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Differential Impact of Combat on Postdeployment Symptoms in Female and Male Veterans of Iraq and Afghanistan

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ABSTRACT Objectives: We aimed to describe differences in combat experience for male and female veterans and characterize differential effects on postdeployment physical and mental health symptoms, including aggression. Methods: Retrospective cross-sectional health screening data from 554 Operation Enduring Freedom and Operation Iraqi Freedom veterans who enrolled for Veterans Affairs health care in San Diego were examined including measures of combat experience, pain intensity, traumatic brain injury symptoms, military sexual trauma, post-traumatic stress disorder, depression, alcohol use, and aggression. Results: Although male veterans (n = 458) experienced significantly higher rates of combat than female veterans (n = 96), both experienced similar levels of postdeployment post-traumatic stress disorder and depression symptoms as well self-reported aggressive behavior compared to male veterans. Female veterans had higher rates of military sexual trauma and lower alcohol consumption than male veterans. Conclusions: All Operation Enduring Freedom and Operation Iraqi Freedom veterans returning from deployment may benefit from broad-based screening of physical and mental health symptoms, beyond those currently mandated by Veterans Affairs, including anger and aggression.

INTRODUCTION

The number of women serving in the U.S. military has grown steadily in the past decade, now representing about 15% of active military and 17% of National Guard and Reserve personnel.[1] The combination of more women in military service and the protracted conflicts in both Iraq and Afghanistan has resulted in a greater proportion of women being deployed to combat zones. In 2006, for example, 10% of service members deployed in support of Operation Enduring Freedom and Operation Iraqi Freedom (OEF/OIF) were women.[2] Although women were not assigned to combat positions, OEF/OIF deployments have put an increasing number of female service members in environments where they experience direct or indirect hostile action. Because of the recent changes in Federal legislation and Department of Defense policies, over 90% of all U.S. military occupations are now open to women,[3] and recent legislation will allow women to serve in combat positions by 2016.[4] In late November 2013, the first three female Marines graduated infantry training, although they are not designated to be assigned to an infantry unit any time soon.[5] Currently, many women serve in combat support units, increasing the likelihood of exposure to enemy fire and other types of direct engagement with combatants,[6] and women will be even more likely to directly engage in combat in the near future.[4] The tactics of asymmetrical warfare such as improvised explosive devices in Iraq and Afghanistan have blurred the front line of fighting and put women in unprecedented danger of attack. Based on recent reports, as many as 74% of deployed women have had one or more combat experiences such as firing a weapon at the enemy or receiving incoming fire.[7]

Despite the increased efforts of the Department of Veterans Affairs (VA) to address the specific physical and mental health care needs of female OEF/OIF veterans,[1] research on gender effects of combat is either scant or inconsistent.[8] Most studies on the health status of OEF/OIF veterans have centered on mental health, specifically, depression and post-traumatic stress disorder (PTSD).[9–14] For example, both men and women who experienced combat appear to have higher rates of depression than those who did not deploy or did not experience combat while deployed, but gender differences were not examined.[15] One study of OEF/OIF veterans, however, found that 48% of women and 39% of men screened positive for depression, whereas 21% of women and 33% of men screened positive for PTSD.[1] Other researchers suggest that because women experience substantially higher rates of sexual assault and harassment in the military, they may be twice as likely to develop PTSD as men.[3] Alternately, studies of alcohol misuse have found lower rates of problematic drinking in female OIF/OEF veterans than in their male counterparts.[16] Further, gender differences in the physical health of OEF/OIF veterans appear to differ from those found in the general population, with male OEF/OIF veterans more likely than female veterans to report pain.[1]

Research on violent or aggressive behavior, a critical outcome of combat experience in OEF/OIF veterans, has shown that returning Iraq soldiers with greater exposure to combat experiences displayed increased physical and verbal aggression toward others,[17] and that OEF/OIF veterans' exposure to

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combat was significantly correlated with aggressive urges, difficulty managing anger, and problems controlling violence.[18] When compared with Persian Gulf and Vietnam veterans, OEF/OIF veterans who were seeking PTSD treatment exhibited more violent behavior.[19] However, no gender differences were investigated in any of these studies. The limited research on anger and aggression in female veterans suggests that those without PTSD have lower levels of hostility,[20] although 30% of female OEF/OIF veterans have identified anger and aggression as a concern.[21]

