JOURNAL OF WOMEN'S HEALTH
Volume 21, Number 6, 2012

DOI: 10.1089/jwh.2011.3113

Gender Differences in Health Service Utilization Among Iraq and Afghanistan Veterans with Posttraumatic Stress Disorder

Shira Maguen, Ph.D.,[1,2] Beth Cohen, M.D., M.A.S.,[1,2] Greg Cohen, M.S.W.,[1,*] Erin Madden, M.P.H.,[1] Daniel Bertenthal, M.P.H.,[1,3] and Karen Seal, M.D., M.P.H.[1,2]

Abstract

Background: Little is known about gender differences in healthcare use among newly returning veterans with posttraumatic stress disorder (PTSD). We investigated gender differences in Veterans Affairs (VA) medical center health service use among Iraq and Afghanistan veterans with PTSD with and without comorbid depression and alcohol use disorders (AUD).

Methods: Using VA administrative data, bivariate and multivariate statistics were used to examine gender differences in health service use among 159,705 Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF) veterans with PTSD seeking VA healthcare from October 7, 2001, to December 31, 2010.

Results: Female veterans with PTSD were more likely to be black and single and to have higher mental health, primary care, and emergency care use compared to men with PTSD. Men were more likely to have higher mental health inpatient use compared to women. Women and men with comorbid PTSD and depression or comorbid PTSD and AUD were more likely to have higher use in all domains compared to their counterparts with PTSD without these comorbid disorders. Women with comorbid PTSD and depression were 12.5 times more likely to have a mental health inpatient hospitalization compared to their female counterparts without depression and twice as likely to have a mental health hospitalization compared to men with comorbid PTSD and depression.

Conclusions: Women with PTSD had higher use than men in almost all areas, as did all veterans with comorbid PTSD and depression and comorbid PTSD and AUD, regardless of gender. Better understanding these health service use differences will allow for targeted evaluation and integrated treatment interventions in veterans with PTSD.

Introduction

Women in the military currently represent a significant percentage of U.S. troops, and the number of women in the military is projected to increase over the next few years.[1] Women represent 12% of the total number of military personnel serving in Operation Enduring Freedom (OEF, principally in Afghanistan) and Operation Iraqi Freedom (OIF, principally in Iraq),[2] and there has been a 2-fold increase in female veterans over the last 20 years.[1]

With an increase in female veterans, as well as an increase in the range of military occupational specialties in which women serve, women's exposure to traditional combat stressors is increasing. Women also may have particular risk factors for the development of mental health problems compared to men, such as elevated rates of military sexual trauma (MST).[3] As a result of multiple sources of potential exposure, women veterans are now being diagnosed with mental health conditions at higher rates. Prior studies have found that 8%–9% of women of mixed eras had a current posttraumatic stress disorder (PTSD) diagnosis[4,5]; a recent study of OEF/OIF veterans found that 17% of female veterans were diagnosed with PTSD, and 23% were diagnosed with depression.[6]

Despite the prevalence of psychiatric symptoms among returning male and female OEF/OIF veterans, many are not seeking mental health services.[7,8] Given that veterans with

[1]San Francisco VA Medical Center, San Francisco, California.
[2]University of California, San Francisco, School of Medicine, San Francisco, California.
[3]Mental Illness Research, Education & Clinical Center, San Francisco, California.
*Present address: Mailman School of Public Health, Columbia University, New York, New York.

PTSD are reluctant to seek mental health treatment, it is important to better understand rates of all health service use among newly returning veterans and how these may relate to risk factors, such as the existence of comorbid mental health diagnoses. Hoge et al.[9] found that OEF/OIF veterans who met screening criteria for a mental health condition were twice as likely to report barriers to seeking mental healthcare as their counterparts who did not meet screening criteria for a mental health condition. Mental health conditions also impact medical service use. Veterans with PTSD are more likely to be seen in primary care than in a mental health setting.[10,11] Indeed, medical service use in all forms—outpatient, inpatient, and emergency room—was higher in OEF/OIF veterans with PTSD compared to those with non-PTSD or no mental health diagnoses.[12] This is consistent with findings of prior veteran cohorts.[10,13] In summary, published literature suggests an underuse of mental health services and an increase in medical health services in military personnel and veterans.

What also remains to be better understood is how health service use varies by gender in newly returning veterans. Although some studies have found no gender differences in mental health service use,[14,15] others found that female veterans diagnosed with mental health problems used VA healthcare services at significantly lower rates than their male counterparts.[16,17] Given female veterans' greater treatment needs,[18–20] findings of proportionally equal use of VA services by gender may reflect an overall underuse of VA services by women veterans, as suggested by some,[21] and greater use of non-VA services to meet treatment needs.[15]

There may be particular health service use differences among those with comorbid PTSD and depression. Prior studies have examined use among depressed veterans, with or without PTSD, and have found that those with comorbid PTSD and depression were more likely to seek mental healthcare and use those services with greater frequency than patients with depression alone.[22,23] There also may be health service use differences among those with comorbid PTSD and alcohol use disorders (AUD), although, to our knowledge, no studies to date have examined this question. Thus, to further delineate health services use patterns among OEF/OIF veterans with PTSD seeking care at the VA, we used a retrospective study to describe (1) mental health outpatient, mental health inpatient, primary care, and emergency care service use by gender and (2) rates of service use among those with depression and AUD within gender. We hypothesized that women with PTSD would either have equal or slightly lower use rates than their male counterparts with PTSD and that those with PTSD and comorbid conditions would have higher rates of use across domains.

