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Exploration of gender differences in how quality of life relates to posttraumatic stress disorder in male and female veterans

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Abstract—Significant gaps exist in our knowledge about gender differences in quality of life among individuals with posttraumatic stress disorder (PTSD). We addressed these gaps by using data from two randomized clinical trials of veterans treated in Department of Veterans Affairs settings: 358 male Vietnam veterans who received group therapy and 203 female veterans who received individual psychotherapy. Using confirmatory factor analysis, we found that a four-factor structure for the Quality of Life Inventory provided the best fit for both groups. Overall quality of life was poor in men and women, and in general, they did not differ in quality of life or in how PTSD was associated with quality of life; the few statistically significant differences were small and clinically insignificant. For both men and women, numbing was uniquely associated with reduced quality of life. We suggest that quality of life should receive increased attention in research and clinical efforts to help veterans with PTSD.

Clinical Trial Registration: Trial registration information for CSP #494: ClinicalTrials.gov; A Randomized Clinical Trial of Cognitive-Behavioral Treatment for Posttraumatic Stress Disorder in Women, NCT00032617; <http://clinicaltrials.gov/ct/show/NCT00032617>. Registration was not required for CSP #420 because it was completed before July 1, 2005.

Key words: functional impairment, gender differences, measurement, posttraumatic stress disorder, PTSD, quality of life, rehabilitation, treatment, VA, veterans.

INTRODUCTION

Individuals with posttraumatic stress disorder (PTSD) have reduced quality of life relative to individuals who have been traumatized but do not have PTSD [1–2] or who have other psychiatric disorders [3]. For example, Magruder et al. found that in Department of Veterans Affairs (VA) patients, higher PTSD symptom severity was associated with lower scores on all subscales of the 36-Item Short Form Health Survey (SF-36®) [4], one of the most widely used measures of health-related quality of life [5]. Furthermore, reductions in PTSD symptoms are associated with improved quality of life [6], and quality of life improves after treatment for PTSD [7–8].

Developing greater understanding of the relationship between PTSD and quality of life is important for addressing the needs of the VA patient population, for

Abbreviations: AIC = Akaike Information Criterion, CAPS = Clinician-Administered PTSD Scale, CFI = Comparative Fit Index, CI = confidence interval, DOD = Department of Defense, DSM-IV® = Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition, PTSD = posttraumatic stress disorder, QOLI = Quality of Life Inventory, RMSEA = root mean square error of approximation, SD = standard deviation, SF-36® = 36-Item Short Form Health Survey, VA = Department of Veterans Affairs.

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which PTSD is a prevalent condition. In fiscal year 2007, ~392,000 (7.7%) of the ~5,100,000 veterans who received VA services had a diagnosis of PTSD.* Understanding whether gender differences exist in the quality of life experienced by veterans with PTSD is also important. Women make up an increasing proportion of VA patients and are expected to constitute 10 percent of that population by 2010 [9]. Female veterans also have a high likelihood of developing PTSD [10–12].

The evidence on gender differences in quality of life in general population samples is mixed. Some evidence suggests that women have lower quality of life [13–14]. Even the norms for the SF-36 differ for men and women—women's scores are lower (i.e., reflect poorer health) than men's [15]. However, differences are often small [14] or are no longer statistically significant when demographic and other factors are statistically controlled [13]. Evidence is also mixed in patient samples. A recent study of VA patients found that women and men were comparable on SF-36 component scales [16]. In contrast, a prospective study of patients who had experienced major physical trauma found that women had poorer quality of life outcomes than men, independent of the effects of injury severity and injury characteristics [17].

Significant gaps exist in our knowledge about gender differences in quality of life and PTSD. Specifically, we do not know conclusively whether men and women with PTSD differ in quality of life or in how their PTSD symptoms relate to quality of life. Magruder et al. reported that gender did not moderate the relationship between PTSD symptom severity and SF-36 subscales [4]. In contrast, the results of analyses of National Vietnam Veterans Readjustment Study data that were based on identical measures suggest that the relationship between PTSD and quality of life might be stronger for men than for women [10]. Among women, the odds ratio for the effect of PTSD diagnosis on poor subjective well-being was 3.7 (95% confidence interval [CI] = 1.7–8.3) in unadjusted analyses and 2.0 (95% CI = 0.8–4.8) in analyses adjusted for demographic factors [18]. Among men, the comparable odds ratios were 6.0 (95% CI = 3.7–9.6) and 3.6 (95% CI 2.0–6.4) [2]. These findings are intriguing, but we must remember that the CIs are overlapping and the investigators did not specifically test whether gender moderated the effect of PTSD on quality of life.

