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Civic Service as an Intervention to Promote Psychosocial Health and Implications for Mental Health in Post-9/11/01 Era Women Veterans

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Abstract

Background: Women veterans experience significant morbidity with poorer health and mental health outcomes relative to nonveteran counterparts. Little is known about how to best promote health and well-being among reintegrating female veterans. Civic service has been shown to improve mental health in civilians, but its impact on female veterans is unknown. This study characterizes the physical and mental health and psychosocial functioning of female veterans and evaluates changes in these domains following completion of an intensive civic service program.

Materials and Methods: Data were obtained from an observational, pre-post cohort study of post-9/11/01 era veterans who completed a 6-month, 20-hour per week civic service program. Of the 346 participants, 107 were women. Participants completed online pre- and post-program surveys. Nine measures of health, mental health, and psychosocial functioning were analyzed.

Results: Before starting the program, 47% of women screened positive for a probable diagnosis of post-traumatic stress disorder (PTSD), 24% for depression, and 51% reported seeking assistance for mental health problems. Pre-post change scores indicated significant improvements on nine measures of health, mental health, and psychosocial functioning ($p < 0.05$). Perceived self-efficacy change scores predicted PTSD change scores, $F(1, 93) = 8.00$, $p < 0.05$. Seeking professional assistance for mental health problems and social isolation and loneliness change scores predicted depression change scores, $F(2, 95) = 15.618$, $p < 0.05$, explaining 23% of the variance.

Conclusions: Civic service has the potential to promote and support the maintenance of psychosocial well-being for returning post-9/11/01 era women veterans with symptoms of PTSD or depression.

Keywords: women's health, veterans, psychosocial support systems, mental health, PTSD, depressive symptoms

Introduction

The role of women in the U.S. military has changed dramatically over the past several decades. All combat jobs are now open to women, and at over 2 million, female veterans comprise the most rapidly growing cohort of veterans.[1] Research shows that veterans from Iraq and Afghanistan (also called post-9/11/01 era veterans) experience significant morbidity.[2] Indeed, women veterans have poorer health outcomes than their nonveteran counterparts, including more limited activities, more psychological distress, poorer overall health, and are at an increased risk for chronic health and mental health conditions.[3]

Among the most common veteran conditions, rates of major depressive disorder are 30% in female veterans compared with 6.9% in nonveterans,[2] ~20% of women veterans experience symptoms of post-traumatic stress disorder (PTSD) compared with 5.2% of nonveteran women,[4,5] and female veterans have a 2.5-fold higher risk of traumatic brain injury (TBI) than their nonveteran counterparts.[6] Finally, the

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age-adjusted suicide rate is two-fold higher in veteran women compared with nonveteran women.[7]

Depression is a particularly salient health risk factor in female veterans as it is associated with several long-term comorbid health conditions.[8] Recent findings show, for example, that in female veteran VA health care users older than 45 years, those with depression were 60% more likely to be diagnosed with coronary artery disease.[9] In addition, depression in female veterans was associated with increased hazards of mortality including respiratory disease, accidents, Alzheimer's disease, and suicide.[10] Given these disparities between female veterans and civilians, there is a need for the development and tailoring of services that can support and promote health in this particular subpopulation of women.

While the majority of veterans do well with reintegration into civilian life following deployment, disability, retirement, or military service completion, some veterans experience concerns related to transitions in personal, family, community, and/or workplace domains of functioning.[11] Notably, reintegration difficulties with redevelopment of identity,[12,13] self-care, health, mental health, and/or social interaction[11,14–16] may be compounded by the exacerbation of deployment-related or prior health or mental health conditions. Such reintegration difficulties can persist over time if left unaddressed,[15] potentially negatively impacting long-term health and psychosocial outcomes.

Female veterans may also face unique gender-related challenges when reintegrating into civilian life. Research reveals gender-specific reintegration difficulties related to readjustment of personal and family roles[13,17–19] as well as work experiences.[20] For example, in female veterans, depression was an important predictor of family functioning and satisfaction.[20] Overall, the extant literature suggests that female veterans have higher rates of physical and mental health issues compared with their nonveteran counterparts and may experience certain aspects of the reintegration process differently than male veterans.

In the current study, to account for physical, mental, and psychosocial aspects of overall health and well-being in veterans, the diathesis–stress model[21] was used to provide theoretical grounding for the selection of measures. According to this model, psychosocial resources such as social support can act as a protective factor, buffering the negative effects of physical or mental health symptoms.