Materials and Methods

Study population

Our study sample was identified using the VA OEF/OIF Roster, a database of veterans who have separated from OEF/OIF military service. Veterans were required to have at least one clinical visit to a VA facility from October 7, 2001, through December 31, 2010, and be new users of VA healthcare after 9/11 to be included. Consequently, those with mental health problems who never sought VA services are not included in these analyses. We excluded all those who were killed in action during the study period and selected veterans diagnosed with PTSD. Our final study population consisted of 159,705 OEF/OIF veterans. The study was approved by the Committee on Human Research, University of California, San Francisco, and the San Francisco VA Medical Center.

Data source

We linked the OEF/OIF Roster database, which includes OEF/OIF veterans' demographic and military service information, to the VA National Patient Care Database (NPCD), which includes information about the dates of VA visits and associated *International Classification of Diseases*, Ninth Revision Clinical Modification (ICD-9-CM) diagnostic codes. NPCD data are derived from the VA electronic medical record from clinical visits to any of the 153 VA medical centers and 901 VA outpatient clinics nationwide.

Study variables

Demographic and military service variables. For the purpose of this study, we used demographic information (age, sex, race/ethnicity, and marital status) and military service information, such as component type (active duty vs. National Guard or Reserve during deployment), branch of service, rank (officer vs. enlisted), and number of deployments (one vs. more than one).

Mental health diagnoses. We selected the group of veterans who were diagnosed with PTSD (ICD-9-CM diagnosis 309.81) during clinic visits to VA healthcare facilities. Depression was defined as ICD-9-CM diagnoses 293.83 (mood disorder, transient organic psychotic condition, depressive type), 296.20–296.25, 296.30–296.35 (major depressive affective disorder), 300.4 (dysthymic disorder), and 311 (depressive disorder not otherwise classified). AUDs were defined as ICD-9-CM diagnoses from 305.00 to 305.03 (nondependent alcohol abuse) and 303 (alcohol dependence syndrome).

Use. VA clinic codes were used to create four categories of services: mental health outpatient, mental health inpatient, primary care, and emergency services. The number of visits made in each service category was counted over the duration of the study period. Dichotomous measures of use were defined as having at least one visit. Outpatient and inpatient data are stored in different files, and both types of files were used for the purposes of our analysis. Outpatient use was categorized by clinic stop codes, particular designated codes characterizing each clinic. Emergency department visits also were identified through appropriate clinic codes. For inpatient data, we used both hospital admissions data for a particular stay (each inpatient stay was coded once) and stays in observational units. The primary diagnosis at admission was used to determine if the admission was for mental health. Fee basis codes were used as available, but visits from other non-VA facilities (e.g., community clinics) were not included, given that we did not have access to these data.

Statistical analyses

Using chi-square tests, we first compared women and men who had served in OEF/OIF and were diagnosed with PTSD on demographic and military service characteristics. Next, we compared women and men who had served in OEF/OIF and were diagnosed with PTSD on a number of health service use

variables: (1) whether they had ever used mental health outpatient care, mental health inpatient care, primary care, and emergency care using chi-square tests and (2) the mean and median number of visits (per person, per year) in each health service use category using *t* tests and the Mann-Whitney test, respectively. Unadjusted and adjusted incidence rate ratios (IRR) were estimated using negative binomial regression. Because veterans were observed for varying lengths of time, the regression estimates were adjusted for time in VA system (i.e., the log of time in VA system was included as an offset in all models). The multivariate negative binomial models were adjusted for demographic, military, and VA system-related factors (i.e., distance to nearest facility and closest VA facility type). Using the same health service use categories and analysis strategy, we examined the proportion who initiated use and the rate of use for each type of care in those with PTSD with and without a depression diagnosis and with and without an AUD diagnosis within each gender category. Analyses were conducted using SAS software (version 9.2). Because of our large sample size, we chose a cutoff p value of <0.0001 to denote significant differences between the comparisons specified, and there is precedent for doing so in several of our studies using these data.[6,12]

Results

Demographic and military service comparisons

There were several differences between female and male OEF/OIF veterans with PTSD. Women with PTSD were more likely to (1) be black, (2) be single (never married or separated/widowed/divorced), and (3) have one deployment (vs. multiple deployments) compared to their male counterparts with PTSD (Table 1).

