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The Impact of a Civic Service Program on Biopsychosocial Outcomes of Post 9/11 U.S. Military Veterans

Monica M. Matthieu[a], **Karen A. Lawrence**[b], and **Emma Robertson-Blackmore**[c]

[a] Saint Louis University, College for Public Health and Social Justice, School of Social Work, Saint Louis, MO, USA

[b] University of Kentucky, School of Social Work, Lexington, KY; formerly affiliated with Washington University, George Warren Brown School of Social Work, Saint Louis, MO, USA

[c] Family Medicine Residency, Halifax Health, Daytona Beach, FL, USA

Abstract

Volunteering as a health promotion intervention, improves physical health, mental health, and social outcomes particularly in older adults, yet limited research exists for veterans. We conducted a preliminary study to explore whether volunteering impacts a variety of biopsychosocial outcomes, including symptoms of post-traumatic stress disorder (PTSD) and depression, among returning military veterans from Iraq and Afghanistan. A survey enrolling a prospective cohort of United States (U.S.) veterans who served in the military after 11 September 2001 and who participated in a national civic service program was conducted. A total of 346 veterans completed standardized health, mental health, and psychosocial self-report measures before and after the program. Statistically significant differences were detected in overall health rating, level of emotional difficulty, PTSD and depression symptoms, purpose in life, self-efficacy, social isolation, and the perceived availability of social support at program completion. Screening positive for probable PTSD predicted improved perceived self-efficacy while probable depression predicted a decrease in loneliness, an increase in purpose in life, and an increase in perceived social support, at program completion. Volunteering was associated with significant improvements in health, mental health and social outcomes in returning veterans.

Keywords

veterans; health; volunteer; mental health; depression; brain injury; stress disorders; post-traumatic; loneliness; social support; self-efficacy; reintegration

[*] **Corresponding Author:** Monica M. Matthieu, Saint Louis University, College for Public Health and Social Justice, School of Social Work, Tegeler Hall, Room 321, 3500 Lindell Blvd, Saint Louis, MO, 63104. Phone: 314-977-7139. mmatthie@slu.edu.

1. Introduction

Among American military veterans of Operations Enduring Freedom (OEF) and Iraqi Freedom (OIF), post-traumatic stress disorder (PTSD) and depression are common diagnoses (Vaughan, et al., 2014). PTSD and depression are associated with increases in unhealthy behaviors (Tanielian, et al., 2008), medical services use (Schnurr and Jankowski, 1999), and negative impacts on family and social functioning (Cohen et al., 2010; Tanielian et al., 2008). In addition to health concerns, veterans reintegrating into civilian life following deployment, disability, or completion of military service, potentially face numerous hurdles. These hurdles include personal, professional, and financial challenges such as changes in family roles, rebuilding social networks, and unemployment, which may exacerbate symptoms. Unfortunately, many veterans with mental health symptoms do not seek treatment. In a national survey of OEF/OIF veterans, almost half of those with a positive PTSD or depression screen reported no mental health care use within the prior year (Tanielian et al., 2008). Research on health care barriers and preferences of OEF/OIF veterans with PTSD shows that negative treatment beliefs and stigma remain barriers to care. Alternatively, these same veterans express a desire for community services that are integrated, person-centered, and holistic (Crawford et al., 2015). These findings highlight that this generation of veterans may be interested in promoting health in new ways, more so than by engaging in traditional mental health care, to overcome challenges.

Volunteering has produced positive outcomes in civilians' mortality rates, mental health, and social outcomes (Jenkinson et al., 2013). In one study, 40% of American adults who volunteered in the past year showed improvements in well-being: happiness, life satisfaction, self-esteem, mastery, health, and depression (Thoits and Hewitt, 2001). In older adult studies, volunteers significantly reduced their depression and mortality rates (Lum and Lightfoot, 2005; Musick, et al., 1999; Musick and Wilson, 2003) with concomitant increases in wellbeing with increased volunteering (Morrow-Howell, et al., 2003). Given these findings (Coorperation for National and Commmunity Service [CNCS], 2007), it could be posited that individuals who are leaving the military due to disability or retirement, might also benefit. However, there is currently no research on the effects of volunteering as a health promotion intervention among veterans. To our knowledge, this is the first national study of formal volunteering among U.S. military veterans who previously served in Iraq and Afghanistan and who participated in a formal civic service program after completing their career in the military service.