Previous investigations suggest that there is a detrimental effect of combat on physical and mental health functioning of both male and female veterans across multiple domains. However, few studies have focused on gender differences in response to combat, and those studies that have, yield inconsistent findings. Studies of aggression as a part of postdeployment heath are becoming more common.[22,23] However, to our knowledge, no studies have examined the differential impact of combat experience on aggression in male and female OEF/OIF veterans. The aims of this study were to (a) characterize differences in rates of combat experience for male and female OEF/OIF veterans, (b) examine the relationship between combat experience and gender with postdeployment physical and mental health symptoms, and (c) determine the effects of combat on postdeployment aggression in male and female veterans.

METHODS

Participants and Procedures

This study was part of a larger retrospective cross-sectional evaluation of OEF/OIF veterans registering for care at the VA San Diego Healthcare System (VASDHS) between May 1, 2009 and December 3, 2010. All OEF/OIF veterans who presented to the two primary VASDHS Member Services offices for enrollment into VA health care completed a packet of self-report instruments as part of a clinical program to screen newly enrolling veterans for physical and mental health care needs and OEF/OIF Care Management Program Services. A total of 1,363 veterans who presented in person completed the instruments. Analyses presented here focus on a subset of 554 veterans who were administered the measure of aggression as part of their enrollment in 2010. The project was approved by the University of California, San Diego Institutional Review Board and the VASDHS Institutional Review Board, and the Research and Development Committee.

Measures

Demographics

Demographic information included sex, age, race and ethnicity, education level, current employment, marital status, military service history including rank, branch of service, and number and location of deployments.

Combat Experience

Combat experience was assessed by the question, "Did your military experience include exposure to combat?" Respondents were presented with a list of 10 combat experiences, such as firing at the enemy, caring for wounded, receiving small-arms fire, and seeing dead bodies, similar to those used in previous research.[13] Respondents were asked to "select all that apply"; responses were then coded into a dichotomous "yes" or "no" response for each of the 10 experiences.

Somatic Symptoms

The Patient Health Questionnaire 15-Item Somatic Symptom Severity Scale (PHQ-15) was used to measure somatic symptoms such as stomach pain, back pain, headaches, and trouble sleeping.[24] Each item on the PHQ-15 is scored on a 3-point scale with a maximum score of 30. Higher scores indicate greater somatic symptom severity. The PHQ-15 has high internal consistency,[24] with a Cronbach's α of 0.83 in our sample.

Pain Intensity

Pain intensity was assessed using a numerical rating scale from 0 to 10, anchored at "no pain at all" and "worst pain ever," respectively. A rating of 4 or greater was considered to be clinically significant pain.[1]

Traumatic Brain Injury

History of traumatic brain injury (TBI) with concurrent potentially related symptoms was assessed using the 4-item VA TBI (BITBIS) screen.[25] A positive screen for TBI-related symptoms required one or more positive responses in each of the following categories: events that may increase the risk of TBI, immediate symptoms following the event, new or worsening symptoms, and current symptoms. The VA TBI screen has high internal consistency (0.77) and test–retest reliability (0.80), high sensitivity (0.94), and moderate specificity (0.59).[26]

Military Sexual Trauma

Military sexual trauma (MST) was assessed by 2 VA created questions: "When you were in the military, did you ever receive uninvited and unwanted sexual attention (i.e., touching, cornering, pressure for sexual favors, verbal remarks, etc?" and "When you were in the military, did anyone ever use force or the threat of force to have sex with you against your will?".[27] A positive screen required an affirmative answer to either of these questions. Prior research has shown this measure to be an effective screen for MST.[28]

Post-Traumatic Stress Disorder

In compliance with the standard practice within the VA health care system, the PTSD Checklist—Civilian Version (PCL-C) was used to screen for PTSD symptoms. The PCL-C is a 17-item measure, with items scored on a 5-point scale indicating the degree to which respondents were bothered by a particular PTSD symptom over the past month.[29]

The maximum score is 85; higher scores indicate greater severity. The PCL-C has high internal consistency in both military and nonclinical populations,[30,31] with a Cronbach's α of 0.97 in our sample.