Several psychosocial constructs have been associated with mental health conditions and psychiatric risk/protective factors pertinent to veterans, although in samples varying in terms of sex, age, and veteran status. For example, the construct of social isolation and loneliness is positively associated with a higher risk of physical health conditions[22,23] and mortality[24] in the general population and has been associated with depressive symptoms in mid-age and older women.[25] The construct of social support is negatively correlated with depression in male post-9/11 veterans.[26] Finally, in studies composed of mostly male veterans, improvement in self-efficacy has been associated with decreased PTSD symptoms.[27,28] Thus, findings in the extant literature, composed of male and mixed-gender samples of civilians and veterans, have established associations between these psychosocial factors and mental health outcomes, in congruence with the diathesis–stress model.

To delve deeper into the current state of knowledge on women veterans' health, a research synthesis from a gender-specific perspective is necessary. One such review illuminates several gaps in female veteran health and service provision, including mental health problems most commonly seen in primary care such as depression and anxiety, prevention of chronic conditions, engagement of women veterans into care, and issues a call for reporting of female-specific outcomes.[29] For example, while mental health is a highly researched topic within female veteran-focused research, studies of depression and depression-related comorbidities are sparse. However, depression is the most commonly diagnosed mental health condition in female veterans. Findings indicate that innovative models for health promotion, chronic disease prevention, and proactive engagement strategies specifically targeting female veterans are greatly needed.

As one novel approach that builds upon the call to serve in the military, civic service has the potential to mitigate some of these adverse outcomes by promoting positive health, mental health, and psychosocial functioning in women veterans. In contrast to less structured, occasional volunteering, civic service is a structured, high-frequency intensive form of volunteering, typically administered within a formal program.[30,31] As such, it requires greater intensity, duration, frequency, and accountability in the volunteer role and achievement of specific service-related goals for the volunteer, the organization, and the broader community.[32]

To the best of our knowledge, there is little research on the impact of civic service on physical and psychosocial health within the general population, and lesser still, among veterans. Yet, the health, well-being, and civic engagement effects of participating in these programs have been studied among civilians (*e.g.*, AmeriCorps[33,34]) and retired older adults (*e.g.*, AARP Foundation Experience Corps[35]). Systematic and meta-analytic reviews on the impact of volunteering in older adults report clear associations between volunteering frequency and decreased depressive symptoms, improved life satisfaction, increased well-being, reduced functional impairment, and reduced mortality, with less clear associations noted regarding physical health outcomes.[36,37] However, a major limitation is that the majority of the included studies are not designed to assess veteran-specific outcomes. For example, the programs enroll civilian young adults younger than 18 years, too young to be of military or veteran status. Alternatively, many of the studies enroll older adults; however, veteran status is rarely recorded and is not an eligibility requirement. Furthermore, gender-specific analysis on volunteering outcomes is very uncommon, with only one study reporting that volunteering improved mood in civilian women but not in men.[38] Therefore, with the demographics of these samples being very heterogeneous, bifurcated by age, and lacking assessments of subgroup statuses (*e.g.*, women or veterans), there remains a gap in knowledge of who specifically benefits from civic service with respect to established health and wellness outcomes.

Previously, we examined the biopsychosocial impact of civic service in a mixed-gender, predominantly male sample of reintegrating post-9/11/01 era veterans.[32,39] We found that completion of a community-based civic service program resulted in numerous health and mental health improvements. Most notably, depression screening scores significantly improved[32]; furthermore, most of the psychosocial improvements extended to the subgroup of veterans who reported a

history of TBI.[39] While veteran-specific studies on the effects of civic service are rare, female veteran-specific outcomes of civic service have been nonexistent to our knowledge. Therefore, the current study concentrates specifically on the female veteran civic service outcomes. Using data previously collected on this veteran cohort, the aims of the current study were to: (1) evaluate changes in female veterans across nine measures of physical, mental, and psychosocial health following completion of an intensive civic service program and (2) determine whether pre-post program changes in psychosocial health predict changes in mental health symptoms. Based on findings from the body of volunteering literature, which has studied mixed-gender nonveteran cohorts, we hypothesized that female veterans who completed the civic service program would show (1) an improvement in perceived overall health from pre to post,[37] (2) a decrease in depressive symptoms,[33,36,37] (3) an increase in perceived self-efficacy,[33,36,37] (4) an increase in perceived social support,[37] (5) no change in loneliness,[36,40] and (6) no change in purpose in life (PIL).[36,41,42] We did not generate hypotheses related to PTSD or perceived physical and emotional health interference, as these have not been investigated previously in studies of civic service, in either civilians or veterans, to our knowledge. Regarding the second aim, grounded in a diathesis–stress framework, we hypothesized that improvements in psychosocial functioning would predict improvements in mental health.

