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The Association Between Military Sexual Trauma and Use of VA and non-VA Healthcare Services among Female Veterans with Military Service in Iraq or Afghanistan

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Abstract

Military sexual trauma (MST) has been linked with increased rates of mental health disorders among veterans. Few studies have addressed how military sexual trauma is related to use of VA and non-VA health care. The purpose of the current study was to (1) examine the association between MST, combat experiences and mental health outcomes (i.e., PTSD and depression) and (2) examine the association of MST and use of VA and non-VA health care services among female veterans who served in Iraq and Afghanistan. Female respondents to a survey assessing OEF/OIF veterans' needs and health (N=185) completed measures of demographic variables, military history, combat exposure, MST, PTSD and depression symptoms, and use of VA and non-VA healthcare. Overall, 70% of the sample experienced one or more combat-related experiences and 15.7% endorsed MST during deployment to Iraq or Afghanistan. MST and combat exposure were both positively associated with PTSD and depression symptoms even after controlling for the effects of demographic and military history variables; the interaction between MST and combat exposure was not a significant predictor of PTSD or depression symptoms. MST was associated with increased use of VA mental health services in bivariate results but was not independently related to VA service utilization after accounting for PTSD and depression symptoms. MST and combat exposure are significantly related to PTSD and depression symptoms among female

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Conflict of interest
All of the authors declare that they have no conflicts of interest.

OEF/OIF veterans, but there was not a synergistic effect of these two types of trauma in the current study. Approximately half of women who report MST have not used VA healthcare. Continued outreach and education initiatives may be needed to ensure veterans understand the resources available to address MST related mental and physical health problems through the VA.

Keywords

military sexual trauma; Operation Iraqi Freedom (OIF); Operation Enduring Freedom (OEF); veterans; service use

The number of women in the U.S. military has been steadily increasing over the past 20 years (VA, 2011). Recent conflicts in Afghanistan (Operation Enduring Freedom; OEF) and Iraq (Operation Iraqi Freedom; OIF) involved guerilla warfare tactics and shifting front lines which resulted in women being exposed to greater levels of violence and combat exposure compared to previous wars (Hoge, Clark, & Castro, 2007; Maguen, Luxton, Skopp, & Madden, 2012; Street, Vogt, & Dutra, 2009). The ban on women serving in direct combat roles was lifted in 2013 (Roulo, 2013), which is likely to increase combat exposure among women in future conflicts. Severity of combat exposure is strongly associated with risk of development of posttraumatic stress disorder (PTSD) and the accumulation of multiple traumatic events has a cumulative effect on mental health outcomes (Green, Calhoun, Dennis, Mid-Atlantic Research Education and Clinical Center Workgroup, & Beckham, 2010; Scott et al., 2014).

Unfortunately, combat exposure is not the only potentially traumatic experience that women may experience while deployed. Women are at increased risk of experiencing interpersonal stressors including sexual assault and harassment than their male counterparts (Street et al., 2009). Sexual assault includes all forms of unwanted, coerced physical sexual contact ranging from unwanted touching to rape; sexual harassment includes a wide range of behaviors, such as repetitive unwelcome comments about physical appearance or of a sexual nature, repetitive unwelcome sexual jokes, and promise of rewards in exchange for sexual favors (e.g., a condition for employment, promise of a more desirable duty station or performance evaluation; (Paludi & Barickman, 1991; Street et al., 2009).

Military sexual trauma (MST) is defined by the Veterans Administration (VA) as “sexual harassment that is threatening in character or physical assault of a sexual nature that occurred while the victim was in the military, regardless of geographic location of the trauma, gender of victim, or the relationship to the perpetrator” (Kimerling, Gima, Smith, Street, & Frayne, 2007). Like combat experiences, MST has been associated with increased risk of mental and physical health problems (Kimerling et al., 2007; Kimerling et al., 2010; Sadler, Booth, Mengeling, & Doebbeling, 2004; Skinner et al., 2000; Suris & Lind, 2008; Suris, Lind, Kashner, Borman, & Petty, 2004). For this reason, the VA implemented universal MST screening in 2002 and currently provides free treatment for all MST-related conditions consistent with the mandate of Public Law 108–422 signed in 2004 (Kimerling et al., 2007).