Health service use comparisons of women and men with PTSD

We found that the mean number of visits for each type of use was similar across women and men with PTSD (Table 2). Women and men with PTSD had a mean of just over 6 mental health outpatient visits per year and between 1 and 3 primary care visits per year. In the IRR models, there were a few statistically significant differences, although effect sizes were small: female OEF/OIF veterans with PTSD were more likely to have (1) lower use of inpatient mental health hospitalizations, (2) a higher rate of outpatient mental health use, (3) higher use of primary care visits, and (4) higher use of emergency care visits, compared to male OEF/OIF veterans with PTSD.

Health service use in veterans with PTSD with and without comorbid depression within gender

Given that 72% of women and 57% of men had comorbid PTSD and depression, we examined health service use in those with PTSD with and without comorbid depression within gender and found that both women and men with comorbid PTSD and depression were more likely to have used all categories of services more frequently than their counterparts with PTSD without comorbid depression (Table 3). For example, women and men with PTSD and depression had a mean of about 8 outpatient mental health visits per year, more than double the rate of those with PTSD without depression.

Table 1. Sociodemographic and Military Service Characteristics of 159,705 Operation Enduring Freedom/Operation Iraqi Freedom Veterans Diagnosed with Posttraumatic Stress Disorder

	Women n=*15,303* n *(%)*	*Men* n=*144,402* n *(%)*	*Total* n=*159,705*
Age group, years			
18–24	5,424 (35.4)	51,188 (35.4)	56,612 (35.4)
25–29	4,566 (29.8)	43,434 (30.1)	48,000 (30.1)
30–39	3,267 (21.3)	30,072 (20.8)	33,339 (20.9)
40+	2,046 (13.4)	19,708 (13.6)	21,754 (13.6)
Race*			
White	6,115 (40.0)	74,621 (51.7)	80,736 (50.6)
Black	3,147 (20.6)	13,362 (9.3)	16,509 (10.3)
Hispanic	1,707 (11.2)	15,873 (11.0)	17,580 (11.0)
Other/unknown	4,334 (28.3)	40,546 (28.1)	44,880 (28.1)
Marital status*			
Never married	8,584 (56.1)	77,967 (54.0)	86,551 (54.2)
Married	5,248 (34.3)	61,093 (42.3)	66,341 (41.5)
Divorced/ separated/ widowed	1,404 (9.2)	5,173 (3.6)	6,577 (4.1)
Component*			
Active duty	8,612 (56.3)	86,203 (59.7)	94,815 (59.4)
National Guard/ Reserve	6,691 (43.7)	58,199 (40.3)	64,890 (40.6)
Rank*			
Enlisted	14,420 (94.2)	139,564 (96.6)	153,984 (96.4)
Officer	883 (5.8)	4,838 (3.4)	5,721 (3.6)
Branch*			
Army	11,530 (75.3)	103,321 (71.6)	114,851 (71.9)
Air Force	1,524 (10.0)	5,387 (3.7)	6,911 (4.3)
Marines	710 (4.6)	27,731 (19.2)	28,441 (17.8)
Navy and Coast Guard	1,539 (10.1)	7,963 (5.5)	9,502 (5.9)
Multiple deployments*			
One	10,335 (67.5)	84,130 (58.3)	94,465 (59.1)
More than one	4,959 (32.4)	60,202 (41.7)	65,161 (40.8)
Distance to nearest facility (miles)*			
0–10	9,624 (62.9)	85,200 (59.0)	94,824 (59.4)
11–25	4,102 (26.8)	41,033 (28.4)	45,135 (28.3)
26–50	1,174 (7.7)	14,307 (9.9)	15,481 (9.7)
50+	134 (0.9%)	1,776 (1.2)	1,910 (1.2)
Closest VA facility type*			
VA community clinic	10,214 (66.7)	103,296 (71.5)	113,510 (71.1)
VA medical center	4,820 (31.5)	39,020 (27.0)	43,840 (27.5)

Numbers vary because of missing data.
*$p<0.0001$.

In general, the difference in the rate of use by those with PTSD with depression vs. those without depression was similar in men and women. In contrast, the rate of mental health inpatient use by women with comorbid PTSD and depression was 12.5 times greater than the rate in women without depression, and in men, the rate of mental health inpatient use among those with comorbid PTSD and depression was 6.7 times greater than that for men without depression.