*R. Rosenheck, personal communication, May 6, 2008.

The present study attempted to address the gaps in knowledge about PTSD, quality of life, and gender by using data from two large randomized clinical trials of male and female veterans who were treated in VA settings. In the first study, 360 male Vietnam veterans were randomly assigned to receive 30 weekly sessions of either trauma-focused group therapy or present-centered group therapy followed by five monthly booster sessions [19]. In the second study [20], 284 female veterans were randomly assigned to receive 10 weekly individual sessions of prolonged exposure [21] or present-centered therapy. Given the substantial differences between the studies in treatment duration, we used only the baseline data.

Definitions of quality of life vary and include some combination of objective elements (such as income), functioning, and subjective well-being [22]. However, Mendlowicz and Stein suggest that the general consensus is that a definition should capture the subjective experience of well-being and the multidimensional nature of the construct [23]. To do so, we used the Quality of Life Inventory (QOLI) [24], described by Gladis et al. as "perhaps the 'purest' life satisfaction measure" [22, p. 322]. The QOLI is globally focused, encompassing both the multidimensional and subjective nature of quality of life. Satisfaction and importance are rated for 16 areas of life, including work, relationships, and health. The overall measure is an average of satisfaction weighted by importance for areas rated as important. Although the overall measure assumes a unidimensional structure [25], we found that the four-factor model proposed by O'Cleirigh and Safren [26] provided an even better fit for the items in male veterans [6]. The model's four domains are achievement, self-expression, relationships, and surroundings. Clinically significant change in PTSD symptoms was associated with improvement in all quality-of-life domains. Numbing symptoms were uniquely associated with all domains of quality of life before treatment, but change in each symptom cluster was differentially related to change in each domain.

We had two primary objectives in the present study. Our first was to examine gender differences in quality of life. We addressed this objective by first assessing whether the four-factor model of quality of life derived from male veterans [6] applied to female veterans. Descriptive analyses ("Results" section, p. 387) revealed differences between men and women on a number of demographic variables that were consistent with prior findings on gender differences in VA patients [27] but

that also could be causally related to differences in quality of life, e.g., education, marital status. Thus, our analyses comparing quality of life in men and women were adjusted for demographic covariates. We also present unadjusted analyses to illustrate the differences between male and female VA patients. Our second objective was to examine gender differences in the association between quality of life and PTSD symptom clusters. We used multiple regression to look for gender differences in the unique contribution of each symptom cluster to the prediction of each quality of life domain.

METHODS

Details about the procedures and the results of the original studies have been published elsewhere [19–20]. All participants in these studies gave informed consent prior to participation.

Participants

Male participants were 358 Vietnam veterans who took part in a randomized clinical trial of group psychotherapy for PTSD [19]. Inclusion criteria in the treatment study were current combat-related PTSD according to the "1/2" rule on the Clinician-Administered PTSD Scale (CAPS) [28]; agreement to not receive other psychotherapy for PTSD during study treatment; and, for those on psychoactive medication, a stable regimen for the preceding 2 months. Exclusion criteria were current or lifetime psychotic disorder, mania, or bipolar disorder; current major depression with psychotic features; current substance dependence; prominent current suicidal or homicidal ideation; cognitive impairment; unwillingness to refrain from substance abuse at treatment or work; and severe cardiovascular disorder. Most participants had a current comorbid Axis I disorder (n = 244, 68.2%), typically a mood (n = 205, 57.3%) or anxiety disorder (n = 114, 31.8%).

Previous longitudinal analyses involving this sample excluded veterans who did not participate in follow-up assessments [6,19,29]. Because the current project focused on pretreatment symptoms and quality of life, our sample included most of the participants from the original sample of 360, excluding 2 men who were missing the quality of life measure.

The 203 female participants were selected from a sample of 284 female veterans who took part in a randomized clinical trial of individual PTSD treatment [20]. Inclusion criteria in the treatment study were current PTSD according to the "1/2" rule and minimum severity of ≥45 on the CAPS [28]; ≥3 months since experiencing trauma; a clear memory of the trauma that caused PTSD; agreement to not receive other psychotherapy for PTSD during study treatment; and, for those on psychoactive medication, a stable regimen for the preceding 2 months. Exclusion criteria were current psychotic symptoms, mania, or bipolar disorder; current substance dependence; prominent current suicidal or homicidal ideation; cognitive impairment; current involvement in a violent relationship; and self-mutilation within the past 6 months. Most participants had a current comorbid Axis I disorder (n = 165, 81.3%), which was typically a mood (n = 136, 67.0%) or anxiety disorder (n = 105, 51.7%).

