Association of Comorbid Substance Use Disorders and PTSD on Later Symptom Severity, Functioning, and Economic Outcomes among Veterans Applying for Department of Veterans Affairs PTSD Disability Benefits: A Retrospective Cohort Study

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Abstract

Background: Posttraumatic stress disorder (PTSD) that is comorbid with substance use disorders (SUDs) has been associated with poorer mental health outcomes compared to when SUD is not present. **Objectives:** To identify the prevalence of SUDs in Veterans who have applied for PTSD disability benefits and, within this subgroup, examine the effect of a SUD diagnosis on PTSD symptom severity, functioning, and economic outcomes approximately 2 years later. **Method:** Retrospective, gender-stratified cohort study of 4,918 representatively sampled Veterans who applied for Department of Veterans' Affairs (VA) PTSD disability benefits between 1994 and 1998. We used medical administrative data to determine if a SUD diagnosis was present when Veterans' disability claims were adjudicated. PTSD symptom severity; work, role, and social functioning; physical functioning; working for pay; and low income were assessed by mailed survey approximately 2 years later. **Results:** 3,337 (68%) Veterans returned surveys. Among respondents, men were more likely than women to have any SUD diagnosis at the time of their claims' adjudication (25.6% v. 17.6%, $p < 0.001$). Regardless of gender, Veterans with a SUD diagnosis had clinically meaningful and statistically significantly severer PTSD symptoms and poorer functioning approximately 2 years after their claim was adjudicated than did Veterans without SUD ($ps < 0.001$). Work, role, and social functioning was also statistically significantly worse for men and women with a SUD diagnosis ($ps < 0.001$). In terms of economic outcomes, men and women with a SUD diagnosis at the time their claim was adjudicated were 50-60% less likely to report working for pay two years later and 40%-100% more likely to report low income compared to respondents without a SUD diagnosis ($ps < 0.001$). **Conclusions:** Although a substantial fraction of respondents were diagnosed with a SUD at the time their claim was adjudicated, the proportion of men with a SUD

was similar to that reported for other clinical samples with PTSD; it was actually lower among the women compared to other clinical samples. A SUD diagnosis was a poor prognostic factor for the Veterans in this sample, associated with severer PTSD, poorer functioning, and poorer economic outcomes.

Tags: PTSD, Posttraumatic Stress Disorder, Compensation, Disability Benefits, Disability, Veterans, Substance Use Disorders, Alcohol Abuse, Cohort, Functioning, Social Adjustment Scale, Employment, Prognosis, Gender Differences, Penn Inventory for PTSD

Introduction

Posttraumatic stress disorder (PTSD) is a common, chronic, and often debilitating condition precipitated by exposure to trauma. Symptoms include heightened autonomic arousal; “flashbacks” and other intrusive recollections of the trauma event; and “numbing” symptoms, such as anhedonia, restricted emotional affect, and detachment from others. Associated with high distress, functional impairment (Zatzick et al., 1997), and low quality-adjusted health status (Mancino et al., 2006), PTSD affects about 7-12% of American adults (Kessler et al., 1995; Resnick et al., 1993; Breslau et al. 1991), 30% of Vietnam era combat veterans (Kulka et al., 1988; Green et al., 1989) and 50%-80% of former prisoners of war (Sutker et al., 1993; Blake et al., 1990; Engdahl et al., 1997).

In general populations, substance use disorders (SUDs) frequently co-occur with PTSD (e.g., Kessler et al., 1995), possibly because sufferers self-medicate their symptoms (Chilcoat & Breslau, 1998). In clinical samples of male Veterans, active SUDs range from 22% to 24% (Kulka et al. 1988; Hankin et al., 1999; Orsillo et al., 1996), and the lifetime prevalence of SUD ranges from 40% to 84% (cf. Stewart 1996 and Stewart et al., 1998). The prevalence of SUDs in Veteran women with PTSD is relatively understudied, unfortunately, but Kulka et al. (1988) and Dobie et al. (2004) estimated that approximately 20%-31% of women with PTSD had a concurrent or lifetime history of SUD. Examined from a slightly different perspective –namely, the proportion of women with a SUD who also have PTSD, Walker et al. (1995) estimated that women Veterans with SUD were 4.5 times as likely to carry a PTSD diagnosis as those without a SUD diagnosis. In a small convenience sample of women returning from Operations Enduring and Iraqi Freedom (OEF/OIF), Nunnick et al. (2010) found that alcohol misuse was associated

with 1.3-fold higher odds of having a PTSD diagnosis, and drug misuse, with 3.67-fold higher odds.