1.2. Study aims

We undertook a preliminary study to explore the biopsychosocial outcomes of participation in a national civic service program on OEF/OIF veterans. Using the stress-diathesis model to guide our selection of measures (Zubin and Spring, 1977), biopsychosocial outcomes were defined as physical, mental, and psychosocial functioning. Civic service was defined as participation in a formal, structured, and stipended volunteer program (McBride and Sherraden, 2007). Based on the results of previous literature, we hypothesized that civic service would (1) increase self-reports of purpose in life, self-efficacy, and social support, and (2) decrease reports of social isolation and loneliness, emotional health difficulties, and

depressive symptoms among participants. However, given the complex psychosocial and health issues facing returning veterans and that PTSD and depression are characterized by avoidance and dysphoria, we proposed that civic service would not impact reports of overall health, physical health difficulties, or PTSD symptoms. With regard to the complexity of health issues and PTSD, we note that returning veterans have varying degrees of co-occurring conditions, polytrauma, and chronic illnesses that may require ongoing surgery, rehabilitation, and therapy to resolve. Consequently, we proposed that overall health, physical health difficulties, and PTSD might remain unchanged without specifically targeted health and mental health interventions. However, with depression, the behavioral activation of going to volunteer each week with specific tasks and a purpose to contribute to the organization might naturally alleviate some of the dysphoric symptoms. Finally, we explored whether experiencing symptoms of PTSD and depression would impact the ability of participants to benefit from civic service in terms of purpose in life, self-efficacy, social support, and social isolation and loneliness. Due to the dearth of literature on the effects of these diagnoses on civic service, no a priori hypotheses were developed.

2. Methods

2.1. Study design and intervention

Using an observational cohort design, we evaluated the impact of a civic service program administered by The Mission Continues, a national nonprofit organization in the U.S. The health promotion intervention evaluated in this study, the Fellowship Program, involved adults who previously served in the U.S. military after September 11, 2001 (subsequently referred to as post-9/11/01-era veterans) who volunteered for 20 hours per week for 26 weeks at a local nonprofit organization in their hometown. Civic service is a rather unusual volunteering experience which McBride and Sherraden (2007) defined as a specific type of formal volunteering with an organization that typically provides an orientation, a stipend to offset living expenses, and a well-defined role and duration for the volunteering time. This is differentiated from less structured and occasional volunteering such as helping out at church or collecting food, thereby inferring greater intensity, duration, frequency, and accountability in the particular volunteer role and achievement of specific civic service related goals for the individual volunteer and the organization.

A detailed description of the measures, orientation and curriculum is found elsewhere (Matthieu, 2016; Matthieu, Lawrence, Gould, Scheinberg, in press), therefore a brief overview is provided here. The Fellowship Program begins with veterans completing leadership, networking, goal-setting, and autobiographical writing exercises (i.e., describe existing military service skills and apply to future service, education, or employment goals) for professional development during orientation. Following this orientation, a goal-setting curriculum is completed throughout the duration of the fellowship with peer mentorship from a member of The Mission Continues staff which coincides with the veterans' civic service at a non-profit organization. Ethical approval was obtained from Saint Louis University's Institutional Review Board.

2.2. Participants and procedures

Agency staff recruited prospective participants for the civic service program in person, over the phone, and via the internet. Staff also collected eligibility information from prospective participants using intake forms. In order to be considered for the program, veterans must have served for a minimum of two years in the US military after September 11, 2001, although exceptions were made for veterans who served less than two years due to a medical discharge. Veterans are also expected to have an honorable discharge and a clean criminal record. However, the agency recognized that struggling with the transition to civilian life can coincide with substance abuse or becoming involved with the criminal justice system, and veterans with criminal records or other discharge status were considered on a case-by-case basis. Admitted veterans were asked to complete web-based surveys (i.e., within one week of program start and at the completion of the program). Data were collected by the agency and de-identified to the researchers.

Measures, described below, were not collected on those individuals who declined to participate, were not admitted to the program due to military service completion before September 11, 2001, had a criminal record or dishonorable discharge, and/or chose not to complete the program. The study sample was comprised of Fellowship Program completers between February 2011 and March 2014 who provided both surveys, before and after completion of the program (N = 346).