Because the male sample included only Vietnam veterans (age 44–74) and the total female sample included women from all eras (age 22–78), the women were younger than the men, $t(639) = 10.79$, $p < 0.001$. We attempted to minimize this difference by selecting only those women who were ≥40; therefore, both groups ranged from the fourth through the seventh decades of life. The 80 excluded women did not differ significantly from the included women on the PTSD or quality of life measures or the demographic variables presented in **Table 1**. One additional woman was excluded because of missing quality of life data.

For both men and women, the index trauma used to gauge treatment response had occurred many years previously when participants were young adults. Among the men, war-zone exposure in Vietnam was the index event. Although 17 percent of the women (n = 35) had served in a war zone, sexual trauma was the most common index trauma among women (n = 149, 73.4%) followed by physical assault (n = 30, 14.8%) and war-zone exposure (n = 9, 4.4%). The age of male participants upon entry to Vietnam was not available, but the majority of Vietnam veterans were in their late teens or early twenties when they served in Vietnam [10]. The index event occurred when the women were a mean ± standard deviation (SD) 21.9 ± 10.9 years of age, approximately 27.3 ± 12.9 years before the study (mean ± SD).

Measures

Quality of Life

Quality of life was assessed with the QOLI [24]. Sixteen areas of life are rated in terms of importance (0 =

Table 1.
Demographic characteristics and posttraumatic stress disorder (PTSD) symptom severity in male and female veterans. PTSD symptom severity was measured with Clinician-Administered PTSD Scale.

Variable	Women (n = 203)	Men (n = 358)	χ^2 or t
Age, yr (mean ± SD)	49.22 ± 6.67	50.61 ± 3.62	–3.20*
White, *n* (%)	111 (54.7)	238 (66.5)	7.67*
Unemployed, *n* (%)	74 (36.5)	186 (52.0)	12.52†
Post-High School Education, *n* (%)	180 (88.7)	240 (67.0)	32.21†
Married/Cohabitating, *n* (%)	62 (30.5)	183 (51.1)	22.29†
VA PTSD Disability, *n* (%)	36 (17.7)	217 (60.6)	96.20†
Total PTSD Severity (mean ± SD)	77.86 ± 16.23	81.30 ± 18.37	–2.22‡
Reexperiencing	21.18 ± 7.18	22.18 ± 7.10	–1.60
Avoidance	10.86 ± 3.32	10.51 ± 3.74	1.13
Numbing	20.80 ± 6.79	22.79 ± 7.51	–3.12*
Hyperarousal	25.02 ± 5.96	25.83 ± 6.14	–1.51

*$p < 0.01$.
†$p < 0.001$.
‡$p < 0.05$.
SD = standard deviation, VA = Department of Veterans Affairs.

not important to 2 = extremely important) and satisfaction (–3 = very dissatisfied to +3 = very satisfied). Importance ratings are multiplied by satisfaction ratings to compute a weighted satisfaction score for each item.

PTSD Symptoms

PTSD symptoms were measured with the CAPS [28], a structured interview in which the frequency and intensity of each of the 17 Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition (DSM-IV®) PTSD symptoms are rated on a five-point scale [30]. Interrater reliability was high in both of the original studies [19–20]. Severity scores were calculated for four PTSD symptom clusters. Reexperiencing (cluster B) and hyperarousal (cluster D) symptom clusters were defined according to DSM-IV. Separate avoidance and numbing subscales were created for the C cluster, based on evidence that avoidance and numbing form separate clusters [31].