Health service use in veterans with PTSD with and without comorbid AUD within gender

Comorbid PTSD and AUD diagnoses were present in 8.2% of women and 29% of men. Similar to our findings for PTSD and comorbid depression, we found that both women and

Table 2. Health Service Use in 159,705 Operation Enduring Freedom/Operation Iraqi Freedom Veterans Diagnosed with Posttraumatic Stress Disorder

Use	*Women Total: 15,303* n *(%)*	*Men Total: 144,402* n *(%)*
Mental health outpatient		
Any visit (yes/no)**	14,688 (96.0)	137,901 (95.5)
Mean number of visits (SD)(per person per year)*	6.59 ± 11.66	6.22 ± 11.67
Median (IQR) (per person per year)*	3.23 (1.18–7.60)	2.78 (1.03–6.72)
IRR (95% CI)*	1.06 (1.04-1.08)	1
Adj IRR[a] (95% CI)	1.03 (1.01-1.05)	1
Mental health inpatient		
Any visit (yes/no)*	1622 (10.6%)	18208 (12.6%)
Mean number of visits (SD) (per person per year)*	0.07 ± 0.33	0.09 ± 0.42
Median (IQR) (per person per year)*	0.00 (0.00–0.00)	0.00 (0.00–0.00)
IRR (95% CI)*	0.75 (0.70-0.80)	1
Adj IRR[a] (95% CI)*	0.74 (0.69-0.79)	1
Primary care		
Any visit (yes/no)*	14,763 (96.5)	135952 (94.1%)
Mean number of visits (SD)(per person per year)*	2.62 ± 2.25	1.89 ± 2.40
Median (IQR) (per person per year)*	2.11 (1.09–3.59)	1.43 (0.69–2.51)
IRR (95% CI)*	1.43 (1.41-1.45)	1
Adj IRR[a] (95% CI)*	1.43 (1.41-1.45)	1
Emergency visits		
Any visit (yes/no)*	8,251 (53.9)	69,405 (48.1)
Mean number of visits (SD) (per person per year)*	0.61 ± 1.20	0.51 ± 1.16
Median (IQR) (per person per year)*	0.17 (0.00–0.74)	0.00 (0.00–0.60)
IRR (95% CI)*	1.21 (1.18-1.25)	1
Adj IRR[a] (95% CI)*	1.16 (1.13-1.19)	1

*$p < 0.0001$; **$p < 0.001$.

[a]Incidence rate ratios (IRR) for the negative binomial regression model adjusted for gender, age, race, marital status, component type, rank, service branch, multiple deployment, distance to nearest facility, closest VA facility type, and time in VA system since first clinical encounter. Because of missing values for some covariates, the *n* in multivariate analysis was 157,041.

Adj IRR, adjusted incidence rate ratio; CI, confidence interval; IQR, interquartile range; SD, standard deviation.

men with comorbid PTSD and AUD were more likely to have used all categories of services compared to those with PTSD without AUD (Table 4). For example, both men and women with PTSD and AUD had more than double the mean number of mental health outpatient visits compared to their counterparts without AUD. The magnitude of the difference in rates of use by those with vs. those without comorbid AUD was similar in men and women.

Health service use in veterans with triple comorbidity (PTSD, depression, and AUD) within gender

We next examined service use by whether veterans were diagnosed with PTSD and both comorbid depression and AUD. As expected, those with all three diagnoses (PTSD, AUD, and depression) had the highest rates of use compared to the dual diagnosis (PTSD plus depression or AUD) and PTSD only groups. For example, for mental health outpatient use, the adjusted IRR comparing those with PTSD and depression to those with PTSD only was 2.1 (95% CI 2.1-2.2) among women and 1.95 (95% CI 1.92-1.98) among men, the adjusted IRR comparing those with PTSD and AUD to those with PTSD only was 3.1 (95% CI 2.7-3.5) among women and 2.3 (95% CI 2.3-2.4) among men, and the adjusted IRR comparing those with triple comorbidity to those with PTSD only was 4.6 (95% CI 4.3-4.9) among women and 4.1 (95% CI 4.0-4.2) among men. The patterns of association between all health service use categories and triple comorbidity were similar in men and women, except that the effect of comorbidity on rates of mental health inpatient use was greater in women than men (similar to results presented for comorbid depression in Table 3).

Discussion

This is the first study, to our knowledge, to compare rates of various types of health service use in a national sample of OEF/OIF veterans diagnosed with PTSD by gender. Although we know that there are high rates of stigma and barriers among returning veterans with mental health problems,[9] few existing studies include large numbers of women. Consequently, we know little about how health service use varies by gender.

We found that women and men with PTSD were fairly similar in their health service use, with women having slightly higher mental health, primary care, and emergency service use. Importantly, women and men with PTSD had a median of about 3 mental health outpatient visits per year, which is lower than expected, particularly given that 9 or more visits are recommended for evidence-based PTSD treatment.[24,25] Although veterans with PTSD are coming into mental health clinics, they may not be getting an optimal amount of treatment. Another possibility, however, is that although veterans are seeking fewer than the recommended 9 sessions, this may be enough to reduce PTSD symptomatology and increase

Table 3. Health Service Use in 159,705 Operation Enduring Freedom/Operation Iraqi Freedom Veterans Diagnosed with Posttraumatic Stress Disorder With and Without Depression, by Gender