Materials and Methods

Sample

We conducted a national observational pre-post cohort study of post-9/11/01 era veterans who had served at least 2 years in the U.S. military and subsequently completed a formal civic service program.[32,43] During the 6-month, structured stipend-supported program, participants engaged in leadership and goal-setting activities while volunteering at a community-based nonprofit organization of their choice for 20 hours per week. During the study period, February 2011 to March 2014, 580 veterans completed the program for a 78% completion rate and 346 responding to both pre- and post-surveys (60% response rate). We report on psychosocial outcomes of the female subgroup ($n = 107$) from the parent study ($N = 346$).[32] In this female sample, the number of deployments since September 11, 2001, ranged from none to two (mean number of deployments = 1.3). Demographic and military characteristics are shown in Table 1. The Saint Louis University Institutional Review Board approved the study.

Table 1. Demographic and Military Characteristics of Female Post-9/11/01 Era Veterans Who Completed the Mission Continues Fellowship Program, A Civic Service Program

Characteristic	*Female (*N = *107),* n *(%)*
Age, years	
22–25	7 (6.5)
26–30	37 (34.6)
31–35	30 (28.0)
36–40	16 (15.0)
41–45	9 (8.4)
46–50	7 (6.5)
51–55	1 (0.9)
Race[a]	
White/Caucasian	48 (45.7)
Black/African American	40 (38.1)
Asian/Pacific Islander	4 (3.8)
Native American/Alaskan Native	2 (1.9)
Multiracial/Biracial	7 (6.7)
Other race	4 (3.8)
Ethnicity (Hispanic/Latino)[a]	15 (14.3)
Marital status	
Married	40 (37.4)
Divorced	25 (23.4)
Single, never married	40 (37.4)
Widowed	2 (1.9)
Parent of child/children	58 (54.2)
Education[b]	
High school or GED	13 (12.3)
Trade/technical or associates after high school	31 (29.2)
Undergraduate degree	37 (34.9)
Graduate degree	25 (23.5)
Branch of service/component*	
Air Force	15 (14.0)
Army	59 (55.1)
Marines	10 (9.3)
Navy	24 (22.4)
Active duty	1 (0.9)
Coast Guard	1 (0.9)
National Guard/Reserves	40 (37.4)
Treatment and probable/reported diagnoses	
Mental health treatment history[a]	53 (50.5)
Positive PC-PTSD screening[c]	49 (47.1)
Positive PHQ-2 depression screening[a]	25 (23.8)
History of TBI[a]	7 (10.6)

All demographic and mental health characteristics are those reported at pre-intervention.
*Categories are not mutually exclusive.
[a]$n = 105$.
[b]$n = 106$.
[c]$n = 104$.
PC-PTSD, Primary Care Post-Traumatic Stress Disorder; PHQ-2, Patient Health Questionnaire-2; TBI, traumatic brain injury.

Data collection and measures

Detailed data collection procedures and measurement instruments for the parent study have been described previously.[32,43] Briefly, the current study focused on health, mental health, and psychosocial outcomes in female veterans before entering, and after completing, the Mission Continues Fellowship Program. In collaboration with staff, standardized measures were chosen, a longitudinal evaluation plan was developed, and the web-based survey was pilot tested. Adults with prior service in the U.S. military during the post-9/11/01 era competitively applied for enrollment in the program; agency staff evaluated and approved applications. Pre-surveys were completed before program entry and were tied to the first stipend (*e.g.*, a cost-of-living allowance) distribution. Post-surveys were completed 6 months later, following program completion. Data were de-identified to the researchers.

Participant characteristics including demographics were assessed on the pre-survey. Dependent variables included measures in the health, mental health, and psychosocial domains of functioning assessed at pre- and post-program. Cronbach's alphas are included for measures with a composite scale.