Depression

The Patient Health Questionnaire 9-Item Depression Module was used as a measure of depression symptom severity.[32] Items are rated on a 4-point scale with a maximum score of 27. Higher scores indicate greater severity. The Patient Health Questionnaire 9-Item Depression Module has high internal consistency,[32] with a Cronbach's α of 0.91 in our sample.

Alcohol Use

The Alcohol Use Disorders Identification Test was used to assess hazardous alcohol consumption.[33] Items are scored on a 4-point scale with a maximum total score of 12 points. This instrument has high internal consistency,[34] with a Cronbach's α of 0.82 in our sample.

Aggression

The Retrospective Overt Aggression Scale (ROAS) was used to measure aggressive behavior.[35] The 16-item ROAS has 4 subscales corresponding with verbal aggression (range 0–40), physical aggression toward objects (range 0–56), physical aggression toward others (range 0–72), and physical aggression toward self (range 0–72). Each item is scored on a weighted scale to reflect the severity and frequency of aggressive incidents, with higher score indicating greater aggression over the previous month. The ROAS is internally consistent in veterans,[35] with a Cronbach's α of 0.85 in our sample. Internal consistency for each of the 4 subscales was also good, with Cronbach's α ranging from 0.75 to 0.89.

Analyses

Pearson's χ^2 analyses with categorical variables and independent-samples *t*-tests for continuous variables were used to characterize the sample and examine differences in demographics, rates of combat experience, and rates of positive screens for MST and TBI. Fisher's exact tests were used for categorical variables in which cell counts were less than 5. After examining the distribution of the primary continuous variables for normality, a series of 2-way between-group analyses of variance (ANOVAs) were conducted with combat experience and gender as independent variables and the normally distributed continuous physical and mental health symptom scores as dependent variables. Post hoc simple effects tests were conducted for any significant interactions. For the continuous variables that were not normally distributed (the 4 ROAS subscales), the subscale scores were first log-transformed and then the 2-way between-group ANOVAs were conducted as described above. The alpha level was not adjusted for multiple comparisons with the Bonferonni correction because all analyses were exploratory; however, the significance level was set at 0.01 based on recommendations for unequal group sizes.[36] All analyses were performed using SPSS version 16.0.1.

RESULTS

Of the 554 OEF/OIF veterans with complete aggression data, 96 were women. Table I presents the demographic characteristics of the entire sample and by gender. Veterans were 30.6 years old on average and the majority (64.4%) was Caucasian. Consistent with the demographic makeup of the geographical area, there were substantial numbers of Hispanic (31.3%) and African-American (15.9%) veterans. Forty percent of the sample was married or living with a partner. At the time of screening, 62.9% were unemployed and 58.1% had some college education. The majority of the veterans had served in the Navy/Coast Guard (47.1%), Marines (31.1%), and Army (15.3%); 72.8% held ranks of E4 to E6 on discharge. Over half (58.8%) reported more than one deployment. Compared to male veterans, female veterans were better educated (Fisher's exact test = 15.54, p= 0.003), served in the Navy (Fisher's exact test = 13.57, p = 0.008) and had fewer deployments (χ^2 (1, n = 546) = 10.79, p = 0.002).

Additionally, 34% of the entire sample reported experiencing TBI-related symptoms and 5.9% reported MST. Although 36.8% of men and 18.9% of women reported TBI-related symptoms, that difference was not statistically significant (χ^2 (1, n = 338) = 5.66, p = 0.02) based on our established criteria. The rate of MST in men and women was 2.7% and 21.1%, respectively. As expected, this difference was significant (χ^2 (1, n = 547) = 44.96, $p < 0.001$).

Rates of Combat Experience

Table II presents the rates of combat experience for 10 typical combat exposures by gender. A majority of the women (61.3%) and a third of the men (33.5%) reported no combat experience. The most frequent types of combat experience for women were receiving rocket or mortar fire (28.0%), seeing dead bodies (14.0%), caring for the wounded (12.9%), and receiving small-arms fire (11.8%). Men frequently experienced receiving rocket or mortar fire (49.2%), receiving small-arms fire (39.5%), seeing dead bodies (38.8%), clearing or searching buildings (29.0%), attacks or ambushes (27.9%), and firing their weapons at the enemy (27.3%). Aside from hand-to-hand combat, which occurred rarely, female veterans experienced significantly lower rates of all combat exposures compared to male veterans (all $p < 0.01$).