	Women		*Men*	
Use	*PTSD with depression* n = *1,1027* n *(%)*	*PTSD without depression* n = *4,276* n *(%)*	*PTSD with depression* n = *82,743* n *(%)*	*PTSD without depression* n = *61,659* n *(%)*
Mental health outpatient[a]				
Any visit (yes/no)	10,859 (98.5)	3,829 (89.5)	81,421 (98.4)	56,480 (91.6)
Mean number of visits (SD) (per person per year)	7.76 ± 12.57	3.57 ± 8.14	8.02 ± 13.41	3.80 ± 8.19
Median (IQR) (per person per year)	4.15 (1.73–9.07)	1.40 (0.45–3.86)	3.97 (1.70–8.84)	1.59 (0.55–4.05)
IRR (95% CI)	2.3 (2.2-2.4)	1	2.2 (2.2-2.2)	1
Adj IRR[b] (95% CI)	2.3 (2.2-2.4)	1	2.2 (2.1-2.2)	1
Mental health inpatient[a]				
Any visit (yes/no)	1,553 (14.1)	69 (1.6)	15,834 (19.1)	2,374 (3.9)
Mean number of visits (SD) (per person per year)	0.09 ± 0.38	0.01 ± 0.17	0.14 ± 0.51	0.03 ± 0.22
Median (IQR) (per person per year)	0.00 (0.00–0.00)	0.00 (0.00–0.00)	0.00 (0.00–0.00)	0.00 (0.00–0.00)
IRR (95% CI)	12.5 (9.9-15.7)	1	6.7 (6.4-7.0)	1
Adj IRR[b] (95% CI)	12.5 (9.9-15.9)	1	6.7 (6.4-7.0)	1
Primary care[a]				
Any visit (yes/no)	10,764 (97.6)	3,999 (93.5)	79,489 (96.1)	56,463 (91.6)
Mean number of visits (SD) (per person per year)	2.81 ± 2.26	2.15 ± 2.16	2.09 ± 2.40	1.62 ± 2.38
Median (IQR) (per person per year)	2.31 (1.26–3.80)	1.62 (0.73–2.89)	1.63 (0.84–2.76)	1.19 (0.54–2.17)
IRR (95% CI)	1.37 (1.33-1.41)	1	1.37 (1.36-1.38)	1
Adj IRR[b] (95% CI)	1.34 (1.30-1.38)	1	1.35 (1.33-1.36)	1
Emergency visits[a]				
Any visit (yes/no)	6,506 (59.0)	1,745 (40.8)	45,644 (55.2)	23,761 (38.5)
Mean number of visits (SD) (per person per year)	0.69 ± 1.26	0.41 ± 0.98	0.63 ± 1.30	0.35 ± 0.91
Median (IQR) (per person per year)	0.25 (0.00–0.85)	0.00 (0.00–0.43)	0.20 (0.00–0.77)	0.00 (0.00–0.38)
IRR (95% CI)	1.82 (1.71-1.94)	1	1.84 (1.81-1.88)	1
Adj IRR[b] (95% CI)	1.83 (1.72-1.95)	1	1.88 (1.85-1.92)	1

[a]Unless otherwise noted, all within-gender comparisons have $p < 0.0001$.
[b]Incidence rate ratios (IRR) for the negative binomial regression model adjusted for age, race, marital status, component type, rank, service branch, multiple deployment, distance to nearest facility, closest VA facility type, and time in VA system since first clinical encounter. Because of missing values for some covariates, the *n* for multivariate analysis in women was 14,962, and the *n* for men was 142,079.

functioning. Although veterans were seen in primary care between one and three times a year, rates of emergency care were high for women and men with PTSD. It may be that individuals with PTSD are using emergency services to a greater extent because of lower use of mental health outpatient services.

Whereas prior studies have shown that those with PTSD have higher use in some domains,[12,13,26] this is the first study to demonstrate a higher use across multiple domains. Women with PTSD were likely to have slightly higher use of primary care visits than their male counterparts. It may be that women with PTSD are more likely to have increased physical health problems, as previously found in one community sample[27] and other OEF/OIF veteran samples,[28] and, as a result, these women seek primary care more often than do men.[28] Wolfe et al.[29] found that among female veterans, PTSD mediated the relationship between trauma exposure and physical health, which may explain why women with PTSD may seek physical healthcare more often.

The finding that women with PTSD use primary care at higher rates than their male counterparts may also not be unique to women with PTSD. Indeed, studies have found that women of similar age generally use primary care at higher rates than their male counterparts.[30] In this population of younger men and women, women may also have more need for routine primary care services for reproductive health concerns, such as cervical cancer screening and contraceptive counseling. However, although female veterans with PTSD have higher primary care use than male veterans with PTSD, the gaps between female and male veterans with PTSD may be narrower than those of their civilian counterparts.

Female veterans with PTSD, compared to their male counterparts, also had higher use of emergency room visits, which is similar to the finding that women in the general population also use emergency services more than men.[31] One possibility is that despite overall higher rates of primary care use, women with PTSD have greater physical health needs and are not using primary care often enough to avoid the use of emergency services. Another possible explanation is that they wait until health problems are severe to seek healthcare rather than doing so in a preventive fashion.