2.3. Measures

All measures were administered before and after the civic service program with the exception of demographics and Traumatic Brain Injury (TBI), which were obtained only at the start of the program. Two single categorical items were included to assess history of TBI and mental health treatment exposure: “Have you ever been diagnosed with or treated for a Traumatic Brain Injury (TBI)?” (yes/no) and “Are you currently seeking professional help for emotional problems (such as feeling depressed or anxious?” (yes/no).

2.3.1 Health—Perceived overall health was assessed using a standard military service personnel screening tool, the Post Deployment Health Re-Assessment (PDHRA) (Department of Defense, 2008): “Overall, how would you rate your health during the past month?” Responses were scored 1 = Excellent, 2 = Very Good, 3 = Good, 4 = Fair, and 5 = Poor. Perceived physical and emotional health difficulties were also assessed with the PDHRA (Department of Defense, 2008), “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 (feeling depressed or anxious) made it for you to do your work, take care of things at home, or get along with other people?” Responses were scored 1 = Not difficult at all, 2 = Somewhat difficult, 3 = Very difficult, and *4 = Extremely difficult*.

2.3.2 Mental Health—The Primary Care PTSD Screen (PC-PTSD) (Prins et al., 2003) is a 4-item screening measure assessing the presence of the Diagnostic and Statistical Manual, IV-TR ([APA], 2000) PTSD symptoms in the past month: re-experiencing, avoidance, numbness, and arousal. The PC-PTSD is a validated psychometric screening measure with a

diagnostic accuracy or efficiency score of 85%, analogous to that of longer PTSD measures (Brewin, 2005; Prins et al., 2003). Respondents indicated '*yes*' or '*no*' to each item; total scores ranged from 0 to 4. A cut-off score of ≥ 2 designated PTSD symptoms of clinical significance (α = 0.88).

Depressive symptoms were assessed using the Patient Health Questionnaire-2 (PHQ-2) (Kroenke, et al., 2003), a 2-item screener composed of items one and two from the PHQ-9, a validated, shorter version of the full-length PHQ (Kroenke, et al., 2001; Kroenke et al., 2003). The PHQ-2 asks about the frequency of anhedonia and depressed mood (Kroenke et al., 2003). Responses were scored 0 = Not at all, 1 = Few or several days, 2 = More than half the days, and 3 = Nearly every day; total scores ranged from 0 to 6. A cut-off score of ≥3 indicates clinically significant depressive symptoms (α = 0.89).

2.3.3 Psychosocial—This domain consisted of four standardized and self-report measures. Purpose in Life (PIL), a 14-item subscale of the Scales of Psychological Wellbeing (Ryff and Keyes, 1995) assessed direction, meaning, and purpose in life. Responses were scored from *1 = strongly disagree* to *6 = strongly agree*; summed scores ranged from 14 to 84. Higher scores indicated strong life goals or aims, while lower scores indicated an absence of a sense of direction, life purpose and meaning. (α = 0.86).

Self-efficacy was measured using the General Self-Efficacy Scale (GSE) (Schwarzer and Jerusalem, 1995), a 10-item scale that assessed self-efficacy related to minor daily stressors and major life events. Responses were scored 1 = Not at all true, 2 = Hardly true, 3 = Moderately true, and *4 = Exactly true;* summed scores ranged from 10 to 40. Higher scores indicated stronger perceived self-efficacy (α = 0.93).

The UCLA Loneliness Scale, Version 3 (Russell, 1996), consisted of 20 items and assessed social isolation and loneliness. Responses were scored *1 = Never, 2 = Rarely, 3 = Sometimes,* and *4 = Always;* summed scores ranged from 20 to 80. High scores indicated a higher degree of loneliness (α = 0.94).

Perceived availability of social support was assessed with the Interpersonal Support Evaluation List - short form (ISEL) (Cohen, et al., 1985), a 12-item scale. Responses were scored 1 = Definitely false, 2 = Probably false, 3 = Probably true, and 4 = Definitely true; summed scores ranged from 12 to 48. Higher scores indicated a higher degree of social support (α = 0.93).

2.4. Statistical analysis

PTSD and depression scores were treated as continuous data to calculate mean screening scores and for nonparametric testing. Categorical variables of 'probable PTSD' and 'probable depression' were created using the established screening cut-off scores for frequencies and regression analyses (Kroenke et al., 2003; Prins et al., 2003).