While SUDs appear common among Veterans with PTSD generally, its prevalence in the increasingly large subgroup of Veterans who apply for PTSD disability benefits is unknown. Of the 4.4 million Veterans receiving VA disability benefits for military-related disorders in 2016, almost 20% were indemnified for PTSD (Veterans Benefits Administration, 2016). On one hand, one might expect SUD prevalence to be especially elevated in this subgroup, because comorbid PTSD/SUD is associated with greater PTSD chronicity (Zlotnick et al., 1999), more medical and psychiatric comorbidities (Stewart et al., 2002), poorer perceptions of health and life opportunities (Najavits et al., 1999) and poorer response to PTSD treatment (Perconte & Griger, 1991) than PTSD alone. Further, in two small samples of treatment-seeking civilians, Riggs and colleagues (2003) showed that those seeking integrated treatment for PTSD/SUD had lower incomes and higher unemployment than those seeking treatment only for PTSD. These increased burdens could differentially predispose Veterans with comorbid PTSD/SUD to apply for disability benefits. On the other hand, Najavits et al. (1999) found PTSD severity levels were equivalent between civilian women with PTSD alone and those with comorbid PTSD/SUD. In a study of primary care patients with PTSD, Zlotnick et al. (2003) identified similar social functioning and health functioning for those with and without SUDs.

In the present study, our goal was to examine the prevalence of SUDs in a nationally representative, gender-stratified sample of Veterans who applied for PTSD disability benefits in the VA system between 1994 and 1998. We were particularly interested to examine the association, if any, of having a SUD diagnosis at the time Veterans' claims were adjudicated and their clinical and economic outcomes approximately 2 years later. Since women represent a

rapidly growing demographic in the Veteran population and since so little is known about SUD comorbidity in women veterans with PTSD, we emphasize gender-specific results. The study takes advantage of a pre-existing, well-described cohort originally assembled to examine gender and race disparities in VA disability awards for PTSD (Murdoch et al., 2003a; Murdoch et al., 2003b).

Method

The Minneapolis VA Medical Center's Subcommittee on Human Studies reviewed and approved the study protocol. Veterans' signified their consent to take part in the study by returning their completed questionnaire.

Subjects

Of the approximately 101,000 men and 4,000 women who applied for VA PTSD disability benefits between 1994 and 1998, 2,700 men and 2,700 women were randomly selected for survey. We excluded 5 duplicate names, 81 deceased Veterans, and 396 Veterans with invalid addresses, leaving 2,466 men and 2,452 women eligible for survey. 3,337 (68%) of eligible Veterans returned surveys. On average, participants' claims had been decided 2.4 ($\pm$ 1.2) years prior to receiving the mailed questionnaire. The study has been described elsewhere (Murdoch et al., 2003b; Murdoch et al., 2003c).

Survey respondents' mean age was 48.4 (SD = 12.6). Almost three-quarters were white and about half were married. Approximately two-thirds of respondents had at least some college education; three fifths of the sample's PTSD disability claims were approved.

Data collection

Between 1998 and 2000, a 20-page questionnaire, cash incentive, and cover letter were mailed to eligible Veterans' homes. We used follow-up mailings and a telephone prompt to

maximize response rates. To determine whether survey respondents had any SUD diagnosis at the time their claim was adjudicated, we used VA inpatient and outpatient data files from the National Patient Care Database (NPCD) and from the following three Medicare administrative data files: 1) The Carrier file, which contains claims from non-institutional providers; 2) The outpatient Standard Analytical File (SAF), which contains claims from institutional outpatient providers; and 3) The Medicare Provider Analysis and Review (MedPAR) file, which contains inpatient hospital and skilled nursing facility (SNF) stay records. The date veterans' claims were adjudicated was abstracted from the Veterans Issues Tracking Adjudication Log (VITAL), a Veterans Benefits Administration (VBA) administrative database.

Measures

SUD diagnosis. Veterans with the relevant SUD-related ICD-9-CM codes (see Appendix) between 1994 (the first year VA records were available) and the end of the calendar year in which their claim was adjudicated were considered to have a SUD diagnosis at the time their claim was adjudicated. Beginning with 1999 (the first year they were available) ICD-9-CM codes in the CMS records were also used to determine SUD diagnosis, but we did not identify any additional cases using these files. We created four indicator variables to signify whether the veteran had any SUD diagnosis, any alcohol-related diagnosis, any drug-related diagnosis, or both a drug and alcohol related diagnosis.

PTSD symptom severity. PTSD symptom severity was measured by survey using the Penn Inventory for Posttraumatic Stress Disorder (Penn Inventory) (Hammarberg, 1992). Penn Inventory scores range from 0 (no symptoms) to 78 (most severe symptoms); scores of 35 or more identify veterans with PTSD with an accuracy of 93% to 97% (Hammarberg, 1990; Baker

et al., 1998). A score change of 6.0 is considered clinically meaningful (Hammarberg and Silver, 1994). Seventy-one percent of respondents met survey criterion for PTSD.