Health domain. Health functioning and impairment were measured using three Likert scale questions from a standard military screening tool, the Post Deployment Health Re-Assessment (PDHRA).[44] Overall health was assessed with the question: ''Overall, how would you rate your health during the past month?'' Respectively, physical and emotional health impairment were assessed with the questions: ''During the past month, how difficult have physical health problems (illness and injury) made it for you to do your work or other regular daily activities?'' and ''During the past month, how difficult have emotional problems (such as feeling depressed or anxious) made it for you to do your work, take care of things at home, or get along with other people?''

Mental health domain. Depression and PTSD symptoms were measured using two psychometrically valid and reliable screening tools. Past month PTSD symptoms were measured with a four-item screener, the Primary Care PTSD Screen (PC-PTSD)[45] on which a clinical cutoff score of ≥3 has a diagnostic accuracy of 85%. Past month depressive symptoms were measured with a two-item screener, the Patient Health Questionnaire-2 (PHQ-2)[46] on which a clinical cutoff score of ≥3 indicates symptoms indicative of a depression diagnosis ($\alpha = 0.89$). A categorical item was included to assess exposure to mental health treatment: ''Are you currently seeking professional assistance for emotional problems (such as feeling depressed or anxious)?''

Psychosocial health domain. Four standardized scales were used to assess PIL, self-efficacy, loneliness, and social support. PIL was assessed with PIL, a 14-item subscale of the Scales of Psychological Well-being,[47] on which higher scores indicate a sense that life has direction and is meaningful ($\alpha = 0.86$). The average PIL score for adult women (in a sample of $n = 114$ mothers) was $M = 69.1$, standard deviation (SD) = 9.5.[48] Perceived self-efficacy was measured with the General Self-Efficacy Scale (GSE),[49] a 10-item scale on which higher scores indicate a greater sense of self-efficacy and coping ability ($\alpha = 0.93$). The average GSE score in a sample of $N = 1594$ American male and female adults was $M = 29.48$, SD = 5.13.[50] Social isolation and loneliness were measured with the UCLA Loneliness Scale 3,[51] a 20-item scale on which high scores indicate more severe loneliness ($\alpha = 0.94$). Norms for healthy adult women have been documented: $M = 34.49$ (SD = 9.49)[52] and $M = 36.06$ (SD = 10.11)[53]; a score below 40 indicates loneliness is rare, whereas a score of 40 or greater indicates frequent loneliness. Perceived availability of social support was measured with the Interpersonal Support Evaluation List short form (ISEL),[54] a 12-item scale on which higher scores indicate greater perceived availability of social support ($\alpha = 0.93$). ISEL average values have been published for male/female mixed adult U.S. English-speaking Hispanic populations, $M = 39.29$ (standard error [SE] = 0.09).[55]

Statistical analyses

Statistical analyses were conducted at the 0.05 alpha level using IBM SPSS version 22 (IBM Corp., Armonk, NY).[56] A maximum of 10% of responses were missing from a time point on any given variable. Investigation of the proportions and patterns of missing data indicated that data were missing at random and available case analysis was used.[57] Bivariate analyses were performed with nonparametric statistical tests, as specified below, due to nonnormally distributed data. However, parametric tests including simple and multiple linear regression analyses, as well as moderation analyses, were conducted due to all model assumptions being met including normally distributed residuals.

Chi-square tests were performed to detect associations between demographic characteristics and screening positive for PTSD or depression. When chi-square tests of association resulted in an expected cell frequency of five or less, Fisher's exact *p*-values were reported instead of significance for Pearson's chi-square. *Post hoc* testing was performed to detect specific associations by analysis of adjusted standardized residuals.[58] The proportion of veterans screening positive for a probable mental health diagnosis at pre- versus post-program was compared using McNemar's tests[59] with continuity correction.[60] The *p*-value was determined using a chi-square distribution or, in the case that there were fewer than 25 discordant pairs, the *p*-value was approximated from the binomial distribution. Classification of positive depression and PTSD screening scores was based on clinically determined cutoff values applied to pre- and post-averages of summed individual scores. We also tested for significant differences in average scores of nine biopsychosocial variables at pre- versus post-program completion (Wilcoxon signed rank tests). Pre- to post-effect sizes were calculated as designated for use with nonparametric analyses wherein $r = Z/[\text{sq rt (N at T1+N at T2)}]$[61] (Table 2). Pre- to post-change scores were also calculated on the nine biopsychosocial outcome measures and were compared on the key demographic variables of race, education, marital status, and child status (Mann–Whitney *U* tests). Pre- to post-change scores for all measures are referred to hereafter as change scores, calculated as the difference in scores on each individual measure taken before starting the program and at program completion. Spearman's correlations were run to examine associations between mental health and psychosocial change scores. Regression analyses were used to test whether psychosocial change scores predicted mental health change scores.