Our first set of hypotheses examined the change in multiple psychosocial and health outcomes, before and after the program completion. Because data were not normally distributed, bivariate analyses of the two time-points (i.e., before and after program

completion) were conducted with nonparametric tests. McNemar tests (continuity corrected) analyzed single-item measures and Wilcoxon signed-rank tests analyzed multi-item measures, with asymptotic significance reported. Means, standard deviations, and change scores were computed. Effect sizes (Cohen's *d*) were calculated using means from the change scores and pooled standard deviations. Multivariate analyses were conducted using change scores (continuous) as dependent variables due to our interest in the ability of preexisting mental health symptoms to predict change in the outcome measures.

Our final hypotheses examined whether experiencing symptoms of PTSD and depression would impact the ability of participants with these conditions to benefit from civic service. We performed four multiple linear regression analyses to model the relationship between the two binary independent variables, probable PTSD (yes/no) and probable depression (yes/no), and the change scores for the four psychosocial dependent variables. In addition, the covariate of "seeking professional treatment" was included in the four regression models due to the possibility that mental health treatment outside of program participation could influence psychosocial outcomes. Note that the proportion of veterans seeking professional treatment for emotional problems before the program, 56.97% (184/323), had not changed significantly by the end of the program 56.04% (189/323; $p = 0.80$). Less than 7% of responses were missing in a given analysis. Data were analyzed using SPSS Version 22 (IBM Corporation, 2013).

3. Results

Table 1 shows that the sample was predominantly male, under 40 years of age, married and slightly more than half identified as Caucasian. At the time of this study between February 2011 and March 2014, approximately 88% of the sample reported that they served on an overseas deployment for which they received hazardous duty pay and the mean time from their last deployment was 5.88 years (SD=2.49). Half of the sample screened positive for probable PTSD (50.6%) and over a fifth (23.5%) for probable depression. Almost half (43.5%) of the sample reported receiving treatment for a mental health condition and almost 20% reported a history of diagnosis or treatment for a TBI.

3.1. Impact of civic service on biopsychosocial outcomes

Table 2 shows the results of the McNemar tests to examine whether perceived health and mental health outcomes had significantly changed at program completion. We hypothesized that there would be no change in reports of overall health and physical health difficulties. The hypothesis that there would be no change in reports of level of daily interference due to physical health problems was supported; there was no significant change. We hypothesized that there would be no change in reporting of overall health; this hypothesis was rejected. The proportion of participants reporting good/excellent health increased from an initial value of 0.76 to 0.82 at program completion, a statistically significant difference, $\chi^2(1) = 6.15$, $p = 0.01$.

We hypothesized that respondents would report decreased levels of difficulties in performing in everyday activities due to emotional health problems, following program completion. Our hypothesis was supported; the proportion of respondents who reported no/some emotional

difficulty in everyday activities significantly increased from an initial value of 0.79 to 0.88 at program completion, $\chi^2(1) = 10.45$, $p = 0.001$.

Wilcoxon signed-rank tests were conducted to examine the significance of median change scores on two mental health and four psychosocial health measures assessed before and after program completion (Table 2). We hypothesized that there would be no change in PTSD symptom scores across time; this hypothesis was rejected. The median change for PTSD symptom scores significantly decreased (d = 0.21). This was echoed in the decrease in individuals screening positive for probable PTSD, which fell from 50.6% (171/338) at the start of the program to 43.1% (144/334) at program completion (see Table 2 for more detailed statistics).

Depression symptom screening scores improved significantly (i.e. a significant decrease in scores) as hypothesized, and showed the greatest effect size out of the mental health outcomes (d = 0.23); the rate of participants screening positive fell from 23.5% (80/341) before the program to 15.0% (50/333) after program completion (see Table 2 for detailed statistics).

Our hypothesis that participants would improve on all psychosocial outcomes was supported. All four measures were marked by statistically significant improvements. Small effects were seen for ratings of belief that life holds purpose and meaning (d = -0.01) as well as perceived self-efficacy (d = -0.19). The greatest effects within the psychosocial domain occurred for perceived social isolation and loneliness which decreased (d = 0.27) and perceived availability of social support which increased (d = -0.25) at the end of the civic service program.

