Military, Demographic, and Psychosocial Predictors of Military Retention in Enlisted Army Soldiers 12 Months After Deployment to Iraq

Jennifer J. Vasterling, PhD*†; Susan P. Proctor, DSc‡§‖; Mihaela Aslan, PhD¶**; John Ko, MS¶**;
Matthew Jakupcak, PhD††‡‡; Christopher B. Harte, PhD*†; Brian P. Marx, PhD*†;
John Concato, MD, MPH¶**

ABSTRACT   Objective: To examine military, demographic, and psychosocial predictors of military retention following operational deployment. Methods: Military status 12 months following return from Iraq deployment was assessed via service records in 740 regular active duty Army Soldiers. Potential predictors of military retention were derived from prospectively administered in-person interviews and questionnaires conducted within 3 months following return from Iraq. Results: At 12 months following return from deployment, 18.1% ($n = 134$) of the sample had separated from military service. Cox proportional hazards analyses, adjusting for demographic, military, and psychosocial predictors, identified several factors that were independently associated with military attrition: less than (vs. equal to or more than) 6 years military experience (hazards ratio [HR], 3.98; 95% CI, 2.12–7.45); unmarried (vs. married) status (HR, 1.51; 95% CI, 1.06–2.16); and lower (vs. higher) levels of self-reported unit support during deployment (HR, 2.22; 95% CI, 1.42–3.47). Conclusions: Service members early in their career may be especially prone to military attrition. With regard to military retention, our findings suggest that it may be particularly important to develop initiatives that target organizational cohesion and support.

INTRODUCTION

Extended military involvement in the Iraq and Afghanistan Wars (Operations Enduring and Iraqi Freedom; OEF/OIF) is one of various potential threats to the retention of an experienced military force. Given that retention of service members holds relevance to the development of future military leaders and also affects the cost and time needed to train new personnel, identification of factors that influence military retention is pivotal. Factors often associated with combat deployments, including exposure to traumatic events, psychological distress, and physical injury,[1,2] have been associated with early attrition from military basic and combat training,[3–6] as well as with lower retention during periods of nonwar time military service.[7–10] In addition, studies of military recruits have found associations between military attrition and demographic factors, such as women being less likely to be retained than men, and older personnel less likely to be retained than younger service members.[7,9,10]

How deployment-related stress exposures and their psychological consequences may be related to occupational functioning and military retention is relatively understudied, especially among service members who served in a war zone. Among military Veterans already separated from service, depression and panic symptoms increased the risk of civilian unemployment, although recent deployment, combat exposure, and a positive screen for posttraumatic stress disorder (PTSD) did not predict self-reported civilian employment status.[11] The few studies examining military retention in relation to mental health concerns among active duty personnel returning from war-zone duty found that screening positive for mental health symptoms following deployment increased the likelihood of separating from military service. Hoge et al[12] found that, within 1 year following return from deployment, military attrition increased by 8% (from 13% to 21%) among OEF Veterans and by 5% (from 16% to 21%) in OIF Veterans. Wright et al[13] surveyed an Army Infantry brigade 6 months after returning from an OIF deployment and found higher rates of mental health symptomatology among Soldiers reporting intention to leave service after fulfilling their current enlistment obligations, relative to Soldiers reporting an intention to stay. The same study found that Soldiers reporting higher perceived organizational support were 26% (from 8% to 41%) less likely to report intent to leave military service, compared with those reporting lower

*National Center for PTSD and Psychology, VA Boston Healthcare System, 150 South Huntington Avenue, Boston, MA 02130.

†Department of Psychiatry, Boston University School of Medicine, 715 Albany Street, Boston, MA 02118.

‡US Army Research Institute for Environmental Medicine, Kansas Street, Building 42, Natick, MA 01760.

§Research Service, VA Boston Healthcare System, 150 South Huntington Avenue, Boston, MA 02130.

‖Department of Environmental Health, Boston University School of Public Health, 715 Albany Street, Boston, MA 02118.

¶Clinical Epidemiology Research Center, VA Connecticut Healthcare System, 950 Campbell Avenue, West Haven, CT 06516.

**Department of Medicine, Yale University School of Medicine, 333 Cedar Street, New Haven, CT 06510.

††VA Puget Sound Healthcare System, 1660 South Columbian Way, Seattle, WA 98108.

‡‡Department of Psychiatry and Behavioral Sciences, University of Washington School of Medicine, 1959 NE Pacific Street, Seattle, WA 98195.

The views expressed in this article are those of the authors and do not reflect the official policy or position of the Department of the Army or Department of Veterans Affairs.

doi: 10.7205/MILMED-D-14-00468

organizational support. Lancaster et al[14] observed a similar association between unit support and intent to re-enlist observed in Army National Guard Soldiers following deployment to Iraq. These findings point to the potential adverse occupational outcomes associated with mental health concerns among service members returning from war-zone service. Importantly, these findings also raise the question of whether contextual psychosocial factors, such as organizational support, moderate the adverse occupational effects of deployment-related stress.