We also found that men with PTSD, compared to their female counterparts, were more likely to be hospitalized on a mental health inpatient unit. Given that men with PTSD are

Table 4. Health Service Use in 159,705 Operation Enduring Freedom/Operation Iraqi Freedom Veterans Diagnosed with Posttraumatic Stress Disorder With and Without Alcohol Abuse or Dependence, by Gender

	Women		*Men*	
Use	*PTSD with AUD* n = *2,461* n *(%)*	*PTSD without AUD* n = *12,842* n *(%)*	*PTSD with AUD* n = *41,121* n *(%)*	*PTSD without AUD* n = *103,281* n *(%)*
Mental health outpatient[a]				
Any visit (yes/no)	2,444 (99.3)	12,244 (95.3)	40,549 (98.6)	97,352 (94.3)
Mean number of visits (SD) (per person per year)	12.77 ± 20.84	5.41 ± 8.37	10.55 ± 17.66	4.50 ± 7.46
Median (IQR) (per person per year)	6.30 (2.75–13.94)	2.79 (1.02–6.61)	4.84 (2.02–11.58)	2.23 (0.81–5.27)
IRR (95% CI)	2.4 (2.3-2.5)	1	2.4 (2.4-2.4)	1
Adj IRR[b] (95% CI)	2.4 (2.3-2.6)	1	2.4 (2.4-2.5)	1
Mental health inpatient[a]				
Any visit (yes/no)	811 (33.0)	811 (6.3)	12,259 (29.8)	5,949 (5.8)
Mean number of visits (SD) (per person per year)	0.26 ± 0.66	0.03 ± 0.21	0.24 ± 0.68	0.03 ± 0.22
Median (IQR) (per person per year)	0.00 (0.00–0.23)	0.00 (0.00–0.00)	0.00 (0.00–0.21)	0.00 (0.00–0.00)
IRR (95% CI)	8.5 (7.4-9.7)	1	8.7 (8.4-9.0)	1
Adj IRR[b] (95% CI)	8.5 (7.4-9.7)	1	8.4 (8.1-8.7)	1
Primary care[a]				
Any visit (yes/no)**	2,397 (97.4)	12,366 (96.3)	39,159 (95.2)	96,793 (93.7)
Mean number of visits (SD) (per person per year)	2.93 ± 2.37	2.57 ± 2.22	2.01 ± 2.76	1.84 ± 2.24
Median (IQR) (per person per year)	2.40 (1.32–3.96)	2.06 (1.06–3.52)	1.55 (0.80–2.63)	1.39 (0.65–2.46)
IRR (95% CI)	1.15 (1.11-1.19)	1	1.12 (1.11-1.13)	1
Adj IRR[b] (95% CI)	1.16 (1.12-1.20)	1	1.16 (1.14-1.17)	1
Emergency visits[a]				
Any visit (yes/no)	1,669 (67.8)	6,582 (51.3)	24,802 (60.3)	44,603 (43.2)
Mean number of visits (SD) (per person per year)	1.02 ± 1.61	0.53 ± 1.09	0.75 ± 1.48	0.41 ± 0.99
Median (IQR) (per person per year)	0.48 (0.00–1.31)	0.14 (0.00–0.64)	0.30 (0.00–0.95)	0.00 (0.00–0.47)
IRR (95% CI)	1.93 (1.80-2.1)	1	1.86 (1.82-1.89)	1
Adj IRR[b] (95% CI)	1.84 (1.72-1.97)	1	1.78 (1.74-1.81)	1

[a]Unless otherwise noted, all within-gender comparisons have $p < 0.0001$.

[b]Incidence rate ratios (IRR) for the negative binomial regression model adjusted for age, race, marital status, component type, rank, service branch, multiple deployment, distance to nearest facility, closest VA facility type, and time in VA system since first clinical encounter. Because of missing values for some covariates, the *n* for multivariate analysis in women was 14,962, and the *n* for men was 142,079.

**Within women, $p = 0.0064$.

AUD, alcohol use disorder.

less likely to seek mental health outpatient care than their female counterparts, a greater number of inpatient mental health hospitalizations may be a potential consequence. The rate of mental health inpatient use may be an indicator that helping men overcome barriers to seeking outpatient mental healthcare is an important priority for VA. Another possibility is that women are underusing mental health inpatient care. It is unclear if this is a true gender difference or if there are systemic barriers that prevent women from seeking inpatient care. For example, some VA hospitals may not be as well designed to accommodate female inpatients. There may be other barriers, such as being the primary caretaker for children or parents, that may prevent women from seeking inpatient care.