3.2. Influence of probable PTSD and depression on psychosocial outcomes

Multiple regression analyses tested whether screening positive for probable PTSD or depression before the intervention could predict changes in the four psychosocial outcome measures by the end of the program. The covariate of whether or not participants (reported before beginning the program) seeking professional experience for emotional problems was also included in these models due to the possible influence mental health treatment could have on improvement in psychosocial outcome variables. For these analyses, we calculated change scores by subtracting the score at the end of the program from the scores at the beginning of the program. If the score increased, then the resulting change value was negative, and therefore, the beta coefficients were negative. For example, an initial score of 45 increased to 60; 60-45 = -15, so the negative beta coefficient is reflective of an increase over time.

In the psychosocial domain, probable depression significantly ($p < 0.05$) predicted changes in three outcome measures, specifically the belief that life holds purpose and meaning, loneliness, and social support by the end of the program. With regard to probable PTSD, it significantly ($p < 0.05$) predicted changes in one of the four outcome measures, namely, self-efficacy by the end of the program. Regression coefficients and standard errors are listed in Table 3. When PTSD screening score and seeking professional experience variables were held constant in models for each of the four psychosocial outcome variables, screening

positive for probable depression predicted a significant increase in the belief that life holds purpose and meaning (F (3, 318) = 6.72, adj. R^2 =0.05), a significant decrease in loneliness, (F (3, 320) = 5.00, adj. R^2 =0.04) and a significant increase in social support (F (3, 321) = 6.04, adj. R^2 =0.05) from program beginning to end. When depression score and seeking professional experience variables were held constant, a positive PTSD screen predicted an improvement in self-efficacy over time, (F (3,318) = 2.82, adj. R^2 =0.02).

4. Discussion

To our knowledge, this was the first investigation of the biopsychosocial impact of a civic service program on a large sample of community-dwelling returned U.S. military veterans. Overall, self-report measures across nine constructs within health, mental health, and psychosocial domains indicated that participating in this formal civic service program significantly improved veterans' health and well-being upon completion of the program. The greatest impact within the mental health domain was a decrease in depressive symptoms upon program completion. Previous studies reported that volunteering decreased depression in civilian adults and elders (Lum and Lightfoot, 2005; Musick et al., 1999; Musick and Wilson, 2003; Thoits and Hewitt, 2001); our results suggest that the effects of civic service on reduction of depressive symptoms may extend to U.S. military veterans who served in the post-9/11/01-era.

To our knowledge, the effects of civic service on PTSD symptoms have not been previously studied. Contrary to our hypotheses, our results indicated OEF/OIF veterans who participated in civic service experienced decreased PTSD symptom severity. While clearly not a mental health intervention of the magnitude of evidence-based PTSD treatments, nor based on clinical assessment that maps on to the current psychiatric diagnostic criteria, these results suggest that civic service may be beneficial for OEF/OIF veterans with both PTSD and/or depressive symptoms.

All four psychosocial outcome measures showed statistically significant improvements at program completion. This has several connotations for psychological and physical well-being among veterans. Feelings of loneliness, if untreated, are associated with increased mortality rates, lower cognitive functioning, less emotional wellbeing, and negative social behavioral outcomes (Hawkley and Cacioppo, 2010). Social support contributes to psychological and physical well-being with stress buffering effects that moderate the negative life-stress-health relationship (Cohen et al., 1985). In this study, OEF/OIF veterans reported a significant decrease in loneliness and an increase in social support which may aid reintegration into civilian life.

The psychosocial construct of a belief that life holds purpose and meaning also yielded statistically significant improvements. Consistent with the literature that showed a negative correlation between purpose in life and depression screening score (Ryff and Keyes, 1995), a positive depression score in our sample predicted a significant improvement in purpose in life, which strengthens our findings. Interestingly, the initial self-efficacy scores for participants in the present study were above the norm for those reported elsewhere for students, adults, and elders (Schwarzer and Jerusalem, 1995) indicating higher starting levels

of self-efficacy in the sample, perhaps resulting from the training and challenges of military service. However, it also may be self-selection, in that veterans who agree to participate in this volunteer program may have higher levels of self-efficacy (or they would not agree to join).

Despite the initially high scores on this construct, self-efficacy increased for all participants after engaging in civic service, especially for those who started the program with PTSD screening scores suggestive of probable PTSD. Notably, self-efficacy has been identified as a focal mediator and independent contributor to recovery from a wide range of traumas, including military combat, leading to the recognition of the importance of one's belief in their ability to govern their posttraumatic condition to some degree and the impelling and protective qualities that belief affords (Benight and Bandura, 2004). The results here suggest that civic service strengthened these beliefs in the veteran participants in this study.