Data Analysis

We used Amos, version 5.0 (SPSS, Inc; Chicago, Illinois) [32], to compare the fit of a unidimensional and a multidimensional model for the QOLI [24–25]. For the unidimensional model, all 16 items loaded on a single factor. For the multidimensional model [6,26], factors were allowed to correlate with each other and each item loaded on only one factor. Correlations between errors were set to 0. In order to establish scale, we set factor variances to 1. We evaluated model fit using the Comparative Fit Index (CFI) [33], the Akaike Information Criterion (AIC) [34], and the root mean square error of approximation (RMSEA) [35]. We performed chi-square difference tests to compare the relative fit of the two models. Conventional cutoffs for the RMSEA are 0.08 to 0.06 for acceptable fit and <0.06 for close fit; for the CFI, conventional cutoffs are 0.90 to 0.95 for acceptable fit and ≥0.95 for close fit [36–37]. The AIC can be interpreted as a measure of relative fit, with smaller values indicating better fit. We tested equality of the factor loadings across men and women by comparing the fit of the model with factor loadings constrained to be equal for men and women to the model where factor loadings were allowed to be freely estimated for men and women.

We used analysis of variance to examine gender differences on the QOLI domains, including tests for individual items. As noted previously, these analyses were adjusted for demographic covariates, although unadjusted analyses are presented to illustrate differences between VA patients.

We then used a two-step process to examine the association of PTSD symptoms with quality of life. First, we conducted multiple regression analyses separately for men and women, controlling for the demographic variables in **Table 1**. We began by regressing each QOLI domain on each of the four PTSD symptom clusters separately. Then, because the symptom clusters were correlated, we

examined the unique effects of the PTSD symptoms clusters by regressing each QOLI domain on the four clusters simultaneously. Second, in order to specifically test whether the relationship between symptoms and quality of life differed between men and women, we tested for interactions between gender and PTSD symptom clusters in the prediction of QOLI domains, again controlling for demographic variables. As in the gender-stratified analyses, we tested for interactions between gender and each cluster separately for each QOLI domain and then tested all clusters and cluster × gender interactions simultaneously, using forward selection (at $p < 0.05$) to include only significant interactions.

RESULTS

Table 1 presents the demographic characteristics of the male and female participants. Even after truncating the female sample at age 40, women were slightly younger on average than men. Men were more likely than women to be white, unemployed, married or cohabitating, and have a VA PTSD disability and less likely to have more than a high school education. Both men and women had high average PTSD symptom scores according to the CAPS [28], on which 60 to 80 is considered "severe" and ≥80 is "very severe."

Gender Differences in Structure of Quality of Life

For the men, the unidimensional model for the QOLI failed to meet conventional fit criteria (CFI = 0.794, AIC = 571.48, and RMSEA = 0.100 [90% CI = 0.091–0.109]). A significant improvement was noted in model fit for the four-factor model ($\Delta\chi^2$ [$df = 6$] = 262.84, $p < 0.001$). Fit indices for the multidimensional model were between acceptable and close (CFI = 0.936, AIC = 320.64, and RMSEA = 0.057 [90% CI = 0.047–0.068]). Similarly, for the women, the unidimensional model for the QOLI failed to meet conventional fit criteria (CFI = 0.778, AIC = 376.29, and RMSEA = 0.092 [90% CI = 0.079–0.105]) and model fit was significantly better for the four-factor model ($\Delta\chi^2$ [$df = 6$] = 109.84, $p < 0.001$). Fit indices for the multidimensional model were between acceptable and close (CFI = 0.909, AIC = 278.45, and RMSEA = 0.060 [90% CI = 0.045–0.075]).

We also found support for the equivalence of factor loadings across men and women. Fit of the model where factor loadings for men and women were constrained to be equal (CFI = 0.925, AIC = 590.72, and RMSEA = 0.041 [90% CI = 0.035–0.046]) was very similar to the model where factor loadings were freely estimated (CFI = 0.927, AIC = 599.16, and RMSEA = 0.041 [90% CI = 0.035–0.047]). Model fit was not significantly improved by allowing the factor loadings to be freely estimated for men and women ($\Delta\chi^2$ [$df = 16$] = 23.56, $p = 0.10$).

Gender Differences in Quality of Life

Given the support for the four-factor model of quality of life, we calculated scores for each of the QOLI domains by averaging the weighted satisfaction scores for the items in each domain. Alphas for the domain scores were as follows: achievement = 0.71, self-expression = 0.74, relationships = 0.69, and surroundings = 0.75, and were highly similar for men and women. Correlations among the scales are presented in the **Figure** for men and women separately.