Using archived data gathered from a longitudinal cohort of U.S. Army Soldiers who deployed in support of OIF from 2003 to 2005, the current study examined factors predicting military attrition during the 12-month period following return from deployment. Potential predictors included demographic, occupational, mental health, and health- and cognitive-related functioning factors, as well as aspects of social and organizational support. We hypothesized that military attrition would be most strongly associated with greater exposure to deployment-related psychological (e.g., stressful war-zone events) and physical (e.g., traumatic brain injury [TBI]) stressors, and that military retention would be promoted by both more favorable mental health and functional outcomes following deployment and the availability of social and occupational support.

METHODS

Study Population and Analytic Sample

The analytic sample was drawn from the Neurocognition Deployment Health Study (NDHS[15]) study population. The NDHS, initiated in April 2003, is a longitudinal study of U.S. Army Soldiers originally structured around deployment in support of OIF, with the first assessments occurring before deployment for military units scheduled to deploy, and before a period of garrison duty for nondeployed comparison units. Soldiers were sampled at the battalion level to assure diverse deployment experiences and a representation of combat arms (e.g., infantry), combat support (e.g., combat engineers), and service support (e.g., supply clerks) functions. Within each battalion, potential participants were referred using pseudorandom procedures (e.g., every third person on the roster). Assessments were conducted in person at Army installations. All NDHS participants provided written informed consent for the primary study procedures and were given the additional option to consent to access military administrative records held by the Defense and Manpower Data Center (DMDC). Human subjects' approval was obtained from U.S. Army, Tulane University Health Sciences Center, and U.S. Department of Veterans Affairs review boards.

As depicted in Figure 1, the analytic sample (n = 815) included NDHS cohort members who deployed to Iraq, participated in both pre- and postdeployment assessments while still in service, and served in regular active duty status at pre- and postdeployment assessment (n = 815). All participants were stationed at Fort Hood or Fort Lewis at the time of initial NDHS enrollment. NDHS participants were excluded from the sample if they (a) did not consent to access DMDC records or have DMDC records available (n = 27); (b) did not complete written questionnaires (n = 4); or (c) provided invalid questionnaire responses (n = 24). Given that mechanisms influencing retention could be hypothesized to
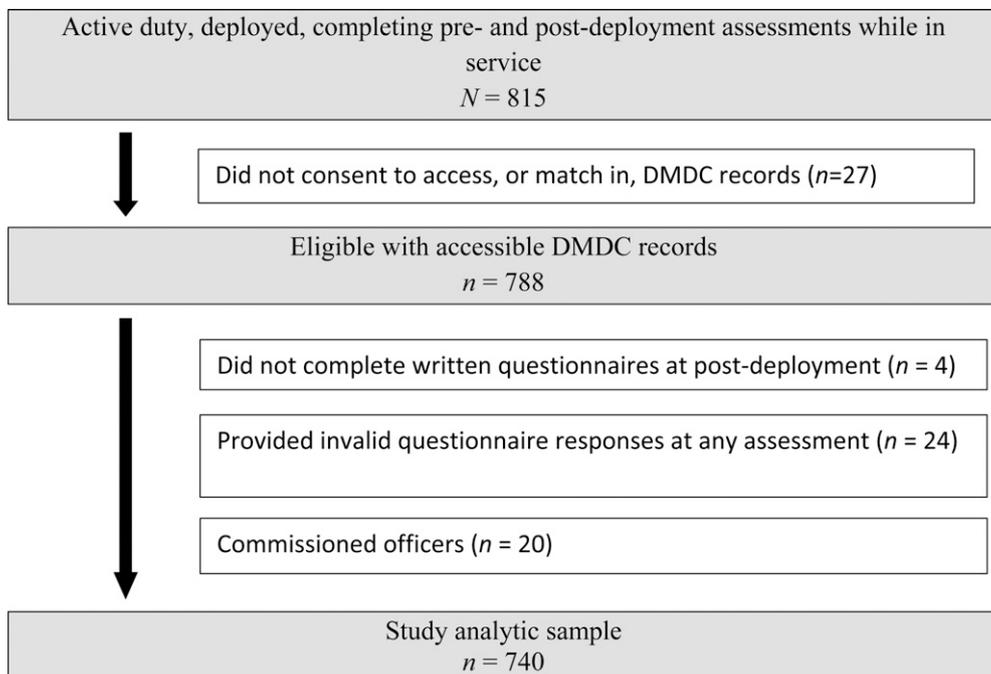
FIGURE 1. Participants from the Neurocognition Deployment Health Study included in this study.

differ in commissioned and warrant officers vs. enlisted personnel, and that there were too few officers to conduct a stratified analysis, commissioned and warrant officers ($n = 20$) were also excluded, yielding an analytic sample of $N = 740$.

Military Attrition

The outcome variable—separation from the military at 12 months post each participant's individual return from their deployment to Iraq—was determined by DMDC records. At the time assessment data were collected, deployments to Iraq were scheduled as 12-month deployments; the time period for our sample began between November 2003 and November 2004, and ended between November 2004 and November 2005, depending on the military unit.