Estimates of the prevalence of MST vary significantly depending on sample characteristics and data collection methods with rates ranging from 0.4% to 71% (see (Suris & Lind, 2008), for a review). Several recent studies have examined MST and associated mental health concerns among the unique population of female veterans who served in the wars in Afghanistan and Iraq. Rates of MST among female OEF/OIF veterans are concerning and estimates have ranged from 14% to 49% among veterans using VA health care (Haskell et al., 2010; Kimerling et al., 2010; Scott et al., 2014). In a population-based study of female OEF/OIF veterans using VA health care services, the prevalence of MST based on the VA's two item MST screen suggests a MST rate of 15% (Kimerling et al., 2007; McIntyre et al., 1999).

While VA administrative data indicate that MST is associated with increased odds of patients receiving ICD-9 diagnostic codes for PTSD, depression, and substance use disorders (Haskell et al., 2010; Kimerling et al., 2010; Maguen, Lau, Madden, & Seal, 2012), much of the previous work examining the association between MST and mental health problems among OEF/OIF female veterans [e.g., (Haskell et al., 2010; Katz, Bloor, Cojucar, & Draper, 2007; Kimerling et al., 2010; Maguen, Lau, et al., 2012; Maguen, Luxton, et al., 2012)] is limited by a lack of measurement of combat exposure. This is an important limitation as female military personnel are increasingly exposed to higher levels of combat stress (Carney et al., 2003; Hoge et al., 2007; Maguen, Madden, Cohen, Bertenthal, & Seal, 2014; Scott et al., 2014; Vogt et al., 2011). One recent study did include assessments of both combat exposure and MST (Scott et al., 2014). In this survey of 3,199 female OEF/OIF veterans using VA healthcare, results from respondents ($N = 366$; 11% response rate) indicated that MST, which was prevalent among 49% of the sample, was independently associated with PTSD symptoms as measured by the PTSD checklist-military version [PCL-M; (Weathers, Litz, Herman, Huska, & Keane, 1993)] even after accounting for combat exposure (Scott et al., 2014). Furthermore, there was a significant interaction between MST and combat exposure suggesting increased synergistic risk associated with experiencing MST and combat exposure in this population (Scott et al., 2014). There continues to be a need for more research examining the unique associations between MST, combat exposure, and mental health problems among female veterans (Allard, Nunnink, Gregory, Klest, & Platt, 2011; Street et al., 2009).

While relatively little is known regarding the potentially synergistic effects of MST and combat exposure, even less is known about how MST affects later VA healthcare use among women, as very few studies have examined this relationship, particularly among OEF/OIF females. While previous research suggests that individuals with a history of sexual assault have higher rates of medical service utilization than those without such a history (Frayne et al., 1999; Suris et al., 2004; Zinzow, Grubaugh, Monnier, Suffoletta-Maierle, & Frueh, 2007), there are theoretical reasons that could contribute to a negative relationship between MST and medical service use among female veterans. For example, a history of MST could cause women to actively avoid reminders of military service, which could include VA healthcare facilities. Female sexual assault survivors who report military sexual trauma to military legal officials experience significant secondary victimization (Campbell & Raja, 2005), which could impair later help-seeking in military/VA facilities. Despite this possibility, one large telephone based survey of women veterans conducted prior to the wars

in Iraq and Afghanistan, however, suggested that MST is associated with increased rather than decreased use of VA healthcare (Kelly et al., 2008). Still, the number of women receiving MST-related healthcare is far lower than the estimated number of women who experienced MST (Suris & Lind, 2008). There is also some evidence that MST is related to perceptions of VA healthcare. Among VA healthcare users, women who endorsed MST were less satisfied with VA healthcare than those who did not endorse MST (Kelly et al., 2008).

