect). The final model demonstrated statistical significance for all predictor variables except for the number of deployments, with health problems and depression severity representing the largest effects (Table 2).

DISCUSSION

Peacekeeping veterans with probable PTSD, pensioned for a service-connected disability, use significantly more medical services (primary and specialty care) than those without PTSD. Our results are consistent with previous studies^{4,8,9,14,25-27} demonstrating increased health care utilization in veterans with PTSD. For comparison purposes, the recent study by Calhoun et al.⁴ reported the

health care use in veterans with PTSD was a median of 18 visits, while Ashton et al.²⁵ reported an average use of 17 visits for a 1-year period, which was similar to our study's mean visit count of 16 times for a 1-year period for veterans with PTSD.

As in previous studies,^{9,15} we did not find an association for age and medical service use. Our results support previous studies^{28,29} demonstrating that psychiatric need (e.g., mental disorders) is more strongly related to seeking health services than demographic characteristics are.

Medical care use (primary and specialty care) among peacekeeping veterans in our study was also related to increased health problems, PTSD diagnosis, and depression symptom severity, with all 3 predictor variables significant in a combined regression model. Our results support previous research by Marshall et al.^{9,17} indicating a significant relationship between health problems and medical service use (primary and specialty care) in veterans with PTSD. We also found that depression severity accounted for health care use intensity and that PTSD only added a small amount of incremental variance above that. The relationship between PTSD and medical care use could be explained by the significant psychiatric comorbidity³⁰ and medical comorbidity^{27,31} found in this population. However, studies demonstrate that psychiatric comorbidity alone would not account for this relationship.^{14,32}

Confirming the results of previous studies^{9,17} but not of one recent study,¹⁵ we found that PTSD and depression severity were both associated with increased medical service use (primary and specialty). Research studies^{27,31} have demonstrated that PTSD and depression are associated with increased health problems, including cardiovascular, respiratory, musculoskeletal, and neurologic problems, and Schnurr et al.¹⁴ described how health problems associated with PTSD may play a mediating role in predicting health service use.

High levels of medical care utilization in veterans may be related to the stigma regarding seeking mental health services.²⁰ Veterans may prefer to seek medical care in order to avoid a "psychiatric label" or may misinterpret psychiatric symptoms as having a physical basis.²⁷ Other researchers³³ explained such increased health care use with the observation that medical patients routinely discuss their psychiatric problems (e.g., PTSD, depression) with their primary care physician. The increased health care use may also be indirectly related to the neurobiological alterations found in patients with PTSD, including adrenergic hyperresponsiveness,³⁴ low cortisol levels and enhanced negative feedback sensitivity of the hypothalamic-pituitary-adrenal axis,^{35,36} dysregulation of the immune response,^{37,38} and decreased hippocampal volume.³⁹⁻⁴²

The results presented in this current study have important clinical implications. The observed association be-

tween PTSD (diagnosis and severity) and medical care utilization stresses the importance of PTSD screening in primary care settings, especially in patients with a history of military service. Since there are currently safe and effective pharmacologic and psychological treatments available for PTSD,^{43,44} further research would be helpful to determine the benefits of early detection and treatment of PTSD in primary care settings.

There are several limitations of the current study. Although this study is representative of peacekeeping veterans with a service-connected medical disability, the results cannot be generalized to military population or veterans in general because we sampled only veterans who were pensioned for a service-connected medical disability. Further research is needed examining medical care utilization in patients with peacekeeping experience but without a service-related disability. We also do not have a Canadian group of nondisabled veterans to compare with, as to be considered a "veteran" in Canada, at the time of the study, a serviceman had to be in receipt of or entitled to (after his release from the Canadian Forces) a disability pension from Veterans Affairs Canada, based on a service-related medical condition.

Also, since the survey did not list psychiatric conditions but only Axis III conditions, we were unable to investigate the medical utilization patterns according to psychiatric and Axis III disabilities. Further study into these broad categories would be helpful. Furthermore, self-reported health service use tends to slightly underestimate visit counts when validated against medical records.⁴⁵

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,^{18,20-22} the diagnosis of PTSD in this study was not confirmed by a diagnostic clinical interview. We were also not able to assess the specific effects of psychiatric care and pharmacotherapy as the survey grouped psychiatric care with specialty medical services and did not include information on the type of medication prescribed.

CONCLUSION

Peacekeeping veterans with PTSD had significantly greater medical care use than veterans without PTSD. The number of health problems and depression severity were associated with increased medical service use among peacekeeping veterans. This information is useful for clinicians and hospital administrators in understanding potential medical and psychiatric needs for veterans. The observation that the psychiatric illnesses PTSD and depression predict medical services use supports an integrated primary care-psychiatric service delivery model to best address the health care needs of veterans. Future research should examine the benefits of screening and early

detection of PTSD in primary care in both civilian and military settings.

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