Table 2 presents the domain scores for each group, along with the item and total scores to facilitate understanding of the domains. The left side of the table shows the unadjusted scores. Men and women differed only on the self-expression domain, with women reporting higher quality of life than men, $F(1, 559) = 5.04$, $p < 0.05$. With respect to the individual items, women reported higher quality of life than men for goals and values, work, learning, creativity, and friends and lower quality of life for

	Achievement	Self-Expression	Relationships	Surroundings
Achievement	1.00	0.63	0.52	0.41
Self-Expression	0.63	1.00	0.53	0.35
Relationships	0.55	0.58	1.00	0.44
Surroundings	0.33	0.37	0.49	1.00

Figure.
Correlations among quality of life domain scores as function of gender. Correlations appear in shaded cells for women ($n = 203$) and nonshaded cells for men ($n = 358$). All correlations are statistically significant at $p < 0.001$, two-tailed.

Table 2.
Quality of Life Inventory (QOLI) domains and items in male (n = 358) and female (n = 203) veterans with posttraumatic stress disorder (PTSD). Adjusted analyses control for age, education, race, martial status, employment status, and PTSD service-connected disability.

Domain/Item	Unadjusted				Adjusted			
	Women Mean ± SD	Men Mean ± SD	F^*	η^2	Women Mean ± SE	Men Mean ± SE	$F^\dagger$	η^2
Achievement	–0.77 ± 2.19	–0.97 ± 2.22	1.09	0.002	–0.79 ± 0.17	–0.96 ± 0.12	0.58	0.001
Health	–1.89 ± 3.57	–1.31 ± 3.59	3.42	0.006	–2.11 ± 0.28	–1.19 ± 0.20	6.37‡	0.011
Self-Esteem	–1.07 ± 3.62	–0.84 ± 3.40	0.60	0.001	–1.09 ± 0.27	–0.83 ± 0.19	0.53	0.0009
Goals & Values	0.35 ± 3.57	–0.66 ± 3.19	12.05§	0.021	0.30 ± 0.26	–0.63 ± 0.19	7.64¶	0.013
Money	–1.07 ± 2.65	–1.02 ± 2.58	0.06	0.0001	–0.88 ± 0.20	–1.13 ± 0.14	0.94	0.002
Work	–0.16 ± 3.32	–1.03 ± 2.89	10.49¶	0.018	–0.19 ± 0.23	–1.01 ± 0.16	7.54¶	0.012
Self-Expression	–0.09 ± 2.58	–0.57 ± 2.29	5.32‡	0.009	–0.16 ± 0.19	–0.54 ± 0.13	2.38	0.004
Play	–0.89 ± 2.99	–0.88 ± 2.63	0.00	0.000	–0.87 ± 0.22	–0.89 ± 0.16	0.007	0.00001
Learning	0.42 ± 3.41	–0.46 ± 3.07	9.79¶	0.017	0.38 ± 0.25	–0.43 ± 0.18	5.97‡	0.011
Creativity	0.19 ± 3.21	–0.38 ± 2.69	5.04‡	0.009	0.02 ± 0.22	–0.29 ± 0.16	1.05	0.002
Relationships	0.45 ± 2.12	0.31 ± 2.21	0.50	0.0009	0.53 ± 0.17	0.27 ± 0.12	1.49	0.003
Helping	0.77 ± 3.22	0.33 ± 2.92	2.74	0.005	0.64 ± 0.23	0.41 ± 0.17	0.56	0.001
Love	–0.56 ± 4.01	–0.26 ± 3.82	0.80	0.001	–0.26 ± 0.29	–0.43 ± 0.21	0.19	0.0003
Friends	0.66 ± 3.16	–0.05 ± 2.70	7.78¶	0.014	0.66 ± 0.22	–0.05 ± 0.16	5.84‡	0.010
Children	1.05 ± 3.60	1.01 ± 3.59	0.01	0.00002	1.17 ± 0.28	0.95 ± 0.20	0.37	0.0006
Relatives	0.32 ± 2.92	0.52 ± 2.77	0.69	0.001	0.45 ± 0.22	0.45 ± 0.16	0.00	0.00
Surroundings	0.74 ± 2.55	0.80 ± 2.39	0.08	0.0001	0.87 ± 0.19	0.72 ± 0.14	0.39	0.0007
Home	0.41 ± 3.65	1.05 ± 3.40	4.36‡	0.008	0.61 ± 0.27	0.93 ± 0.19	0.82	0.001
Neighborhood	1.02 ± 2.90	0.90 ± 2.84	0.22	0.0004	1.11 ± 0.22	0.85 ± 0.16	0.77	0.001
Community	0.78 ± 2.64	0.44 ± 2.50	2.34	0.004	0.90 ± 0.20	0.37 ± 0.14	4.16‡	0.007
QOLI Total	0.02 ± 2.00	–0.22 ± 2.03	1.73	0.003	0.07 ± 0.15	–0.25 ± 0.11	2.60	0.004

*df = 1, 559.
†df = 1, 553.
‡$p < 0.05$.
§$p < 0.001$.
¶$p < 0.01$.
SD = standard deviation, SE = standard error.

the home item. Effect sizes (η^2) for significant effects were small. Men and women did not differ in overall quality of life.