Potential Predictors

Postdeployment emotional distress, war-zone stress exposure, and deployment TBI were predictive variables of particular interest. Emotional distress was measured with the PTSD Checklist-Civilian version (PCL-C[16]), a continuous measure of PTSD symptom severity, and the Center for Epidemiological Studies Depression (CES-D) inventory, 9-item version,[17] a continuous measure of depression severity. These 2 measures had a correlation of $r = 0.70$, but were considered distinct enough, and each of sufficient clinical significance, to warrant assessment and analysis. For sample characterization, a "positive" PTSD screen required Diagnostic and Statistical Manual, 4th Edition, text revision (DSM-IV-TR[18]) symptom congruency and a PCL-C cutoff score of ≥ 50. A "positive" depression screen was established using a validated cutoff value of 4[17].

War-zone stress exposure severity was measured by summing the total scores of the Deployment Risk and Resilience Inventory (DRRI[19]) Combat Experiences and Post-Battle Experiences scales, both event-based scales of common war-zone exposures. The Combat Experiences scale was modified to include an item pertaining to convoy participation. Because of the fluidity of traditional combat and postbattle experiences at the time in Iraq, summary scores from each scale were added to create a single, dimensional war-zone stress exposure variable. This combined score had a potential range of 0 to 31, reflecting the total number of items endorsed by the participant. Deployment TBI, ascertained by structured interview[20] and requiring head injury with at least momentary loss of consciousness, was included as a categorical yes/no variable and captured all TBIs incurred between the pre- and postdeployment NDHS assessments.

Variables thought to potentially moderate the effects of emotional distress and war-zone stress exposure on military retention included deployment military unit support and postdeployment social support. Deployment military unit support was measured by the DRRI Unit Support scale, a continuous measure of support from military peers and leaders.[19] Postdeployment social support was measured by the DRRI Postdeployment Social Support scale, a continuous measure of emotional and instrumental support from friends, family, and society.[19] Somatic- and cognitive-related functional impairments were measured by the Veterans RAND Health Survey (VR-6D[21]) and the Medical Outcomes Study–Cognitive Functioning (MOS-CF[22]) scales, respectively.

Other covariates included postdeployment demographic (age, gender, marital status, and ethnicity) and military (years of military service, rank, prior deployment, and unit type) variables, queried via written survey and interview and, for military variables, confirmed by DMDC data. Our examination of 12-month separation data following an index deployment, which served as the first OEF/OIF deployment for the majority of the sample (see Results), did not allow for the possibility of a second deployment before the study endpoint. Therefore, we did not examine multiple OEF/OIF deployments as a variable.

Statistical Analyses

Data were analyzed using SAS version 9.2 (SAS Institute, Cary, North Carolina) and TIBCO Spotfire S+ version 8.2 (TIBCO Software, Palo Alto, California) software packages. To assist in the interpretation of results, continuous variables are reported and were analyzed in tertiles, with the exception of age and years of service, which were broken into population-relevant categories. Missing values (<3.6% of cases) for most specific items on psychometric questionnaires were imputed using the mean value of each participant's completed items or, for the VR-6D, using modified regression algorithms reflective of the scale methodology.[21] For multi-item scales, if $\geq 50\%$ of individual items were not completed, the entire scale was considered missing for the participant, and no imputation was conducted. Cases were deleted listwise in regression analyses when values were missing.

Participant characteristics, including psychosocial factors and military service variables, were described at postdeployment assessment for these analyses. Next, proportional hazard analysis (Cox regression) was used to determine unadjusted associations of these postdeployment variables with separation from service 12 months after return from deployment, reported as HRs, p values, and 95% confidence intervals (CIs).

In subsequent adjusted analyses, potential predictive variables were entered into a Cox regression model with HRs describing the impact of each variable on the outcome variable of separation from service, accounting for all other variables in the model. Backward elimination procedures were then used to refine the model based on a p value of 0.2 to retain a predictor variable. Model fit was assessed using likelihood ratios, score, and Wald goodness-of-fit tests. As a sensitivity analysis, proportional hazards analyses were modeled with continuous psychosocial variables in their original (vs. tertile) coding. Finally, to allow comparability with published work using clinical cut points, we performed post hoc analyses substituting two-level categorical variables

for the PCL and CES-D that had been generated from the clinical cutoff scores used to describe the sample.

RESULTS

Sample Characteristics

At the postdeployment assessment (Table I), the final sample (N = 740) reflected the OIF-deployed regular active duty enlisted U.S. Army population at the time of the study, although women (8%) were under-represented. Other than the index deployment, only 1.4% (n = 10) had overseas operational deployment to Iraq, Afghanistan, or Kuwait since 2001. At 12-months postdeployment, 606 (81.9%) Soldiers remained in military service, whereas 134 (18.1%) had separated. This rate is somewhat higher than annual attrition rates observed for the total U.S. Army regular active duty Army population with prior deployment experience who separated from service during the same general time period (2005–2007). Among the 122 Soldiers for whom reason for separation was documented, almost all separations (92.6%) reflected declination to re-enlist when the term of service expired. Unsatisfactory performance, disciplinary or conduct problems, retirement, disability, and parenthood accounted for the remaining (7.4%) separations. At postdeployment assessment, 88 participants (11.9%) screened positive for probable PTSD, 142 (19.3%) screened positive for probable depression, and 62 (8.5%) reported experiencing head injury with loss of consciousness between pre-and postdeployment assessment.