Work, role, and social functioning. We used the summary score of the Social Adjustment Scale-Self Report (SAS-SR) (Weissman and Bothwell, 1976) to measure work, role and social functioning. Scores range continuously from 1 (best functioning) to 5 (worst functioning) (Weissman and Bothwell, 1976). SAS-SR scores for healthy community-dwelling adults average 1.6, whereas individuals with psychiatric illness typically have scores greater than 2.0 (Weissman, et al, 2001). Score changes of 0.4 represent a large clinical effect, but score changes of 0.1 are also thought to be clinically relevant (Cooper et al., 1982).

Physical functioning. We used the RAND Revised Physical Functioning Battery (Stewart et al., 1978) to assess physical functioning. Scores range continuously from 12 (worst impairment) to 36 (no impairment). Community-dwelling adults have average scores of 35; a 1-unit change in this scale is considered clinically important (Stewart, et al. 1981).

Economic Status. *Working for pay* and *low income* were assessed using single survey items. At the time of survey, VA defined “poverty” or “low income” as annual earnings less than \$23,688 for a single veteran; however, we defined low income as a household income of \$20,000 per year or less to be consistent with others’ research (Wilson and Kizer, 1997; National Center for Veteran Analysis and Statistics, 1995).

Analysis

All analyses were conducted in 2003 using SPSS, version 13.0 (Chicago, IL). All analyses were stratified by gender to account for our sampling strategy. We report the percentage of veterans with any SUD diagnosis, alcohol-related diagnosis, drug-related diagnosis, or both. We used Yates’ continuity-corrected Chi-square test or analysis of variance (ANOVA) to test for

unadjusted gender differences and for differences across SUD diagnosis status. We report unadjusted odds ratios for the associations between SUD diagnosis and economic outcomes along with 99% confidence intervals (CI). To see if gender moderated the associations between SUD diagnosis and our study outcomes, we regressed each study outcome on PTSD, SUD status, gender, and the interaction between gender and SUD using logistic or multiple linear regression. We used a Bonferroniized p-value of ≤ 0.001 as the threshold for all tests' statistical significance.

Results

As Table 1 shows, men were significantly more likely than women to have received any SUD diagnosis, an alcohol only diagnosis, drug only diagnosis, or alcohol and drug diagnosis at the time their claims were adjudicated. On net, when men and women had a SUD diagnosis at the time their claim was adjudicated, they subsequently reported severer PTSD symptoms and poorer work, role, and social functioning on the survey than did their counterparts without a SUD diagnosis (Table 2).

SUD diagnosis at the time of claim adjudication was also associated with significantly greater odds of reporting low income and lower odds of working for pay at the time of survey (Table 3). Tests for gender-by-SUD diagnosis interactions on PTSD symptom severity; work, role and social functioning; physical functioning; and income were insignificant (all p's > 0.16). However, women were less likely than men to say they were currently working for pay if they had a SUD at the time of adjudication compared to if they did not have a SUD (Wald $\chi^2 = 4.2$; df = 1; p = 0.04).

Discussion

In this nationally representative sample of Veterans who applied for PTSD disability benefits between 1994 and 1998, almost a quarter of men and a sixth of women had at least one

SUD-related diagnosis when their claim was adjudicated. Those who carried a SUD diagnosis at that time subsequently reported severer PTSD symptoms, poorer functioning, greater poverty, and more unemployment approximately 2 years later compared to those without a SUD diagnosis. There was a trend toward a larger impact of SUD comorbidity on work outcomes 2 years later in women than in men. Gainful employment, symptom reduction, and improved functioning are likely critical to transitioning any Veteran off the disability rolls (e.g., Hennessey & Muller, 1994; Hogg-Johnson & Cole, 2003; Muller, 1992). Comorbid SUDs may therefore complicate this process for Veterans disabled by PTSD.

Contrary to expectations, SUD prevalence in our sample was well within the range of active SUD diagnoses reported for other clinical and population-based samples of male Veterans with PTSD (e.g., 22% - 24%) (Kulka et al., 1988; Hankin et al., 1999; Orsillo et al., 1996). Women had slightly lower SUD prevalence than has been reported in other studies of women Veterans with PTSD (Kulka, et al. 1988; Dobie et al., 2004). Comorbid SUDs may not differentially predispose Veterans to apply for PTSD disability benefits compared to Veterans with PTSD but no comorbid SUD.

Limitations

Observed associations between PTSD, SUD, and poorer outcomes 2 years later may have resulted from confounding. For example, compared to Veterans whose VA disability claims for PTSD were denied, those with successful claims had larger, clinically important reductions in their PTSD symptoms and lower odds of poverty 6 years later (Murdoch, et al. 2011). If Veterans with SUD were less likely to successfully receive VA disability benefits for PTSD than those without SUD, the lack of benefits and not SUD, per se, could have driven the poorer outcomes observed here.