Results

Demographic characteristics

The original cohort of post-9/11/01 era veterans who completed the program consisted of 346 individuals, of which 343 responded to the survey question on biological sex. Demographic characteristics of the female subpopulation ($N = 107$) of this sample are shown in Table 1. The majority of female veterans (62.6%, $n = 67$) were within the age range of 26–35 years, self-identified as non-Caucasian (54.3%, $n = 57$), had a college or graduate degree (58.5%, $n = 62$), were not married (62.6%, $n = 67$), and over half had children (54.2%, $n = 58$).

Table 2. Biopsychosocial Impact of Civic Service Program Completion on Female Post-9/11/01 Era Veterans ($N = 107$)

Outcome measures	n	*Time 1, mean (SD)*	*Time 2, mean (SD)*	*Scale range and directionality*	*Mean change*	z	p	r
Health domain								
Perceived overall health	100	2.95 (1.12)	2.57 (1.09)	1 (+) to 5 (−)	0.40	−3.397	0.001*	0.24
Perceived physical health interference	97	1.73 (0.67)	1.54 (0.67)	1 (+) to 4 (−)	0.16	−2.051	0.040*	0.15
Perceived emotional health interference	97	2.02 (0.90)	1.70 (0.63)	1 (+) to 4 (−)	0.32	−3.283	0.001*	0.24
Mental health domain	n	*Time 1, mean (SD)*	*Time 2, mean (SD)*	*Scale range, direction, and cutoff*	*Mean change*	z	p	r
PTSD screening	98	1.99 (1.74)	1.31 (1.57)	0 (+) to 4 (−) ≥ 2	0.62	−3.427	0.001*	0.24
Depression screening	99	1.85 (1.62)	1.28 (1.62)	0 (+) to 6 (−) ≥ 3	0.59	−3.328	0.001*	0.24
Psychosocial domain	n	*Time 1, mean (SD)*	*Time 2, mean (SD)*	*Scale range, direction, and norm*	*Mean change*	z	p	r
PIL	96	63.83 (10.87)	66.78 (10.68)	14 (−) to 84 (+) **69.10 (9.5)**	−3.25	−3.669	0.000*	0.26
Self-efficacy	96	32.30 (5.13)	33.74 (4.90)	10 (−) to 40 (+) **29.48 (5.13)**	−1.39	−2.695	0.007*	0.19
Social isolation and loneliness	98	45.25 (11.90)	40.58 (12.71)	20 (+) to 80 (−) **34.09 (9.49) & 36.06 (10.11)**	4.61	−4.776	0.000*	0.34
Perceived availability of social support	98	33.43 (8.80)	36.49 (8.36)	12 (−) to 48 (+) **39.29 (0.09)**	−3.03	−3.890	0.000*	0.29

n is the number of cases included in the Wilcoxon signed rank test. Time 1 represents the mean at pre-intervention and Time 2 represents post-intervention means. The possible score range is shown in the scale range and directionality column wherein (−) or (+) denotes whether the high or low score is associated with negative or positive outcomes, respectively. The scale range and direction column also include clinically designated cutoffs for the mental health domain as well as published norms (population means) for the psychosocial health domain (see Data Collection and Measures section for more details). *Z* statistic is from Wilcoxon signed rank test (two-tailed, $\alpha = 0.05$). Published norms (population means) for the psychosocial health domain are in bold print.

*Significance at the 0.05 alpha level. Cohen's (1988) criteria were used for interpretation of *r* effect sizes = small (0.1), medium (0.3), and large (0.5).

PIL, purpose in life; SD, standard deviation.

Pre-program health, mental health, and psychosocial functioning

Before beginning the program, 50.5% ($n=53$) of the women reported engaging in mental health treatment. Nearly half screened positive for a probable diagnosis of PTSD (47.1%, $n=49$) and almost a quarter (23.8%, $n=25$) screened positive on the depression screening. There was no association found between demographic characteristics and whether the female veterans in this sample screened positive for PTSD or depression.