Interestingly, however, improvement in self-efficacy was not associated with high depression scores at the start of the program. Given that self-efficacy is an internal state suggesting core resources and strengths, it is possible that this measure was theoretically independent of the impact of depression. Due to the heightened prevalence of probable PTSD, and depression in this OEF/OIF veteran sample (Fulton et al., 2015; Ramchand et al., 2015), we hypothesized that these conditions may hinder veterans' capacity to benefit from civic service. Findings reveal that all veterans in the civic service program experienced improvements in health, mental health, and social functioning. Importantly, even after controlling for current treatment, veterans with positive depression screens when entering the program benefited the most with significant improvements in purpose in life, enhanced social support, and decreased feelings of loneliness. Those screening positive for probable PTSD, again, after controlling for current treatment showed significant improvements in self-efficacy at program completion.

4.1. Limitations

This exploratory study provided a preliminary evaluation of the relationship between civic service and health, mental health, and social outcomes using valid and reliable psychometric instruments chosen according to the stress-diathesis model. However, several limitations remain. First, there is selection bias; the findings pertain only to those veterans who participated in, and completed, this program. Data were unavailable on those who did not participate or complete the program.

This was an observational, cohort study and not a randomized controlled trial. As such, changes observed at the completion of the civic service program could be attributed to other variables including time since deployment, resilience, and receipt of mental health treatment. Similarly, the impact of individual components of the program could not be assessed. For example, there were writing and goal setting assignments as part of the civic service curriculum. Various forms of narrative writing that specifically focus on a traumatic event have demonstrated efficacy in decreasing PTSD symptoms (see Sloan, Sawyer, Lowmaster, Wernick, and Marx, 2015) as well as other negative outcomes. However, it should be noted that the focus of the curriculum is on translating military skills to future goal setting as a civilian and not structured writing therapy, narrative exposure therapy, or expressive writing

specifically focused on potentially traumatic events the individual may have experienced during military service.

Finally, we did not use gold-standard clinical diagnostic interviews but rather utilized single items, self-report screening measures, and screening cut off scores for mental and physical health outcomes. Other studies of OEF/OIF samples have demonstrated the persistence of mental health symptoms following deployment (Bliese et al., 2007; Milliken et al., 2007; Polusny et al., 2011; Sayer et al., 2010; Sundin et al., 2010)); the significant improvements reported here, even after controlling for current treatment, support our assertion that engagement in the civic service program contributed to reduction of these symptoms.

Despite these limitations, this exploratory study provides important initial data regarding veterans' health using an observational cohort design. Detailed clinical assessments of mental health symptoms in future studies may reveal whether the health promotion impact of volunteering among veterans served as behavioral activation or if the increases in social support, purpose in life, or decreased loneliness buffered the negative impact of the depression symptoms.

4.2. Conclusions

Health promotion interventions for veterans are critically needed. Formal volunteering via a veteran-specific civic service program showed significant improvements in a range of biopsychosocial outcomes in returning veterans from Iraq and Afghanistan, after controlling for current treatment, among those reporting PTSD and depressive symptomatology. Such programs may be of great benefit for the reintegration, health, and well-being of this population.

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Highlights

- Volunteering is a key aspect of the United Nations' 2015 State of the World report.
- U.S. veterans desire opportunities to serve at home as part of their reintegration.
- This is the first national study of civic service among U.S. military veterans.
- Volunteering significantly improved health, mental health and social outcomes.
- Returning veterans from Iraq and Afghanistan gain from continuing to serve others.
- Volunteering is a low-cost, high impact, global health promotion intervention.

Table 1

Demographic information of OEF/OIF U.S. military veterans who participated in a formal veteran-focused civic service program (N = 346).

Demographics	***n* (%)**
Age	
22-40 Years	286 (82.7)
41-55 Years	60 (17.3)
Gender[a]	
Male	236 (68.2)
Female	107 (30.9)
Education[b]	
= High school or GED	75 (21.9)
> High school or GED	268 (78.1)
Race/ethnicity[c]	
White/Caucasian	194 (56.7)
Black/African American	87 (25.4)
Asian/Pacific Islander	13 (3.8)
Native American/Alaskan Native	4 (1.2)
Multiracial/Biracial	24 (7.0)
Other race	20 (5.8)
Hispanic/Latino	51 (14.9)
Marital Status	
Married	154 (44.5)
Divorced	74 (21.4)
Single, Never Married	116 (33.5)
Widowed	2 (0.6)
Traumatic Brain Injury History [d]	67 (19.7)
Mental Health Treatment History	147 (43.5)
Positive PC-PTSD Screen [e]	171 (50.6)
Positive PHQ-2 Depression Screen [f]	80 (23.5)