Prediction of Military Attrition

Unadjusted analyses (Table I) indicated that among military and demographic variables, younger age, less military experience, not being married, and lower enlisted rank were associated with a greater hazard of military separation 12 months following return from deployment. Among psychosocial variables, lower levels of perceived unit support during deployment increased the likelihood of being separated.

Adjusted analyses (Table II) show the models before and after the backward elimination process. As a final model, backward elimination identified three predictive variables: unit support during deployment, years of military service, and marital status. Overall model fit in comparison to a null model was confirmed by statistically significant goodness-of-fit statistics (all $\chi^2 > 39.8$; all $p < 0.0001$). With regard to particular predictive factors, Soldiers with fewer than 6 years prior military service were almost four times more likely to separate than Soldiers with longer prior service (≥ 6 years); unmarried Soldiers were 1.5 times more likely to separate from service than married Soldiers; and Soldiers reporting the lowest levels of unit support during deployment were over twice as likely to separate from the military compared with those reporting the highest levels of unit support. When adjusted for other variables, rank and age were no longer significantly associated with 12-month service status. In separate analyses, models that used continuous coding of psychosocial

variables revealed similar results: statistically significant associations in the original model remained significant (e.g., level of unit support was highly predictive of separation), and those not reaching statistical significance in the original model remained nonsignificant. Likewise, results were similar when we substituted two-level categorical variables for PCL and CES-D, based on clinical cut points.

DISCUSSION

In a sample of 740 active duty enlisted Army Soldiers who deployed to Iraq, we found that 18% of Soldiers had separated from service within 12 months of returning from their deployment. Fewer than 6 years duration of military service, being unmarried, and lower levels of military unit support, each independently predicted military attrition, after adjusting for demographic factors, emotional distress, deployment stress exposures, health-related functioning, and general social support. Contrary to our hypotheses, we did not observe significant associations of deployment-related psychological (e.g., combat events) and physical (i.e., TBI) stressors, or their emotional and functional sequelae, with military status 12 months following return from deployment.

Soldiers reporting lower levels of unit support were more than twice as likely to separate from service as those reporting higher levels of support from their military peers and leaders. Consistent with these findings, both Wright et al[13] and Lancaster et al[14] documented that organizational support can influence intent to stay in the military, although neither study measured actual retention or separation. Military unit support can be defined as assistance and encouragement obtained from military unit leadership and fellow unit members.[19] Unit support has long been recognized by military leaders as an important component of a healthy work environment, and such support has been found to protect service members from the development and exacerbation of PTSD symptoms in response to prior stressful life events[23] and deployment-related stressors.[24–27] Because our measure of unit support reflected perceptions during the deployment, it is possible that some of its positive impact on military retention may have occurred via its attenuation of deployment-related distress. Alternatively, perceived organizational support is associated with job satisfaction, occupational commitment, and work performance in the civilian workforce.[28] Therefore, military unit support may exert broader benefits on occupational retention than solely those attained via dampening the negative effects of deployment-related stress.

The benefits of support from others in retaining service members in the military may extend beyond the support received from unit members and leaders. Although we did not observe a significant association between our social support scale, which measures societal support in addition to individual assistance and encouragement from family and friends, Soldiers who were married were more likely to be retained than those who were not married. Unfortunately, the quality of marital relationships was not measured, and

TABLE I. Unadjusted Association of Postdeployment Participant Characteristics and Psychosocial Predictors With Separation From Service During 12 Months Following Return From Deployment (*N* = 740)