Screening positive for depression was significantly associated with daily difficulty due to physical health problems in the past month (Fisher's exact $p=0.022$), daily difficulty due to emotional health problems in the past month [$\chi^2(1)=36.291$, $p=0.000$], and overall health during the past month [$\chi^2(1)=10.989$, $p=0.001$]. Likewise, a positive screening for PTSD was significantly associated with daily difficulty due to physical health problems in the past month [$\chi^2(1)=6.628$, $p=0.010$], daily difficulty due to emotional health problems in the past month [$\chi^2(1)=14.007$, $p=0.000$], and overall health during the past month [$\chi^2(1)=9.482$, $p=0.002$]. In addition to this link between screening positive for a probable mental health disorder and difficulty in daily health functioning, positive mental health screenings were also associated with poorer psychosocial outcomes at pre-program.

For interpretation of psychosocial health scores, published population norms are provided as a reference (Table 2). Before starting the civic service program, female veterans' scores on PIL and perceived availability of social support were, on average, lower than that of the general population. In contrast, pre-program self-efficacy scores, on average, were higher in this cohort relative to the population norm. Finally, pre-program scores on social isolation and loneliness suggest an above average level of loneliness. These results indicate some challenge existing for female veterans in terms of belief that life holds meaning or purpose, perceived availability of social support, and the level and quality of their social interaction (Table 2). Finally, women who screened positive for depression or PTSD differed significantly from those with a negative screening with regard to the four psychosocial outcomes assessed in this study (Table 3). Relative to women with a negative depression or PTSD screening, those who screened positive had: lower PIL scores, lower perceived self-efficacy, lower perceived availability of social support, and higher scores on social isolation and loneliness.

Finally, seven women (10.6%) reported a history of TBI. While none of these seven women screened positive for depression, four (57.1%) women were screened positive for PTSD. In terms of their general health, 71.4% ($n=5$) endorsed good, very good, or excellent health in the preceding month. Only 14.3% ($n=1$) reported very/extreme difficulty with everyday activities due to physical and emotional problems.

Health, mental health, and psychosocial functioning change scores

Significant improvements in change scores were noted across all health, mental health, and psychosocial health outcomes (Table 2). These findings support our hypotheses that perceived overall health, depression symptoms, self-efficacy, and perceived social support would improve from pre- to post-program. In contrast, our hypotheses that loneliness and PIL would not change were rejected. The strongest effects in the health domain occurred for perceived overall health ($r=0.24$) and perceived daily functioning difficulties due to emotional health problems ($r=0.24$). In the mental health domain, both PTSD and depression significantly improved ($r=0.24$). Finally, the greatest magnitude of changes occurred within the psychosocial domain with increased perceived availability of social support ($r=0.29$) and decreased social isolation and loneliness ($r=0.34$). Overall, women veterans who completed the program had statistically significant improvements in health, mental health, and psychosocial functioning, with the greatest effects being decreased social isolation and loneliness and increased perceived social support.

Table 3. Pre-Program Associations Between Mental Health Screening Outcome and Psychosocial Functioning in Female Post-9/11/01 Era Veterans Who Completed a Civic Service Program ($N=107$)

Psychosocial measures	*Mental health screening*	*Mean rank*	U	z	p
Belief that life holds purpose and meaning ($n=96$)	PTSD–	63.36	726.5	–3.821	0.000*
	PTSD+	40.95			
	Depression–	59.33	369.0	–4.521	0.000*
	Depression+	27.88			
Self-efficacy ($n=96$)	PTSD–	63.96	698.0	–4.023	0.000*
	PTSD+	40.43			
	Depression–	57.22	536.0	–3.225	0.001*
	Depression+	34.83			
Social isolation and loneliness ($n=98$)	PTSD–	34.61	485.5	–5.522	0.000*
	PTSD+	67.17			
	Depression–	43.73	295.0	–5.273	0.000*
	Depression+	80.20			
Perceived availability of social support ($n=98$)	PTSD–	64.05	741.5	–3.830	0.000*
	PTSD+	41.48			
	Depression–	59.85	406.5	–4.426	0.000*
	Depression+	29.26			

U and *z* statistics are from Mann–Whitney *U* test (two-tailed, $\alpha=0.05$).
*Significance at the 0.05 alpha level.