NOTE: missing data:

[a] $n = 343$,

[b] $n = 343$,

[c] $n = 342$,

[d] $n = 340$,

[e] $n = 338$; Primary Care-PTSD Screener (PC-PTSD),

f_{n}=341, Patient Health Questionnaire-2 (PHQ-2)

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Table 2

Biopsychosocial impact of civic service program completion on OEF/OIF U.S. military veterans (N=346).

Outcome Measures	n	Time 1 Mean (SD)	Time 2 Mean (SD)	Scale range and directionality	Mean change	*Z* (2-tailed)	*P*	*d*
Health Domain								
Perceived Overall Health[a]	331	2.67 (1.07)	2.46 (1.08)	1 (+) to 5 (−)	0.21	-	-	0.20
Perceived Physical Health Interference[a]	327	1.64 (0.70)	1.56 (0.72)	1 (+) to 4 (−)	0.08	-	-	0.11
Perceived Emotional Health Interference[a]	326	1.90 (0.86)	1.73 (0.75)	1 (+) to 4 (−)	0.18	-	-	0.21
Mental Health Domain								
PTSD Screen	327	1.84 (1.72)	1.49 (1.65)	0 (+) to 4 (−)	0.35	−3.83[b]	0.000*	0.21
Depression Screen	328	1.78 (1.67)	1.42 (1.49)	0 (+) to 6 (−)	0.36	−3.79[b]	0.000*	0.23
Psychosocial Domain								
Belief that Life Holds Purpose and Meaning	326	63.02 (11.57)	64.35 (11.17)	14 (−) to 84 (+)	−1.33	−3.03[c]	0.002*	−0.12
Self-Efficacy	326	33.11 (5.01)	34.05 (4.83)	10(−) to 40(+)	−0.94	−3.16[c]	0.002*	−0.19
Social Isolation and Loneliness	327	44.71 (12.01)	41.47 (12.15)	20 (+) to 80 (−)	3.23	−5.92[b]	0.000*	0.27
Perceived Availability of Social Support	329	34.54 (8.37)	36.54 (7.69)	12 (−) to 48 (+)	−2.01	−5.07[b]	0.000*	−0.25

Note. Time 1 reflects the time period before the start of the civic service program and Time 2 is at program completion. For scale range and directionality column, the possible score range is shown and (-) or (+) denotes whether the high or low score is associated with negative or positive outcomes, respectively. Z statistic is from Wilcoxon-signed rank test (2-tailed, $\alpha = 0.05$);

Cohen's d effect sizes = small (0.2), medium (0.5), large (0.8).

[a] variable analyzed for statistical significance with McNemar's test and reported in text;

[b] based on positive ranks;

[c] based on negative ranks;

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* denotes significance at the 0.05 alpha level.

Table 3

Multiple regression analyses for psychosocial outcomes for U.S. military veterans engaged in civic service (N=346).

Independent Variables	Belief that Life Holds Purpose and Meaning[a]			Self-efficacy[a]			Social Isolation and Loneliness[b]			Perceived Availability of Social Support[c]		
	B	***SE*$_B$**	***β***	***B***	***SE*$_B$**	***β***	***B***	***SE*$_B$**	***β***	***B***	***SE*$_B$**	***β***
Intercept	0.64	0.84	-	−0.27	0.41	-	2.00	0.77	-	−0.43	0.58	-
PTSD	−1.78	1.44	−0.08	−1.63	0.70	−0.16*	0.49	1.32	0.03	−1.34	0.98	−0.09
Depression	−5.31	1.56	−0.21*	−0.78	0.76	−0.06	4.78	1.43	0.21*	−2.51	1.06	−0.15*
Seeking Professional Experience	0.57	1.47	0.03	0.79	0.72	0.08	−0.46	1.35	−0.02	−0.62	1.00	−0.04

Note.

B = unstandardized regression coefficient; *SE*$_B$ = standard error of the coefficient; *β* = standardized coefficient; missing data:

* $p < 0.05$;

[a] $n = 322$,

[b] $n = 324$,

[c] $n = 325$.