The impact of MST on the use of VA and non-VA healthcare among female OEF/OIF veterans is currently unknown. This is an important gap in the literature. In part due to increased combat exposure and multiple deployments, the needs of women veterans who served during OEF/OIF may differ significantly from the needs of women veterans from previous eras. If women with service during OEF/OIF who have a history of MST and associated mental health problems, such as PTSD, are avoiding VA healthcare facilities and are not seeking mental health care outside the VA, the societal costs could be enormous (Kessler, 2000; Kessler, Haro, Heeringa, Pennell, & Ustun, 2006). Outreach may be needed to better inform this population of the free and available resources available at VA (e.g., victims of MST may receive free services related to MST even if they are not eligible for other VA care; resources are available even if a victim did not report the incidents when they happened).

The purpose of the current study was to 1) examine the association between MST, combat experiences and mental health outcomes (i.e., PTSD and depression) and 2) examine the association of MST and use of VA and non-VA health care services. Consistent with previous studies, it was expected that MST and combat exposure would be independently related to increased depression and PTSD symptoms. Similarly, based on work showing an association between history of sexual assault and increased medical service use (Frayne et al., 1999; Suris et al., 2004; Zinzow et al., 2007), we expected that MST would be related to increased use of health care services. As PTSD is associated with increased mental health and physical health utilization [e.g., (Calhoun, Bosworth, Grambow, Dudley, & Beckham, 2002)], we further explored whether MST was related to use of healthcare before and after adjusting for the presence of PTSD and depression.

Method

Participants

Participants in the current study were women (N = 185) who had responded to a mail survey conducted as part of the OEF/OIF Veterans Health and Needs Study and had adequate data on the measures described below (Calhoun et al., 2015; Crawford et al., 2015; Fleming, Crawford, Calhoun, Kudler, & Straits-Troster, in press; Schry et al., in press). The parent study identified a random sample of 5,000 OEF/OIF veterans with a last known address in the VA Mid-Atlantic Region catchment area (i.e., North Carolina, the greater part of Virginia, and the southeastern corner of West Virginia) through a data use agreement with the VA Environmental Epidemiology Service. To be eligible for the study, veterans had to be eligible for VA healthcare with a valid address in the U.S. Of the 5,000 veterans identified, 72 (1.4%) were determined to be ineligible (e.g., deceased, deployed) and 924 (18.5%) surveys were undeliverable (returned to sender). Of the 4,004 surveys that were delivered,

1,161 were completed and returned, resulting in a response rate of 29%. Consistent with the proportion of women serving in the military during OEF/OIF (United States Department of Defense, 2010), 17% (n = 196) of respondents were women.

Procedure

A modified Dillman procedure was utilized in which all participants received a pre-alert letter, a 60-item survey instrument, and if needed, a follow-up letter and duplicate survey in 2010 (Dillman, 2000). Approvals for this project were obtained from both the Durham VA Medical Center Institutional Review Board and the U.S. Office of Management and Budget (OMB). In order to assess possible non-response bias following the continuum of resistance model (Lin & Schaeffer, 1995; Voogt, Saris, & Niemoller, 1998) demographic characteristics and outcome variables were compared between early responders (i.e., responders to the first survey wave; n = 978) and late responders (second wave; n = 183). There were no differences in the proportion of women between early and late responders (early = 17.0%, late = 16.5%; OR = 0.96; 95% CI, 0.63–1.47). Among female respondents, there were no differences between early and late responders on demographic variables including age, marital status, race, proportion of enlisted soldiers, and proportion of veterans who served in the Reserves/National Guard. Importantly, late responders did not differ from early responders in the severity of PTSD (R^2 = 0.006, p = 0.28), depression (R^2 = 0.0001, p = 0.86), use of VA healthcare (OR = 0.83; 95% CI, 0.35–1.96, p = 0.67), or military sexual trauma (OR = 0.88; 95% CI, 0.28–2.76, p = 0.83).