| Sample Characteristics and Psychosocial Variables | Military Service Status 12 Months Postdeployment Return[a] | | | | | |
| | Overall (*n* = 740) | In Military (*n* = 606) | Separated From Military (*n* = 134) | | | |
	n (%)	*n* (%)	*n* (%)	HR	95% CI	*p* Value
Demographic and Military Variables						
Age						
30 or More Years	153 (20.7%)	136 (88.9%)	17 (11.1%)	[Ref]		
25–29 Years	376 (50.8%)	342 (91.0%)	34 (9.0%)	1.52	0.85–2.71	0.16
Less Than 25 Years	211 (28.5%)	128 (60.7%)	83 (39.3%)	2.15	1.28–3.63	0.004
Duration of Military Service						
6 or More Years	201 (27.2%)	190 (94.5%)	11 (5.5%)	[Ref]		
Less Than 6 Years	539 (72.8%)	416 (77.2%)	123 (22.8%)	4.60	2.48–8.53	<0.0001
Self-Reported Deployment Interval TBI						
No	669 (91.5%)	546 (81.6%)	123 (18.4%)	[Ref]		
Yes	62 (8.5%)	52 (83.9%)	10 (16.1%)	1.15	0.60–2.19	0.67
Sex						
Male	681 (92%)	557 (81.8%)	124 (18.2%)	[Ref]		
Female	59 (8%)	49 (83.1%)	10 (16.9%)	0.93	0.49–1.76	0.82
Race/Ethnicity						
White	421 (56.9%)	337 (80.0%)	84 (20.0%)	[Ref]		
African American	117 (15.8%)	101 (86.3%)	16 (13.7%)	0.67	0.39–1.15	0.15
Hispanic American	102 (13.8%)	85 (83.3%)	17 (16.7%)	0.83	0.49–1.40	0.48
Other	100 (13.5%)	83 (83.0%)	17 (17.0%)	0.86	0.51–1.45	0.56
Marital Status						
Married	380 (51.4%)	331 (87.1%)	49 (12.9%)	[Ref]		
Not Married	359 (48.6%)	275 (76.6%)	84 (23.4%)	1.92	1.35–2.73	0.0003
Military Occupational Type						
Service Support	282 (38.1%)	237 (84.0%)	45 (16.0%)	[Ref]		
Combat Support	116 (15.7%)	89 (76.7%)	27 (23.3%)	1.51	0.93–2.43	0.09
Combat Arms	342 (46.2%)	280 (81.9%)	62 (18.1%)	1.13	0.77–1.67	0.52
Rank (Using Pay Grade)						
Noncommissioned Officers (E5–E9)	355 (48%)	309 (87.0%)	46 (13.0%)	[Ref]		
Junior Enlisted (E1–E4)	385 (52%)	297 (77.1%)	88 (22.9%)	1.88	1.32–2.69	0.0005
Psychosocial Variables (in Tertiles)						
DRRI Life and Family Concerns Scale, Summary Score						
Fewest Concerns (13–20)	260 (35.2%)	214 (82.3%)	46 (17.7%)	[Ref]		
Moderate Concerns (21–26)	215 (29.1%)	170 (79.1%)	45 (20.9%)	1.19	0.79–1.79	0.41
Highest Concerns (27–55)	263 (35.7%)	220 (83.7%)	43 (16.3%)	0.91	0.60–1.40	0.65
DRRI Stressful War-Zone Events[b]						
Lowest Event Exposure (0–13)	242 (32.8%)	199 (82.2%)	43 (17.8%)	[Ref]		
Moderate Event Exposure (14–21)	243 (32.8%)	203 (83.5%)	40 (16.5%)	0.92	0.60–1.42	0.13
Highest Event Exposure (22–31)	254 (34.4%)	203 (79.9%)	51 (20.1%)	1.14	0.76–1.71	0.41
PCL						
Lowest Distress (17–24)	253 (34.3%)	210 (83.0%)	43 (17.0%)	[Ref]		
Moderate Distress (25–36)	250 (33.9%)	208 (83.2%)	42 (16.8%)	0.98	0.64–1.50	0.94
Highest Distress (37–82)	234 (31.8%)	185 (79.1%)	49 (20.9%)	1.23	0.82–1.86	0.32
CES-D						
Lowest Distress (0–4)	269 (36.6%)	230 (85.5%)	39 (14.5%)	[Ref]		
Moderate Distress (5–8)	198 (26.9%)	158 (79.8%)	40 (20.2%)	1.45	0.93–2.26	0.10
Highest Distress (9–26)	269 (36.5%)	214 (79.6%)	55 (20.4%)	1.44	0.96–2.17	0.08
VR-6D, Overall Summary Score						
Highest Functioning (0.796–0.967)	247 (33.4%)	206 (83.4%)	41 (16.6%)	[Ref]		
Moderate Functioning (0.707–0.795)	247 (33.5%)	199 (80.6%)	48 (19.4%)	1.2	0.79–1.82	0.39
Lowest Functioning (0.458–0.706)	244 (33.1%)	200 (82.0%)	44 (18.0%)	1.1	0.72–1.68	0.66
MOS-Cognitive Functioning, Summary Score						
Highest Functioning (86–100)	221 (30.0%)	182 (82.4%)	39 (17.6%)	[Ref]		
Moderate Functioning (66–85)	269 (36.5%)	224 (83.3%)	45 (16.7%)	0.94	0.61–1.45	0.79
Lowest Functioning (0–65)	247 (33.5%)	198 (80.2%)	49 (19.8%)	1.14	0.75–1.73	0.56

(continued)

TABLE I. Continued

Sample Characteristics and Psychosocial Variables	Military Service Status 12 Months Postdeployment Return[a]					
	Overall (n = 740)	In Military (n = 606)	Separated From Military (n = 134)			
	n (%)	n (%)	n (%)	HR	95% CI	p Value
DRRI Unit Support Scale, Summary Score						
Highest Support (44–60)	237 (32.4%)	208 (87.8%)	29 (12.2%)	[Ref]		
Moderate Support (34–43)	255 (34.8%)	210 (82.4%)	45 (17.6%)	1.49	0.93–2.38	0.09
Lowest Support (12–33)	240 (32.8%)	181 (75.4%)	59 (24.6%)	2.16	1.39–3.37	0.0007
DRRI Postdeployment Social Support Scale, Summary Score						
Highest Support (62–75)	237 (32.2%)	199 (84.0%)	38 (16.0%)	[Ref]		
Moderate Support (53–61)	262 (35.5%)	212 (80.9%)	50 (19.1%)	1.24	0.81–1.88	0.33
Lowest Support (19–52)	238 (32.3%)	192 (80.7%)	46 (19.3%)	1.24	0.81–1.90	0.33