Effects of Combat and Sex on Postdeployment Symptoms

Table III presents the means and standard deviations (SDs) of the symptom scores by combat experience and gender, as well as the results of the 2-way ANOVAs for each of the dependent variables. There were significant main effects of combat on PTSD ($p < 0.001$) and depression symptoms

TABLE I. Characteristics of Operation Enduring Freedom/Operation Iraqi Freedom Veterans for the Overall Sample and by Gender[a]

Characteristics	Overall, $N = 554$, n (%)	Female, $N = 96$, n (%)	Male, $N = 458$, n (%)
Age, Mean (SD)	30.61 (8.1)	29.91 (8.2)	30.76 (8.1)
Ethnicity			
Hispanic/Latino	118 (31.3)	27 (34.6)	91 (30.4)
Race			
Asian/Native Hawaiian/Pacific Islander	48 (9.5)	8 (9.6)	40 (9.5)
Black/African-American	80 (15.9)	18 (21.7)	62 (14.8)
Other/Multiracial	51 (10.1)	6 (7.2)	45 (10.7)
White/Caucasian	324 (64.4)	51 (61.5)	273 (65.0)
Marital Status			
Never Married	211 (38.4)	43 (44.8)	168 (36.9)
Married/Living With Partner	220 (40.0)	32 (33.3)	188(41.2)
Separated/Divorced	120 (21.6)	21 (21.9)	98 (21.5)
Employment			
None	377 (69.2)	73 (76.0)	304 (67.7)
Full Time	120 (22.0)	15 (15.6)	105 (23.4)
Part Time	48 (8.8)	8 (8.3)	40 (8.9)
Education[b]			
Some High School	9 (1.6)	2 (2.1)	7 (1.5)
GED/High School Diploma	149 (26.9)	11 (11.5)	138 (30.1)
Some College/Associates Degree	322 (58.1)	64 (66.6)	258 (56.3)
4-Year College Degree	48 (8.7)	12 (12.5)	36 (7.9)
Advanced degree, e.g., MA, MD	26 (4.7)	7 (7.3)	19 (4.2)
Branch of Service			
Air Force	21 (3.8)	3 (3.1)	18 (4.0)
Army	84 (15.3)	9 (9.4)	75 (16.6)
Marines	171 (31.1)	20 (20.8)	151 (33.3)
National Guard	14 (2.6)	4 (4.2)	10 (2.2)
Navy/Coast Guard[b]	259 (47.1)	60 (62.5)	199 (43.9)
Military Rank			
E1–E3	65 (11.9)	10 (10.8)	55 (12.2)
E4–E6	396 (72.8)	70 (75.3)	326 (72.3)
E7–E9	47 (8.6)	7 (7.5)	40 (8.9)
Officers	36 (6.6)	6 (6.5)	30 (6.7)
Number of Deployments[b]			
1	225 (41.2)	53 (56.4)	172 (38.1)
>1	321 (58.8)	41 (43.6)	280 (61.9)

[a]Because of missing data, the sample for each variable may not sum to total N of 554. Sample size for females ranged from 78 to 96, and male sample size ranged from 299 to 458. [b]Significant difference between men and women.

TABLE II. Differences in Rates of Combat Experience by Gender

Combat Experience Type	Female, $N = 93$, n (%)	Male, $N = 451$, n (%)	p
None	57 (61.3)	151 (33.5)	<0.001
Attacked or Ambushed	7 (7.5)	126 (27.9)	<0.001
Fire Weapons at the Enemy	5 (5.4)	123 (27.3)	<0.001
Hand-to-Hand Combat	0 (0)	16 (3.5)	0.087
Care for Wounded	12 (12.9)	118 (26.2)	0.009
Receive Rocket/Mortar Fire	26 (28.0)	222 (49.2)	<0.001
See Dead Bodies	13 (14.0)	175 (38.8)	<0.001
Clear/Search Buildings	5 (5.4)	131 (29.0)	<0.001
Receive Small-Arms Fire	11 (11.8)	178 (39.5)	<0.001
Handle Human Remains	5 (5.4)	78 (17.3)	0.006
Someone Killed Near Them	8 (8.6)	108 (23.9)	0.002