In addition to conceptualizing the magnitude of change in the women's average mental health screening change scores, from a clinical perspective, we were interested in whether the proportion of female veterans who met clinical cutoffs for positive depression and/or PTSD screenings changed during the time between their start of the program and their completion, ~6 months later. The percentage of women veterans with positive depression screenings significantly decreased from 23.8% (25/105) at pre-program to 10.9% (11/101) at program completion (exact $p = 0.011$). Similarly, the percentage screening positive for PTSD dropped significantly from 53.8% (56/104) at pre-program to 38.6% (39/101) at program completion [$\chi^2(1) = 4.645$, $p = 0.031$]. Finally, 21.15% (22/104) screened positive for both depression and PTSD at the start of the program; however, the percentage decreased significantly to 9.9% (10/101) at program completion (exact $p = 0.027$). Taken together, these results indicate that both the severity of clinically significant symptoms and the number of individuals with probable PTSD and depression diagnoses significantly decreased in this cohort of women veterans who completed the Mission Continues Fellowship Program.

Key demographic characteristics of race, education, child status, or marital status were analyzed for associations with change scores on the nine outcome measures. Only one significant association occurred, which showed that women without children made greater gains in perceived self-efficacy ($U = 828.5$, $z = -2.227$, $p = 0.026$) by program completion.

Given that half of this veteran cohort reported that they were seeking assistance for emotional problems during the civic service program, we also examined whether the change scores on the PTSD or depression screeners differed between those who were and were not seeking treatment. Notably, the proportion of women who reported engaging in mental health treatment did not change significantly from pre- to post-program ($p = 0.678$). While PTSD change scores did not significantly differ in those who did or did not report seeking external professional help, larger median (Mdn) improvements in depression change scores occurred in help seekers (Mdn = 1.00) relative to those not seeking professional help (Mdn = 0.00), $U = 751$, $z = -3.451$, $p < 0.05$.

From a diathesis–stress perspective, we hypothesized that changes in mental health would correlate with changes in psychosocial functioning and that improvements in psychosocial functioning would predict improvements in mental health. Our findings revealed that, as PTSD symptoms decreased, perceived self-efficacy scores increased, $r_s(95) = -0.206$, $p < 0.05$. Regarding depression, change scores indicating a decrease in depression symptoms were correlated with a decrease in isolation and loneliness scores, $r_s(98) = 0.339$, $p < 0.05$. In addition, as depression scores decreased, PIL scores improved, $r_s(96) = -0.205$, $p < 0.05$. To test our hypothesis that psychosocial functioning improvements would predict mental health improvements, we investigated whether pre- to post-changes in PTSD and depression were predicted by improvements in the respective correlated psychosocial constructs.

Results indicated that the perceived self-efficacy change score could predict pre- to post-changes in PTSD, $F(1, 93) = 8.00$, $p < 0.05$, and the change in perceived self-efficacy accounted for 8% of the explained variability in the PTSD change score. Seeking external professional assistance for emotional problems was not included in the model due to the finding that PTSD change scores did not differ significantly between those who did and did not seek external professional assistance. Regarding depression, results indicated that seeking professional assistance for emotional problems and change scores on loneliness predicted the depression change scores, $F(2, 95) = 15.618$, $p < 0.05$. Remarkably, this model explained over 20% ($R^2 = 24.7\%$, adjusted $R^2 = 23.2\%$) of the variance in depression change scores, a small to medium size effect according to Cohen's original guidelines (1988).[62] When examining the individual predictors, women who were seeking professional assistance for emotional problems ($B = 0.941$, SE = 0.295, $\beta = 0.290$, $p < 0.05$) during the program had significantly greater improvement in depression change scores relative to those who were not seeking help. The isolation and loneliness change score was the strongest predictor in the model such that a pre- to post-decrease in isolation and loneliness predicted greater decreases in depression symptoms from pre- to post-program ($B = 0.064$, SE = 0.017, $\beta = 0.350$, $p < 0.05$). Given the possibility that seeking professional assistance for emotional problems could work synergistically with the pre–post decrease in loneliness, we examined whether seeking professional assistance for emotional problems moderated the relationship between loneliness change score and depression change score. This hypothesis was rejected, as results did not reveal a statistically significant interaction between seeking professional assistance for emotional problems and loneliness change score, with addition of the interaction term to the model contributing 0% explanation of total variance in the model, $F(1, 94) = 0.00$, $p = 0.997$. This indicates that decreasing loneliness as well as obtaining professional help for emotional problems both contribute independently to improving depression symptom scores with a reduction in social isolation and loneliness scores having the greater effect. Taken together, these findings support our hypothesis that improvements in psychosocial functioning would predict improvements in mental health within the context of a formal civic service program.