The right half of **Table 2** contains adjusted mean and standard error values from the analyses of covariance that compared average scores for men and women, which were adjusted for age, race (white/nonwhite), unemployment, post-high school education, marital status, and VA PTSD disability status. None of the QOLI domains differed between men and women when these demographic factors were taken into account. Turning to the individual QOLI items, women reported higher quality of life for goals and values, work, learning, friends, and community and lower quality of life for health. Effect sizes for significant effects were small. As in the unadjusted analyses, men and women did not differ in overall quality of life.

Gender Differences in the Association Between PTSD Symptom Clusters and Quality of Life Domains

Table 3 shows the association between each PTSD symptom cluster and each QOLI domain separately for women and men. The top half of the table contains partial correlations between each QOLI domain and each PTSD symptom cluster separately, controlling for covariates but not for other clusters, to facilitate understanding of the analyses when all clusters were included as predictors. Reexperiencing was associated with achievement in both men and women, with self-expression in men only, and with surroundings in women only. Numbing was associated with all domains in both men and women. Avoidance was not associated with any domain in women but was associated with self-expression and relationships in men. Hyperarousal was associated with relationships in

Table 3.
Multiple regression analyses to predict quality of life domains from posttraumatic stress disorder (PTSD) symptom clusters in male and female veterans. Adjusted analyses control for age, education, race, martial status, employment status, and PTSD service-connected disability. Separate analyses show partial correlations between each Quality of Life Inventory (QOLI) domain and each PTSD symptom cluster individually, controlling for covariates. Simultaneous analyses show partial correlations from multiple regressions of each QOLI domain on all four symptom clusters simultaneously, controlling for covariates.

Domain	Women (n = 203)				Men (n = 358)			
	Reexperiencing	Avoidance	Numbing	Hyperarousal	Reexperiencing	Avoidance	Numbing	Hyperarousal
Separate								
Achievement	–0.15*	–0.02	–0.27†	–0.12	–0.18†	–0.10	–0.29†	–0.23†
Self-Expression	–0.08	–0.03	–0.31†	–0.11	–0.18†	–0.13*	–0.30†	–0.20†
Relationships	–0.09	–0.02	–0.26†	–0.16*	–0.09	–0.11*	–0.30†	–0.19†
Surroundings	–0.15*	–0.03	–0.14*	–0.12	0.02	–0.04	–0.23†	–0.10
Simultaneous								
Achievement	–0.08	0.05	–0.24†	–0.02	–0.05	–0.002	–0.21†	–0.07
Self-Expression	–0.004	0.04	–0.29†	–0.02	–0.06	–0.04	–0.23†	–0.02
Relationships	–0.002	0.06	–0.23†	–0.09	0.05	–0.04	–0.24†	–0.06
Surroundings	–0.09	0.03	–0.10	–0.04	0.11	–0.007	–0.21†	–0.04

*$p < 0.05$.
†$p < 0.001$.

both men and women and also with achievement and self-expression in men. (Note that the results for men differ somewhat from those previously reported by Lunney and Schnurr because of differences in sample size and inclusion of demographic covariates [6].)

The bottom half of **Table 3** presents the results of analyses in which we regressed each QOLI domain on all four PTSD symptom clusters simultaneously, controlling for covariates, in order to examine the unique effect of each symptom cluster on each domain. Numbing was the only symptom cluster with a unique effect on quality of life. For women, greater severity of numbing was associated with poorer quality of life in all domains except surroundings; for men, numbing severity was associated with poorer quality of life in all domains. The R^2 values for the models in men and women, respectively, were achievement = 0.18/0.14, self-expression = 0.14/0.12, relationships = 0.18/0.13, and surroundings = 0.11/0.07, all significant at $p < 0.01$ or less (except for surroundings for the women).