($p = 0.002$). Veterans who had experienced combat had higher PTSD and depression symptom scores than those who did not experience combat. There was also a main effect of gender on alcohol consumption ($p = 0.003$), with women having significantly lower alcohol consumption than men. Although those who experienced combat had higher somatic symptom scores ($p = 0.03$) and greater alcohol consumption ($p = 0.02$) than those who did not experience combat, these differences were not statistically significant based on our established criteria. Likewise, women had higher somatic symptom scores than men, but the difference was not statistically significant ($p = 0.05$).

Effects of Combat and Gender on Postdeployment Aggression

As shown in the bottom half of Table III, analyses of log-transformed data revealed a significant main effect of combat

TABLE III. Means and Standard Deviations, and Effects of Combat Experience and Gender on Physical and Mental Health Symptoms

	Female		Male		2-Way ANOVAs			
Measures	No Combat Mean (SD)	Combat Mean (SD)	No Combat Mean (SD)	Combat Mean (SD)	df	Combat F (*p*)	Gender F (*p*)	Combat × Gender F (*p*)
Somatic Symptoms	7.83 (4.71)	8.60 (5.26)	5.83 (4.52)	8.00 (5.56)	436	4.90 (0.03)	3.83 (0.05)	1.12 (0.29)
Pain Intensity	4.67 (2.98)	4.68 (2.68)	4.70 (2.90)	5.13 (2.88)	531	0.40 (0.53)	0.48 (0.49)	0.36 (0.55)
PTSD Symptoms	25.00 (14.56)	32.89 (18.13)	25.54 (12.69)	35.83 (17.70)	526	22.05 (**<0.001**)	0.81 (0.37)	0.39 (0.53)
Depression Symptoms	5.35 (6.24)	6.79 (7.10)	4.30 (4.98)	7.64 (6.80)	504	0.99 (**0.002**)	0.02 (0.89)	1.54 (0.22)
Alcohol Consumption	3.21 (2.59)	3.55 (2.73)	3.81 (2.70)	5.10 (3.18)	534	5.13 (0.02)	9.09 (**0.003**)	1.76 (0.19)
Verbal Aggression[a]	0.77 (1.60)	2.28 (3.05)	1.47 (2.42)	2.55 (3.35)	540	16.70 (**<0.001**)	3.17 (0.07)	0.55 (0.46)
Aggression Toward Objects[a]	0.67 (1.56)	1.83 (3.14)	1.09 (2.57)	2.68 (6.46)	540	8.94 (**0.003**)	0.59 (0.44)	0.01 (0.94)
Aggression Toward Others[a]	0.12 (0.92)	0.72 (2.24)	0.19 (1.13)	0.94 (5.04)	540	6.26 (**0.01**)	0.05 (0.82)	0.44 (0.51)
Aggression Toward Self[a]	0.46 (1.80)	2.86 (11.45)	0.76 (4.22)	0.70 (2.53)	540	2.34 (0.13)	0.83 (0.36)	1.50 (0.22)

[a]For the aggression measures, the test statistics are based on analyses with log-transformed data; however, the means and standard deviations are presented untransformed for ease of interpretation. Bolded values are statistically significant at $p < .01$.

on verbal aggression ($p < 0.001$), aggression toward objects ($p = 0.003$), and aggression toward others ($p = 0.01$). Veterans who had experienced combat had higher verbal aggression, object aggression, and other aggression scores than those who did not experience combat. There were no significant main effects of gender or interaction effects for any of the aggression domains. Because of the exploratory nature of our approach, we visually examined the profile plots of the estimated marginal means of the log-transformed aggression scores by combat and gender status to see if there were potentially important clinical differences despite lack of statistical significance. The visual inspection of plots for verbal, object, and other aggression was consistent with the statistical findings. For aggression toward self (Fig. 1), although not statistically significant, female veterans who experienced combat appeared to have substantially greater physical aggression toward self than those with no combat (F (1,540) = 2.32, $p = 0.12$), with a 135.4% difference in log-transformed mean scores for women with and without combat experience. In contrast, combat experience did not seem to have an effect on physical aggression toward self in male veterans (F (1,540) = 0.13, $p = 0.72$), with a 13.3% difference in log-transformed mean scores for men with and without combat experience.