Discussion

This study revealed that reintegrating post-9/11/01 era female veterans improved significantly on nine measures of physical, mental, and psychosocial health following completion of a formal civic service program. Before entering the program, nearly a quarter of these veterans screened positive for probable depression, less than half screened positive for probable PTSD, and half reported seeking professional assistance for emotional problems. These rates are similar to those from epidemiological studies with the exception of our study cohort having reported a higher rate of probable PTSD compared with previously established 20%–21% prevalence rates,[18,63] possibly due to a difference in sample sizes or the use of different diagnostic screening instruments.

The association of poorer health outcomes with a positive screening for either PTSD or depression suggests a need for a holistic approach to support health and well-being in reintegrating female veterans and underscores the importance of efforts to prevent long-term negative health outcomes. The World Health Organization has reported that depression is the

leading global cause of disease-related disability.[64] Female veterans are at particular risk for depression and depression-related comorbid health conditions.[8] This study indicates that female veterans who completed a 6-month civic service program reported significant decreases in depression and health problems as well as in PTSD symptoms. Yet, the most striking results were within the psychosocial domain wherein social isolation and loneliness and perceived availability of social support had medium size effects. Because unaddressed isolation and loneliness are associated with depression symptoms, a range of long-term health problems[22,23] and mortality,[24] this is an important outcome especially given the prevalence of depression[2] and rising suicide rates among female veterans.[7]

While depression scores, before the program started, were associated with poorer psychosocial functioning on all four constructs tested, depression scores improved significantly by program completion. Furthermore, we found that decreasing social isolation and loneliness predicted improvement in depression, even when controlling for seeking professional help for emotional problems. Interestingly, our findings suggest that seeking professional help and decreasing loneliness significantly and independently contributed to the pre- to post-improvement in depression scores. Likewise, improved self-efficacy predicted a decrease in PTSD symptoms independent of help-seeking. While improving self-efficacy has been associated with decreasing PTSD symptoms in predominantly male veteran samples,[27,28] our results suggest that this association may be extended to female veterans.

Our prior study findings on a mixed-gender sample of post-9/11 veterans who completed this 6-month civic service program revealed significant improvements of small effect in physical, mental, and psychosocial health outcomes.[32] In comparison, the current study, focused on an all-female sample, revealed at least two-fold greater effects on all biopsychosocial outcomes with the exception of physical health interference. Most notably, reductions in isolation and loneliness as well as increases in perceived social support had effects of 2.5- and 2.4-fold greater in this female veteran sample. Thus, participation in civic service may be a particularly effective mode for promoting biopsychosocial health in female veterans.

The study has several limitations. While we were able to determine that there was no significant change in the proportion of respondents seeking help for emotional problems at program beginning versus completion, it was not possible to determine whether such assistance was formal mental health treatment nor the trajectory or disposition of an individual's help seeking. We used standardized self-report screening measures (*e.g.*, PHQ-2 and PC-PTSD) and cutoff scores for physical and mental health outcomes rather than the gold standard clinical diagnostic interviews. Our study was conducted before the release of the new five-item PC-PTSD screening instrument and therefore reflects diagnostic criteria for the four-item screener. The observational design did not allow for a control group, hence the decrease in PTSD and depressive symptoms may be due to an extraneous confounding factor, self-report measurement bias, or reflect natural progression of the illness course. The current study did not include follow-up subsequent to the post-program survey. Finally, the sample is composed of veterans willing and able to participate in a 6-month civic service program. It is unclear whether programs of lesser duration would have similar effects. Future studies should address these limitations, with the inclusion of a larger sample of women veterans or women trauma survivors, nonvolunteering control groups, and/or a dose–response study design to allow evaluation of the effect of the dose of volunteering on biopsychosocial and quality-of-life outcomes.

However, the current study has several strengths. It provides detailed pre- and post-program data on an under-researched population, reintegrating female veterans. This study also examined a wide range of physical, mental, and psychosocial health measures including PIL, self-efficacy, social support, and loneliness, key constructs in the diathesis–stress model.

Conclusions

Our findings suggest that civic service participation builds psychosocial resources that support mental health. As such, women's health professionals should consider recommending civic service as an adjunctive health-promoting option to complement the frontline PTSD and depression psychotherapeutic and pharmaceutical treatments, especially in cases where female veterans present with marked social isolation and loneliness. Civic service has demonstrated the potential to promote and support the maintenance of well-being for returning post-9/11/01 era women veterans with a diagnostic history of PTSD or depression.

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Author Disclosure Statement

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