HR, hazards ratio; CI, confidence interval; TBI, traumatic brain injury; DRRI, Deployment Risk and Resilience Inventory; PCL, PTSD Checklist; CES-D, Center for Epidemiological Studies Depression Inventory, 9-item version; VR-6D, Veterans RAND Health Survey; MOS, Medical Outcomes Study. [a]The sample size varies slightly across observations because of missing data. [b]Represents a summation of the scores of the DRRI Combat Experiences and Post-Battle Experiences scales.

thus we can only infer that marital status may have served as a proxy for instrumental and/or emotional support. It could also be hypothesized that being married brings with it increased financial responsibilities that motivate continued military service. Regardless of the mechanism by which marital status influences military retention, this finding reinforces recent attention by the military to addressing the needs of military families.[29]

Retention in the Army was also associated with longer duration (6 or more years) of military service. Longer term service may indicate greater commitment to a military career and plans to reach full retirement from the military, which typically requires a minimum of 20 years of service. Although senior rank also predicted military retention in the unadjusted analyses, enlisted rank is typically correlated with years of service and, as suggested by the absence of an association of rank with retention in the adjusted analyses, may be better explained by years of service.

Hoge et al[12] found that mental distress reported during routine postdeployment health assessments from 2003 to 2004 was associated with military attrition. In contrast, we did not observe a significant association between deployment-related psychological stressors, physical injury (i.e., TBI), health-related functioning, or emotional distress—including both PTSD and depression symptoms—and military retention a year following return from deployment. Our findings were similar when using clinical PCL cutoffs identical to those in the Hoge et al[12] study. It may be that differences in study methodology, including the larger sample sized used by Hoge et al[12] and circumstances of reporting (confidential reporting of mental health symptoms in our study vs. nonconfidential reporting in the Hoge et al[12] study), in part explain the differences in findings between the two studies.

Our results also differ from those of prior military studies conducted during periods of non-war-time military service,[3–10] which found associations between military attrition and deployment-related stressors and emotional distress. In our sample of recently returned deployers, it is possible that explicit incentives (e.g., financial re-enlistment bonuses) and implicit factors (e.g., career advancement, continuing to serve with other Soldiers perceived to provide emotional support) outweighed any negative effects of deployment-related stressors and emotional distress. It is noteworthy that Lancaster et al[14] did not find significant associations between postdeployment mental health variables and intent to re-enlist in recently deployed National Guard Soldiers. Horton et al[11] similarly did not find significant associations between job status and prior deployment experiences or PTSD, although their outcome was postservice (vs. military) job status. Unlike our findings, the same study did find associations between civilian unemployment and depression among military Veterans who separated from service via routine military retirement. The mixed results yielded by the literature suggest that associations regarding deployment-related stressors and emotional distress warrant further study.

As a study limitation, we measured military attrition 12 months from return from deployment, not allowing enough time for some service members to reach the end of an enlistment term or to address longer-term predictors of retention. It is also likely that different factors lead to different types of separation. Although our sample was large enough to examine military job status as an outcome, it was not diverse enough with regard to reasons for separation to examine potential differences in predictors of various types of separation from service (e.g., routine retirement, fulfillment of enlistment term, medical discharge, disciplinary actions). Because we examined the service status outcomes of only those NDHS participants who provided postdeployment assessment data, we may have not captured medical discharges (e.g., those attributable to severe TBI or significant psychiatric concerns) that occurred during or soon after deployment. This situation may in part explain the lack of significant associations

TABLE II.   Adjusted Associations of Postdeployment Participant Characteristics and Psychosocial Predictors With Separation From Service During 12 Months Following Return From Deployment (*N* = 740)

Sample Characteristics and Psychosocial Variables	Full Model			Final Model[a]		
	HR	95% CI	*p* Value	HR	95% CI	*p* Value
Demographic and Military Variables						
Age						
30 or More Years	[Ref]					
25–29 Years	0.91	0.48–1.71	0.77			
Less Than 25 Years	0.77	0.42–1.41	0.39			
Duration of Military Service						
6 or More Years	[Ref]					
Less Than 6 years	4.45	2.14–9.25	<0.0001	3.98	2.12–7.45	<0.0001
Self-Reported Deployment Interval TBI						
No	[Ref]					
Yes	1.16	0.60–2.27	0.66			
Sex						
Male	[Ref]					
Female	0.95	0.46–1.96	0.88			
Race/Ethnicity						
White	[Ref]					
African American	0.82	0.46–1.45	0.50			
Hispanic American	0.97	0.56–1.68	0.90			
Other	1.03	0.60–1.77	0.93			
Marital Status						
Married	[Ref]					
Not Married	1.51	1.03–2.22	0.03	1.51	1.06–2.16	0.02
Military Occupational Type						
Service Support	[Ref]					
Combat Support	1.47	0.88–2.45	0.14			
Combat Arms	1.06	0.66–1.68	0.82			
Rank (Using Pay Grade)						
Noncommissioned Officers (E5–E9)	[Ref]					
Junior Enlisted (E1–E4)	1.10	0.73–1.66	0.65			
Psychosocial Variables (in Tertiles)						
DRRI Life and Family Concerns Scale, Summary Score						
Fewest Concerns	[Ref]					
Moderate Concerns	1.27	0.82–1.97	0.28			
Highest Concerns	1.19	0.74–1.92	0.47			
DRRI Stressful War-Zone Events, Summary Score[b]						
Lowest Event Exposure	[Ref]					
Moderate Event Exposure	1.05	0.65–1.69	0.83			
Highest Event Exposure	1.19	0.71–2.00	0.50			
PCL						
Lowest Distress	[Ref]					
Moderate Distress	0.85	0.52–1.37	0.50			
Highest Distress	1.04	0.58–1.85	0.89			
CESD						
Lowest Distress	[Ref]					
Moderate Distress	1.49	0.89–2.48	0.13			
Highest Distress	1.38	0.75–2.52	0.30			
VR-6D, Overall Summary Score						
Highest Functioning	[Ref]					
Moderate Functioning	0.89	0.55–1.45	0.63			
Lowest Functioning	0.66	0.35–1.26	0.21			
MOS-Cognitive Functioning, Summary Score						
Highest Functioning	[Ref]					
Moderate Functioning	0.87	0.54–1.39	0.56			
Lowest Functioning	0.97	0.56–1.68	0.91			