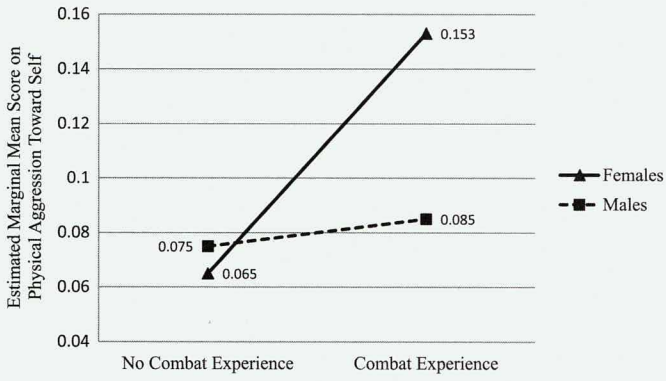

FIGURE 1. Estimated marginal means of the log-transformed score for physical aggression toward self for male and female veterans with and without combat experience.

DISCUSSION

We found that male OEF/OIF veterans had significantly higher rates of combat than female veterans across almost all of the measured domains. Regardless of gender differences in combat experience, all veterans who experienced combat had significantly increased mental health symptoms across a range of assessed domains including PTSD and depression symptoms, and verbal, object, and other aggression. There was also a trend for increased somatic symptoms and alcohol consumption in relation to increased combat experience. In contrast, there were gender differences in rates of MST and level of alcohol consumption, with female veterans showing significantly higher rates of MST and lower alcohol consumption, and a trend toward increased somatic symptoms compared to male veterans.

Our findings on the impact of combat on an array of postdeployment mental health symptoms are consistent with the previous literature.[13,23,37] The higher MST rates and lower alcohol consumption in female OEF/OIF veterans also is consistent with previous research.[1,16] We did not find a statistically significant impact of combat or gender on somatic symptoms and pain intensity ratings, although those with combat experience and women did show a trend toward increased somatic symptoms. Future research can further examine the impact of combat on physical health symptoms to determine if the increased physical health symptoms in veterans are related to the general experience of serving in the military or are impacted significantly by experiences specific to combat or gender.

Additionally, the gender differences in the rates of combat and the apparent lack of gender differences on postdeployment physical and mental health symptoms are generally consistent with the previous literature.[1,9–13,15] Interestingly, we found that although women had lower rates of combat experience than men, they reported similar levels of PTSD and depression symptoms as well self-reported aggressive behavior.

There are several potential explanations for what appears to be a paradoxical effect. First, our findings were based on brief screening tools; more comprehensive assessments may identify gender differences in postdeployment mental and physical health. Second, the substantial and negative postdeployment health in female veterans, despite lower rates of combat experience, could be as a result of their higher levels of MST.[3] Clearly, future research with much larger sample of veterans will be needed to better examine the role of MST alone and in combination with combat exposure in the postdeployment health of female and male veterans. Finally, it is possible that women may be more susceptible to the effects of combat at lower levels. There is a small body of research suggesting high rates of childhood trauma in female veterans[38,39]; thus, the negative postdeployment symptoms may be a result of the cumulative effects of multiple traumas in female veterans. Together our findings highlight the need to further examine the complex contributions of military and deployment experiences in men and women to better assess, prevent, and treat symptoms in multiple domains in all OEF/OIF veterans.