Veterans with comorbid PTSD and depression had higher rates of all types of health services use, compared to their counterparts with PTSD without depression. For example, women with comorbid PTSD and depression used mental health inpatient care at a rate 12.5 times greater than women with PTSD without depression. When comparing across gender, women with comorbid PTSD and depression also had double the rate of inpatient hospitalizations compared to their male counterparts with comorbid PTSD and depression. It seems that women with PTSD and comorbid depression may be at particularly high risk for mental health inpatient hospitalizations. This is a concern because OEF/OIF female veterans have higher rates of depression than OEF/OIF male veterans seeking VA care.[6] This finding highlights that women with PTSD and comorbid depression are a vulnerable group, suggesting that outpatient treatment targeting these comorbid disorders may be particularly important for women in order to prevent mental health hospitalizations. Understanding why women with PTSD and comorbid depression are hospitalized more frequently is important and should be a focus of future investigations. For example, it could be that women with comorbid PTSD and depression are at particular risk for suicidal ideation and need to be identified early and tracked more carefully. This is particularly important given that recent studies have found that female veterans may be at much higher risk for suicide than their civilian counterparts.[32]

The rates of mental health inpatient hospitalizations for men and women with comorbid PTSD and AUD were more than eight times that of their counterparts with PTSD without comorbid AUD. This suggests that decreasing barriers to outpatient mental health use for those with comorbid PTSD and AUD should be a priority. Finally, those with triple comorbidity had the highest use, compared to the other dually diagnosed groups and may deserve further attention and research.

Our findings should be interpreted in light of several limitations. First, this study was conducted with a population of treatment-seeking veterans who had at least 1 visit to a VA healthcare facility; therefore, our results should not be generalized to all OEF/OIF military personnel or veterans. Second, we selected a population of veterans who served in support of OEF, OIF, or both, and, therefore, these results should not be generalized to veterans of other eras or to veterans from other countries. A strength of the current VA system is that all veterans are systematically screened for mental health diagnoses, and whereas this provides standardization across systems, it may also bring about greater detection, resulting in an ascertainment bias when compared to veterans of other eras who served before universal VA mental health screening.

Third, ICD-9-CM code diagnoses were acquired from administrative health records, were not verified with standardized diagnostic measures, and may have high specificity and low sensitivity. In a prior study, however, we found that the majority of veterans received mental health diagnoses on two or more occasions, and of those veterans who first received a mental health diagnosis in a nonmental health setting, 92% received the same mental health diagnosis in a follow-up mental health specialty clinic visit.[33] Fourth, there may be a number of important unmeasured variables that may account for some of these differences for which we did not have information. For example, we used number of deployments to index combat exposure and did not have detailed information on level of exposure within deployments. Other variables that were not included in our analyses included service-connected disability, traumatic brain injury, and MST. Ways in which these may impact use should be considered in future studies.

Conclusions

Overall, we found that female OEF/OIF veterans with PTSD were more likely to have slightly higher mental health, primary care, and emergency care use compared to men with PTSD, and men were more likely to have higher mental health inpatient use. Women and men with comorbid PTSD and depression and comorbid PTSD and AUD were both significantly more likely to have higher use in all domains, compared to their counterparts with PTSD without these comorbid disorders. Health service use in veterans with PTSD varies a great deal by mental health comorbidities and by gender, and these factors are important to consider as the VA and Department of Defense continue to expand and strengthen programs to evaluate and provide care for men and women who have returned from Iraq and Afghanistan.

Acknowledgments

This research was supported by Department of Defense Concept Award Grant W81XWH-08-2-0077 and VA Health Services Research and Development Career Development Award RCD 06-042.

Disclosure Statement

No competing financial interests exist.