This cohort was created in 1998 and may not represent recent PTSD disability applicants. In particular, the cohort does not include Veterans from OEF/OIF and Operation New Dawn. At-risk alcohol use has been reported in almost a third of returning OIF Marines (Hoge et al., 2004), which is higher than the prevalence observed here. SUD diagnoses were available only for survey respondents, and the prevalence of SUD among non-respondents could differ from respondents. Generalizability of findings to Veterans with PTSD who don't apply for disability benefits is also uncertain.

We probably underestimated SUD's prevalence in this cohort. First, we relied on administrative data to determine SUD diagnosis status. Misclassification errors would therefore arise if participants did not present clinically or if providers did not diagnose or record a SUD. Second, we did not have access to diagnostic codes for Veterans using private payers or Medicare's capitated payment system. SUDs are especially likely to be under detected in women Veterans (Grossman et al., 1997; Hankin et al., 1999; Tracey et al., 2007). Therefore, the gender discrepancy reported here may overestimate true differences between men and women's SUD prevalence. If women's SUDs were significantly more undetected than men's, then our tests for gender moderation could also be biased.

Conclusions

To the best of our knowledge, we are the first to describe the prevalence of SUD in Veterans applying for PTSD disability benefits. In this group, SUDs appeared to be common but not more common than in other clinical groups. As in other samples, it was associated with poorer clinical and economic outcomes.

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Table 1. Prevalence of substance use disorder (SUD) among Veterans at the time their PTSD disability claims were adjudicated. Results reported as column percentages (%)

Type of Substance Use Disorder	Men N = 1,655	Women N = 1,682	p-value*
Any Disorder	25.6	17.6	<.001
Alcohol Only	21.3	13.7	<.001
Drug Only	16.3	11.8	<.001
Both	12.0	7.8	<.001

*Tests for difference between men and women.

Table 2. Symptom severity and functioning approximately 2 years later among Veterans who did and did not have a substance use disorder (SUD) diagnosis when their claim was adjudicated, by gender. Results reported as mean scores (SD).

Construct	Men		Women	
	With SUD (n =424)	Without SUD (n = 1,231)	With SUD (n = 296)	Without SUD (n =1,386)
PTSD symptom severity	51.2 (15.4)	44.2 (16.8) ***	47.2 (14.7)	41.4 (15.4) ***
Work, role, and social functioning	3.0 (0.8)	2.7 (0.8) ***	3.0 (.7)	2.7 (0.7) ***
Physical functioning	27.7 (5.9)	28.0 (5.9) ***	28.8 (5.9)	29.6 (5.0) ***

SD = Standard deviation.

***p < 0.001 for those with and without SUD within each gender.

Table 3. Odds Ratio between substance use disorder (SUD) diagnosis at the time of Veterans' claim adjudication and later economic outcomes by gender.

Economic outcome	Odds Ratio ^a	99% CI	Wald χ^2 (df)	p-value
Low Income (<\$20,001/year)				
Men	1.4	1.0 - 1.9	8.11 (1)	<0.001
Women	2.0	1.4- 2.8	27.53 (1)	<0.001
Working For Pay				
Men	0.5	0.4 - 0.8	17.10 (1)	<0.001
Women	0.4	0.3 - 0.6	30.19 (1)	<0.001

^aOdds of reporting low income or working for pay if Veteran had a SUD diagnosis at the time of claim adjudication relative to the odds if the Veteran did not have a diagnosis.

CI = Confidence Interval; df= degrees of freedom.

Appendix. ICD-9-CM codes used for SUD Diagnosis

Alcohol	Drug		
291.0	292.0	304.50	305.50
291.1	292.11	304.53	305.51
291.2	292.12	304.60	305.52
291.3	292.2	304.61	305.53
291.4	292.81	304.62	305.60
291.5	292.82	304.63	305.61
291.8	292.83	304.70	305.62
291.81	292.84	304.71	305.63
291.82	292.89	304.72	305.70
291.89	292.9	304.73	305.71
291.9	304.00	304.80	305.72
303.00	304.01	304.81	305.73
303.01	304.02	304.82	305.80
303.02	304.03	304.83	305.81
303.03	304.10	304.90	305.83
303.90	304.11	304.91	305.90
303.91	304.12	304.92	305.91
303.92	304.13	304.93	305.92
303.93	304.2	305.02	305.93
305.00	304.20	305.03	357.6
305.01	304.21	305.20	573.3
357.5	304.22	305.21	965.00
425.5	304.23	305.22	965.02
535.30	304.30	305.23	965.09
535.31	304.31	305.30	967.0
571.0	304.32	305.31	967.8
571.1	304.33	305.33	968.5
571.2	304.40	305.40	970.1
571.3	304.41	305.41	
572.3	304.42	305.42	
980.0	304.43	305.43	