We found that 69.2% of the sample reported themselves to be unemployed. Although concerning, the high rate of unemployment among veterans is not surprising given that veterans typically report finding a job as the most difficult part of transitioning out of the military.[40] Nonetheless, current statistics on veteran unemployment vary widely[41,42] and the overwhelming rate in our sample was worthy of investigation. In further reviewing the available data on our sample, we found that 29.5% of the veterans were receiving GI Bill funds indicating student status, another 11.6% were receiving disability, and 7.9% retirement pay. Further, only 27.5% of the veterans were collecting unemployment similar to previous research on rates of veteran unemployment reported in 2009 to 2010.[41,42]

To our knowledge, this is the first study to examine the differential impact of combat on aggression in male and female OEF/OIF veterans. We found a significant effect of combat on aggression across several domains regardless of gender. Although recent studies have found similar negative effects of combat on aggression in male veterans,[23,43] we are the first to report similar findings in female veterans. In this regard, a recent qualitative study found that many female OEF/OIF veterans identified anger and aggression as well as behavioral and cognitive avoidance as concerns that require treatment.[21] Although the role of PTSD, depression, substance use, and other mental health symptoms in the link between combat experience and aggression in male veterans has been studied, no such literature exists for female veterans to help delineate the potential mediators and moderators of aggressive behavior in women. We also found a nonsignificant but potentially clinically important interaction effect of combat and gender on aggression toward self, with a 135.4% difference in log-transformed self-aggression scores for women with and without combat experience in contrast to a 13.3% difference for men with and without combat experience. Our measure of aggression toward self, included items such as scratching the skin, hitting or cutting oneself, and head banging. These forms of self-injurious behavior are relatively common among young women[44] and may indicate avoidant and detrimental ways of regulating negative emotions and other life stressors. Further, self-injurious behavior are correlated with psychiatric conditions including borderline personality disorder, eating disorders, depressive and anxiety disorders, and PTSD,[45] that if left undiagnosed and untreated, can lead to substantial burden to veterans. Although we did not clinically assess for any of these disorders nor did we assess suicidal self-injurious behavior, our combined findings on the relationship between combat and aggressive behavior in women supports the need for systematic and comprehensive research to better understand the association and to delineate the role of psychiatric conditions on the impact of combat on aggression, especially nonsuicidal and suicidal self-injurious behavior, in female veterans.[46]

This study has several limitations. First, our findings were based on a population of OEF/OIF veterans enrolling for VA health care at a single facility and do not necessarily represent OEF/OIF veterans at other facilities or those who do not seek care at the VA. In addition, this study used self-reported screening data that may be subject to reporting bias and should be validated with clinical examinations and diagnostic interviews in future studies. A related weakness, this study used some nonstandardized self-report screens created by the VA that have not undergone psychometric testing. Second, potential stigma associated with reporting aggressive or self-injurious behavior,[47] specifically in veterans,[48] may have resulted in underreporting of behavior and symptoms. If so, our findings are likely a conservative estimate. Third, our sample was not large enough to be able to examine the impact of MST on postdeployment physical and mental health or to determine the potential cumulative impact of MST and combat. Future research with much larger samples that include more women and more men who report MST are needed to address those questions. Fourth, our conclusions about the impact of combat on postdeployment symptoms must be tentative given the cross-sectional nature of the data. Longitudinal data are needed to confirm the direction of the link between combat and postdeployment symptoms. Finally, we did not collect information on childhood, interpersonal, and noncombat experiences that could be related to self-injurious behavior and other symptoms.

Implications for Practice and Policy

Primary care and integrated behavioral health providers are often on the front lines of identifying and addressing veterans' physical and mental health care needs. Our findings suggest that all OEF/OIF veterans returning from deployment may benefit from broad-based screening of physical and mental health symptoms, beyond those currently mandated by VA, including anger and aggression. The VA health care

system has been at the forefront of developing anger management interventions that address veterans' combat experience.[49,50] However, these interventions have been designed primarily for male veterans and different approaches to anger management may be necessary to address the needs of female veterans. Future research should focus on better understanding the link between combat experience and aggressive behavior in female veterans, as well as the likely complex relationship with PTSD, depression, and other sequelae of combat.[23] This research can inform a more comprehensive approach to treating postdeployment symptoms in female veterans.

CONCLUSIONS

In conclusion, we found that female OEF/OIF veterans had lower rates of combat but reported similar levels of PTSD and depression symptoms as well self-reported aggressive behavior compared to male veterans. Future research can further elucidate the complex effects of combat on postdeployment symptoms including aggressive behavior in female veterans. As the VA serves increasing numbers of female OEF/OIF veterans, it is crucial to meet their unique health care needs following combat deployments.

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