Measures

Demographic variables—Age, race, employment status, self-reported income, marital status, and number of dependent children were collected. A number of questions assessed military history, including number of deployments, unit type, branch of service, military rank, and history of service-connected injuries.

Combat exposure—Combat experiences were assessed with 17 items from the Combat Experiences Scale (Hoge et al., 2004). Participants are asked to indicate whether they experienced each item during their deployment(s); therefore, total scores range from 0 to 17 (with higher scores indicating a greater number of different combat experiences).

Military Sexual Trauma—Two items (i.e., “experienced sexual assault or rape” and “experienced sexual harassment or abuse”) were included to assess military sexual trauma during deployment. Participants are asked to indicate whether they experienced each item during their deployment(s). Exposure to MST was defined as a positive response on either item.

PTSD symptoms—The Posttraumatic Stress Disorder Checklist, Civilian Version [PCL; (Weathers, Huska, & Keane, 1991)] which is based on DSM-IV-TR diagnostic criteria for PTSD was used to assess PTSD symptom severity (American Psychiatric Association, 2000). The PCL has demonstrated excellent reliability and validity and is a widely used measure of PTSD (McDonald & Calhoun, 2010). Total scores range from 17 to 85 with higher scores indicating greater severity of PTSD symptoms. For descriptive purposes, we

used PCL scores ≥ 45 to identify the presence of probable PTSD in respondents (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996; McDonald & Calhoun, 2010). Internal consistency of the PCL in this sample was excellent (α = .96)

Depression symptoms—The two-item Patient Health Questionnaire [PHQ-2; (Kroenke, Spitzer, & Williams, 2003)] was used to screen for depression. Criterion and construct validity of PHQ-2 scores has been demonstrated (Kroenke et al., 2003; Lowe, Kroenke, & Grafe, 2005). A cutoff of three or higher was used to assess presence of a probable depressive disorder (Kroenke et al., 2003; Lowe et al., 2005). Internal consistency of the PHQ-2 was good in this sample (α = .86).

Health service utilization—Use of any healthcare services (i.e., physical and/or mental health services) was based on a single item which queried use of VA health care services, use of non-VA health care services, dual use (both VA and non-VA health care), or no health care use since their last deployment. Mental healthcare utilization was assessed with an item inquiring about use of mental health counseling from a VA hospital or clinic, from a Vet Center, from a chaplain or religious leader, and/or from a non-VA provider. Participants were asked to indicate all mental health treatment settings used. VA mental health utilization was coded as positive if a respondent endorsed receiving counseling from a VA hospital or clinic or a Vet Center.

Data Analyses

All variables were screened for outliers and patterns of missing data. Eleven participants were excluded from analyses due to extensive missing data (i.e., missing information on combat exposure, missing more than three responses on the PCL or missing both responses to the PHQ-2 items) resulting in a final sample of 185. In this final sample, 7% of participants had missing data on one or more measures. Multiple imputation procedures (Little & Rubin, 1987) were used to handle missing data using the procedure MIANALYZE in SAS version 9.4. Descriptive statistics were calculated to characterize demographic attributes of respondents.

All statistical analyses were performed using SAS PC, Version 9.4. Linear regression analyses were used to examine the association between MST and combat exposure on PTSD and depression symptoms. Combat exposure, PCL and PHQ-2 scores were modeled as a continuous variables for both theoretical and statistical reasons [see e.g., (Scott et al., 2014)]. Specifically, dichotomization of continuous variables results in a loss of statistical power. More importantly, there have been no studies validating PCL cutoff scores against interview based diagnostic criteria in female OEF/OIF veterans (McDonald & Calhoun, 2010). Prior studies of OEF/OIF female veterans have used continuous measures of PTSD symptoms (Maguen, Luxton, et al., 2012; Scott et al., 2014; Vogt et al., 2011), thus using continuous PCL scores will facilitate comparisons to prior research. The potentially synergistic effect of exposure to combat and MST was tested by including a MST × combat interaction term in each model. All models were adjusted for age, race, presence of a service-connected injury, military component, military branch, military rank, and number of deployments. Given small cell sizes in some demographic variables, several variables were dichotomized for entry in

the regression analyses (i.e., race [White vs. Non-White], military component [active duty vs. reserves/National Guard], military branch [Army vs. other branches], rank [officer vs. enlisted], number of deployments [one vs. multiple]).