(continued)

TABLE II. Continued

Sample Characteristics and Psychosocial Variables	Full Model			Final Model[a]		
	HR	95% CI	*p* Value	HR	95% CI	*p* Value
DRRI Unit Support Scale, Summary Score						
Highest Support	[Ref]					
Moderate Support	1.42	0.87–2.32	0.16	1.50	0.92–2.33	0.11
Lowest Support	2.24	1.35–3.73	0.002	2.22	1.42–3.47	0.0005
DRRI Postdeployment Social Support Scale, Summary Score						
Highest Support	[Ref]					
Moderate Support	1.09	0.70–1.71	0.70			
Lowest Support	0.88	0.54–1.45	0.62			

HR, hazards ratio; CI, confidence interval; TBI, traumatic brain injury; DRRI, Deployment Risk and Resilience Inventory; PCL, PTSD Checklist; CES-D, Center for Epidemiological Studies Depression Inventory, 9-item version; VR-6D, Veterans RAND Item Health Survey; MOS, Medical Outcomes Study. [a]Model following backward elimination procedures. [b]Represents a summation of the scores of the DRRI Combat Experiences and Post-Battle Experiences scales.

of functional health measures and TBI with military job status. Because Soldiers in our sample were predominantly deployment naïve and deployed to Iraq for uniform 12-month tours, we were not able to examine the potential impact of the number of deployments, length of dwell time (time between deployments), and total duration of time deployed on military retention. Regarding mental health associations, although we used well-validated psychometric measures of PTSD and depression symptoms, we did not clinically assess PTSD or depression diagnoses. Because our sample only included enlisted active duty Army personnel, findings may not generalize to other military branches, commissioned officers, and reservists. Finally, findings based solely on U.S. service members may not generalize to international forces.

CONCLUSION

Occupational retention is determined by multiple individual and environmental factors. During and after a war-zone deployment, the instrumental and emotional support provided by peers and military leaders may be among the very most important of these factors. Organizational support of this type appears to have broad generalizability to the military occupational context, as demonstrated in the current study, as well as to the civilian workforce, as demonstrated by the civilian occupational literature. Our data, obtained from a relatively large sample of recently deployed active duty Army Soldiers, also points to the potential vulnerability to attrition of service members who have been in the military for shorter durations (<6 years), representing those without a more firmly established commitment to a military career. Marital status also influences military retention. Collectively, our results point to several factors that can be addressed on either individual or systems levels. Specifically, our results reinforce attention to organizational interventions (e.g., via leadership training) that can enhance emotional and instrumental support within military units. The results likewise suggest that initiatives intended to enhance retention be focused on the newest members of the military. Relatedly, it

will be informative for future research to identify factors that are most likely to increase retention, specifically within service members with fewer years of service. Finally, the association of retention with marital status requires more nuanced examination, if variables appropriate for family intervention are to be identified.

REFERENCES

1. Hoge CW, Castro CA, Messer SC, McGurk D, Cotting DI, Koffman RL: Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. N Engl J Med 2004; 351: 13–22.
2. Hoge CW, McGurk D, Thomas JL, Cox AL, Engel CC, Castro CA: Mild traumatic brain injury in U.S. Soldiers returning from Iraq. N Engl J Med 2008; 358: 453–63.
3. Merrill LL, Stander VA, Thomsen CJ, Crouch JL, Milner JS: Childhood exposure to family violence and attrition in the Navy. Mil Med 2004; 169(6): 465–9.
4. Patrick V, Critchfield E, Vaccaro T, Campbell J: The relationship of childhood abuse and early separation from the military among Army advanced individual trainees. Mil Med 2011; 176(2): 182–5.
5. Reis JP, Trone DW, Macera CA, Rauh MJ: Factors associated with discharge during marine corps basic training. Mil Med 2007; 172(9): 936–41.
6. Wolfe J, Turner K, Caulfield M, et al: Gender and trauma as predictors of military attrition: a study of Marine Corps recruits. Mil Med 2005; 170(12): 1037–43.