With these analyses as a background, we then specifically examined whether gender moderates the association between PTSD symptoms and quality of life. We combined the data for women and men and included gender × cluster interactions in both the separate and simultaneous analyses. Little evidence was found that men and women differed in how their PTSD symptoms were associated with quality of life, except for small differences in the way the reexperiencing cluster was related to surroundings. A gender × reexperiencing interaction was found in both the separate and simultaneous analyses, $b = 0.06$, $t(551) = 1.97$ and $b = 0.07$, $t(548) = 2.38$, respectively ($p < 0.05$). However, examination of conditional effects indicated that the slopes for men and women were close to zero and differed only slightly. In the separate analysis, $b = –0.05$ in women ($p < 0.05$) versus $b = 0.01$ in men ($p = 0.76$). In the simultaneous analysis, $b = –0.03$ in women ($p = 0.21$) versus $b = 0.04$ in men ($p = 0.06$).

DISCUSSION

This study is one of very few to explore gender differences in quality of life among patients with PTSD. In general, men and women were more similar than different. First of all, the structure of quality of life was comparable for men and women. Second, men and women reported similar quality of life across domains. Although women reported better quality than men on several single items (except health), the effects were small. And third, men and women did not differ in the association between PTSD and quality of life, except for minor differences in how reexperiencing symptoms were related to quality of life in the surroundings domain (home, neighborhood, and community). For surroundings, reexperiencing symptoms were related to poorer quality of life among women but

not men and only in results from analyses that did not control for associations between the PTSD symptom clusters.

This study extends previous findings that indicate that quality of life is a multidimensional construct [6,26,38–39]. Although instruments such as the QOLI assume a unidimensional structure and have good psychometric properties when their items are combined into a single score, in many circumstances using a multidimensional measure instead may be important, e.g., when treating patients who have particular deficits in one domain in order to specifically track change in that domain. A parallel situation arises in the measurement of functioning. One might, for example, use the SF-36 subscales or the SF-36 mental and physical component scores [15]; alternatively, one might use a single measure such as the Global Assessment of Functioning Scale [30]. Patients in PTSD treatment studies show improved psychosocial functioning, but not physical functioning, following treatment [7]—a finding that might not be captured with a single measure of functioning.

According to unadjusted analyses, women had higher quality of life in the domain of self-expression. No differences were noted in quality of life domains between men and women when we adjusted for the covariates on which they differed. Although our focus was on these domains, we also examined individual items and found some evidence of differences. Except for physical health, women reported better quality of life, a pattern that was diminished but remained even in adjusted analyses. The differences were small, however, with η^2 values for statistically significant differences around 0.01. These findings are similar to those reported by Frayne et al. for a large national sample of VA enrollees, in which the gender differences in SF-36 scores were generally statistically, but not clinically, significant for veterans up to age 64 [16]. A study by Skinner et al., at a single tertiary care facility, also compared the SF-36 scores of male and female VA patients using both adjusted and unadjusted analyses and found that women reported better physical health, although the differences were small [27]. Women reported poorer mental health, and the effects were larger; again, adjustment attenuated but did not eliminate these differences. Our study may be more comparable to Frayne et al.'s in terms of having a broader (i.e., multisite) sample, so one reason we found fewer gender differences may be the higher statistical power in their study, which included more than 28,000 women and 650,000 men [16]. In addition, perhaps the burden of PTSD attenuates any gender differences that might exist. Regardless of the reason, our data are generally consistent with the findings of these prior studies in showing that male and female veterans have similar, and similarly poor, quality of life. Both men and women reported scores that indicate poor quality of life relative to norms [24]. In the QOLI manual, overall QOLI scores of 1.6 to 3.5 are classified as "average," 0.9 to 1.5 as "low," and <0.8 as "very low." In contrast, the average scores for men and women in our study were far below these values—close to zero and even negative (for men in adjusted analyses).

The relationship between symptoms and quality of life was also similar for men and women, especially in simultaneous analyses that examined unique effects. As in our prior analyses of men, numbing was the only PTSD symptom cluster uniquely associated with poorer quality of life [6]. No obvious explanation was found for why no unique association existed between numbing and surroundings for women. However, the overall pattern of findings for men and women underscores the need to better understand why numbing has such effects. Kuhn et al. proposed that emotional numbing plays an important role in psychosocial functioning but found that other symptom clusters also had unique relationships with different aspects of functioning as well [40]. One possibility is the QOLI itself, which strongly reflects life satisfaction [22]. It is not difficult to imagine how numbing—i.e., being unable to have loving feelings or feeling less interest in formerly pleasurable activities—could have the most pervasive (and pernicious) effects on one's satisfaction with life. Regardless of the reason, these findings suggest important clinical implications. If we are to improve quality of life in veterans with PTSD, the reduction of numbing may require particular attention as a treatment goal.