References

1. Manning L. Women in the military: Where they stand. Arlington, VA, Women's Research and Education Institute, 2008.
2. U.S. Department of Defense, Defense Manpower Data Center. Contingency Tracking System Deployment File, data current as of November 30, 2008.
3. Kimerling R, Gima K, Smith MW, et al. The Veterans Health Administration and military sexual trauma. Am J Public Health 2007;97:2160–2166.
4. Litz BT, Orsillo SM, Friedman M, et al. Posttraumatic stress disorder associated with peacekeeping duty in Somalia for U.S. military personnel. Am J Psychiatry 1997;154:178–184.
5. Schlenger WE, Kulka R, Fairbank JA, et al. The prevalence of post-traumatic stress disorder in the Vietnam generation: A multimethod, multisource assessment of psychiatric disorder J Trauma Stress 1992;5:333–363.
6. Maguen S, Ren L, Bosch J, et al. Gender differences in OIF/OEF veterans enrolled in VA healthcare. Am J Public Health 2010;100:2450–2456.
7. Hoge CW, Auchterlonie JL, Milliken CS. Mental health problems, use of mental health services, and attrition from military service after returning from deployment to Iraq or Afghanistan. JAMA 2006;295:1023–1032.
8. Seal KH, Cohen BE, Metzler TJ, et al. Mental health services utilization at VA facilities among Iraq and Afghanistan veterans in the first year of receiving mental health diagnoses. J Trauma Stress 2010;23:5–16.
9. 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.
10. Calhoun PS, Bosworth HB, Grambow SC, et al. Medical service utilization by veterans seeking help for posttraumatic stress disorder. Am J Psychiatry 2002;159:2081–2086.
11. Gebhart RN, Neely FL. Primary care and PTSD. Natl Center for Posttraumatic Stress Disorder Clin Q 1996;6:72–74.
12. Cohen B, Gima K, Bertenthal D, et al. Mental health diagnoses and utilization of VA medical services among returning Iraq and Afghanistan veterans. J Gen Intern Med 2010;25:18–24.
13. Dobie DJ, Maynard C, Kivlahan DR, et al. Posttraumatic stress disorder screening status is associated with increased VA medical and surgical utilization in women. J Gen Intern Med 2006;21(Suppl 3):S58–64.
14. Hoff RA, Rosenheck RA. Utilization of mental health services by women in a male-dominated environment: The VA experience. Psychiatr Serv 1997;48:1408–1414.
15. Hoff RA, Rosenheck RA. The use of VA and non-VA mental health services by female veterans. Med Care 1998;36:1524–1533.
16. Hoff RA, Rosenheck RA. Female veterans' use of Department of Veterans Affairs health care services. Med Care 1998;36:1114–1119.
17. Chatterjee S, Rath ME, Spiro A 3rd, et al. Gender differences in Veterans Health Administration mental health service use: Effects of age and psychiatric diagnosis. Womens Health Issues 2009;19:176–184.

18. Frayne SM, Yu W, Yano EM, et al. Gender and use of care: Planning for tomorrow's Veterans Health Administration. J Womens Health 2007;16:1188–1199.
19. Engel CC Jr., Engel AL, Campbell SJ, et al. Posttraumatic stress disorder symptoms and precombat sexual and physical abuse in Desert Storm Veterans. J Nerv Ment Dis 1993;181:683–688.
20. Willer JK, Grossman LS. Mental health care needs of female veterans. Psychiatr Serv 1995;46:938–940.
21. Suffoletta-Maierle S, Grubaugh AL, Magruder K, et al. Trauma-related mental health needs and service utilization among female Veterans. J Psychiatr Pract 2003;9:367–375.
22. Campbell DG, Felker BL, Liu CF, et al. Prevalence of depression-PTSD comorbidity: Implications for clinical practice guidelines and primary care- based interventions. J Gen Intern Med 2007;22:711–718.
23. Chan D, Cheadle AD, Reiber G, et al. Health care utilization and its costs for depressed veterans with and without comorbid PTSD symptoms. Psychiatr Serv 2009; 60:1612–1617.
24. Foa E, Hembree E, Cahill S, et al. Randomized trial of prolonged exposure for posttraumatic stress disorder with and without cognitive restructuring: Outcome at academic and community clinics. J Consult Clin Psychol 2005;73: 953–964.
25. Monson C, Schnurr P, Resick P, et al. Cognitive processing therapy for veterans with military-related posttraumatic stress disorder. J Consult Clin Psychol 2006;74:898–907.
26. Zinzow HM, Grubaugh AL, Frueh BC, et al. Sexual assault, mental health, and service use among male and female veterans seen in Veterans Affairs primary care clinics: A multi-site study. Psychiatr Res 2008;159:226–236.
27. Lauterbach D, Vora R, Rakow M. The relationship between posttraumatic stress disorder and self-reported health problems. Psychosom Med 2005;67:939–947.
28. Frayne SM, Chiu VY, Iqbal S, et al. Medical care needs of returning veterans with PTSD: Their other burden. J Gen Intern Med 2010;26:33–39.
29. Wolfe J, Schnurr PP, Brown PJ, et al. Posttraumatic stress disorder and war-zone exposure as correlates of perceived health in female Vietnam war veterans. J Consult Clin Psychol 1994;62:1235–1240.
30. Bertakis KD, Azari R, Helms LJ, et al. Gender differences in the utilization of health care services. J Fam Prac 2009;49:147–152.
31. National Center for Health Statistics: National Hospital Ambulatory Medical Care Survey: 2008, Emergency Department Summary Tables. Hyattsville, MD, National Center for Health Statistics, 2008.
32. McFarland BH, Kaplan MS, Huguet N. Datapoints: Self-inflicted deaths among women with U.S. military service: A hidden epidemic? Psychiatr Serv 2010;61:1177.
33. Seal KH, Bertenthal D, Miner CR, et al. Bringing the war back home: Mental health disorders among 103,788 US veterans returning from Iraq and Afghanistan seen at Department of Veterans Affairs facilities. Arch Intern Med 2007;167:476–482.

Address correspondence to:
Shira Maguen, Ph.D.
San Francisco VA Medical Center
4150 Clement Street (116-P)
San Francisco, CA 94121

E-mail: shira.maguen@va.gov