7. Booth-Kewley S, Larson GE, Ryan MA: Predictors of Navy attrition. I. Analysis of 1-year attrition. Mil Med 2002; 167(9): 760–9.

8. Garvey Wilson AL, Messer SC, Hoge CW. U.S. military mental health care utilization and attrition prior to the wars in Iraq and Afghanistan. Soc Psychiatry Psychiatr Epidemiol 2009; 44: 473–81.

9. Hoge CW, Lesikar SE, Guevara R, et al: Mental disorders among U.S. military personnel in the 1990s: association with high levels of health care utilization and early military attrition. Am J Psychiatry 2002; 159: 1576–83.

10. Hoge CW, Toboni HE, Messer SC, Bell N, Amoroso P, Orman DT: The occupational burden of mental disorders in theU.S. military: psychiatric hospitalizations, involuntary separations, and disability. Am J Psychiatry 2005; 162: 585–91.

11. Horton JL, Jacobson IG, Wong CA, et al: The impact of prior deployment experience on civilian employment after military service. Occup Environ Med 2013; 70: 408–17.

12. Hoge CW, Auchterlonie JL, Milliken CS: Mental health problems, use of mental health services, and attrition from military service after returning from deployment to Iraq or Afghanistan. JAMA 2006; 295: 1023–32.

13. Wright PJ, Kim PY, Wilk JE, Thomas JL: The effects of mental health symptoms and organizational climate on intent to leave the military among combat veterans. Mil Med 2012; 177(7): 773–9.

14. Lancaster SL, Erbes CR, Kumpula MJ, Ferrier-Auerbach A, Arbisi PA, Polusny MA: Longitudinal predictors of desire to re-enlist in the military among male and female national guard soldiers. Mil Med 2013; 178(3): 267–73.

15. Vasterling JJ, Proctor SP, Amoroso P, et al: The Neurocognition Deployment Health Study: a prospective cohort study of army soldiers. Mil Med 2006; 171(3): 253–60.

16. Weathers FW, Litz BT, Herman DS, Huska JA, Keane TM: The PTSD Checklist (PCL): reliability, validity, and diagnostic utility. Paper presented at the annual meeting of the International Society for Traumatic Stress Studies; San Antonio, TX, 1993.

17. Santor DA, Coyne JC: Shortening the CES–D to improve its ability to detect cases of depression. Psychol Assess 1997; 9: 233–43.

18. American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, Ed 4, Washington, DC, American Psychiatric Association, 2000.

19. King LA, King DW, Vogt DS, Knight J, Samper RE: Deployment Risk and Resilience Inventory: A collection of measures for studying deployment-related experiences of military personnel and veterans. Mil Psychol 2006; 18: 89–120.

20. Vasterling JJ, Brailey K, Proctor SP, Kane R, Heeren T, Franz M: Neuropsychological outcomes of mild traumatic brain injury, post-traumatic stress disorder and depression in Iraq-deployed US Army soldiers. Br J Psychiatry 2012; 201: 186–92.

21. Selim AJ, Rogers W, Qian SX, Brazier J, Kazis LE: A preference-based measure of health: the VR-6D derived from the veterans RAND 12-Item Health Survey. Qual Life Res 2011; 20: 1337–47.

22. Stewart AL, Ware JE, Sherbourne CD, Wells KB: Psychological stress/well-being and cognitive functioning measures. In: Measuring Functioning and Well-Being: The Medical Outcomes Study Approach, pp 102–42. Edited by Stewart A, Ware J. Durham, NC, Duke University, 1992.

23. Brailey K, Vasterling JJ, Proctor SP, Constans JI, Friedman MJ: PTSD symptoms, life events, and unit cohesion in U.S. soldiers: baseline findings from the neurocognition deployment health study. J Trauma Stress 2007; 20: 495–503.

24. Han SC, Castro F, Lee LO, et al: Military unit support, postdeployment social support, and PTSD symptoms among active duty and National Guard soldiers deployed to Iraq. J Anxiety Disord 2014; 28: 446–53.

25. Pietrzak RH, Johnson DC, Goldstein MB, et al: Psychosocial buffers of traumatic stress, depressive symptoms, and psychosocial difficulties in veterans of Operations Enduring Freedom and Iraqi Freedom: the role of resilience, unit support, and postdeployment social support. J Affect Disord 2010; 120: 188–92.

26. Du Preez J, Sundin J, Wessely S, Fear NT: Unit cohesion and mental health in the UK armed forces. Occup Med (Lond) 2012; 62: 47–53.

27. Jones N, Seddon R, Fear NT, McAllister P, Wessely S, Greenberg N: Leadership, cohesion, morale, and the mental health of UK Armed Forces in Afghanistan. Psychiatry 2012; 75: 49–59.

28. Rhoades L, Eisenberger R: Perceived organizational support: a review of the literature. J Appl Psychol 2002; 87: 698–714.

29. Institute of Medicine: Preventing Psychological Disorders in Service Members and Their Families: An Assessment of Programs. Washington, DC, The National Academies Press, 2014.