Men and women differed on all demographic variables, including objective indicators that could affect quality of life, such as the likelihood of receiving disability compensation from the VA. The differences reflect differences between male and female VA patients, e.g., women tend to be younger, better educated, and less likely to be married than men [27]. Analyses of data on VA compensation claims during the period in which participants were enrolled in the original trials found that women were less likely than men to receive an award [41], primarily because of a bias for awarding claims for combat trauma, which is less likely in women [42]. Because of these differences between the male and female samples, we presented analyses both unadjusted

and adjusted for demographic covariates. The adjusted analyses provide information about gender differences more broadly, whereas the unadjusted analyses provide information about gender differences in VA healthcare users. Also, the adjusted analyses are consistent with prior studies on gender differences in quality of life in civilian samples; differences tend to be small or no longer significant when demographic and other variables are statistically controlled [13–14]. As indicated previously, the unadjusted analyses are consistent with the results of prior studies of VA samples.

Although the differences between male and female samples should be considered when interpreting our results, cautious generalization is possible. However, because our sample consisted of veterans who sought VA treatment for PTSD, the results may not generalize to all men and women or even all veterans with PTSD. Gender differences at the population level may be present, even if no differences were found in this select subgroup of veterans with PTSD who use VA healthcare. Nevertheless, these data are useful for understanding VA patients.

Several additional limitations bear on the interpretation of our findings. First and foremost, our analyses are based on correlational data that do not permit strong inferences about the directionality of the relationship between PTSD and quality of life, which is bound to be bidirectional. Second, we did not have information about current stressors and social support, variables that could have had an important impact on quality of life. Third, we also were unable to explore how differences in social roles and social status between men and women may have influenced our findings. Social variables are important for understanding gender differences in health [43]. And last, the results are based on a single measure of quality of life. Although the findings are generally comparable to findings based on the SF-36 [4,16], more pronounced gender differences may be present in other aspects of quality of life that we did not assess.

CONCLUSIONS

We know that quality of life is reduced in PTSD [1–3] and that PTSD symptom change is related to change in quality of life [6]. We also know that successfully treating PTSD can improve quality of life [7–8]. We do not know whether treatment results in enough improvement or how to ensure that it does. We know little about how modifiable factors such as social support or job skills could be mobilized in patients with PTSD to enhance the results of treatment. We know even less about how to prevent long-term impairments in quality of life in newly traumatized veterans returning from Iraq and other recent deployments. The human costs of these gaps in our knowledge are real, but financial costs are present as well. PTSD disability claims among veterans have been increasing, and these veterans with PTSD make up a disproportionate number of claimants who are 100 percent disabled [44].

Thus, quality of life should receive increased attention in our research and clinical efforts to help veterans with PTSD. These efforts should include further investigation of gender differences. Although we found that men and women were similar in quality of life and in how PTSD symptoms relate to quality of life, the topic has been understudied. Risk and protective factors may operate differently in men and women. For example, Frayne and colleagues found that among VA patients under age 65, social support had greater positive benefits on quality of life in men than in women [16].

Developing increased understanding of the physical and mental health status of VA patients is important. Both men and women who use the VA have poorer health relative to men and women in the general population [16,45]. However, focusing on symptoms in the treatment of any disorder reflects a narrow view of health and disease [22]. Quality of life is an integral component of overall health. Wilson and Cleary have proposed a multidimensional conceptualization of health that includes objective and subjective components along a continuum of increasing complexity [46]. At the most basic level are biological and physiological variables—indicators of the narrow view of health—then symptoms, functional status, health perceptions, and finally, quality of life. From our perspective, which is rooted in Wilson and Cleary's model, symptoms and quality of life are separate but related constructs. Symptoms, because they are part of the health continuum, contribute to quality of life by influencing functional status and health perceptions. Symptoms certainly can and do affect the expression of disease state on functioning, health perceptions, and quality of life, but this is to be expected. In the ideal case, health would be assessed by multiple measures that reflect its constituent constructs and quality of life would be reflected in measures that include both objective and subjective indicators [22].

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