Logistic regression was used to examine the relationship between MST status and use of VA and non-VA healthcare services. Adjusted models examined the association of MST and service use after adjusting for the presence of probable PTSD and depression.

Results

Demographic and Clinical Correlates of Exposure to Military Sexual Trauma

Demographic characteristics of the sample (N = 185) are presented in Table 1. The mean age of participants was 35.84 years (SD = 9.33) and did not differ between those with and without MST, $F(1,184) = 0.26$, *ns*. Twenty-nine women (15.7%) endorsed military sexual trauma; five participants reported experiencing sexual assault andr twenty-eight reported experiencing sexual harassment. The majority of women in the sample (69.2%) reported exposure to combat (see Table 2). The average number of different combat experiences among combat-exposed women was 3.87 (SD = 2.72). Women who had experienced MST reported significantly more combat experiences (M = 3.79; SD = 3.74) compared to women without a history of MST (M = 2.47; SD = 2.63; $F(1,183) = 5.3$, $p = 0.02$). There were no significant differences between women reporting MST and women who did not report MST on other demographic variables (i.e., race, income, military branch, military component, and whether they suffered a service-connected injury during deployment; see Table 1).

Association between MST, Combat, and Mental Health Outcomes

Bivariate results suggested that exposure to MST was related to probable PTSD and depression (see Table 1). The interaction between MST and combat exposure was not significant in predicting PCL total scores ($\beta = 0.06$, $t = 0.56$, $p = 0.57$) or PHQ-2 depression scores ($\beta = 0.12$, $t = 1.25$, $p = 0.21$), which indicated there was not a synergistic effect between combat exposure and MST on the severity of symptoms. These models were rerun excluding the interaction term. As shown in Table 3, combat exposure was strongly related to both PTSD and depression symptoms. History of a service-connected injury during deployment was also related to both PTSD and depression symptoms. Importantly, MST was independently related to both PTSD and depression even after accounting for demographic variables, military history, presence of a service connected injury, and combat exposure.

Association between MST and Health Care Service Utilization

As shown in Table 4, almost the entire sample reported use of healthcare services since returning from deployment. MST was not significantly associated with use of any healthcare services. Women reporting MST (64.3%) and women who did not report MST (65.8%) were equally likely to report use of non-VA healthcare services. Similarly, there was not a statistically significant difference in the use of any VA healthcare services between women who reported MST and those who did not report MST (see Table 4). Women who reported MST (20.7%) did not differ from women who did not report MST (21.8%) in the use of non-VA mental healthcare. In bivariate analyses, however, MST was related to utilization of VA

mental health services (27.6% MST+ vs. 7.1% MST−, $p < 0.001$). The association between MST and use of VA mental health services was no longer significant, however, after adjusting for PTSD and depression symptoms.

Discussion

The purpose of this study was to examine the association between MST, combat trauma, and PTSD and depression in a sample of U.S. female veterans deployed to Iraq and Afghanistan. Furthermore, it was designed to examine the association between MST status and use of VA and non-VA healthcare services. MST was significantly related to symptoms of depression and PTSD even after controlling for combat exposure and other military history factors. While history of MST was related to utilization of VA mental health services in bivariate analyses, it was not significantly related to use of VA mental health services after adjusting for presence of PTSD or depression symptoms.

Military Sexual Trauma, Combat Trauma, and PTSD and Depression

This study extends previous findings documenting high rates of MST and associated mental health problems. Approximately 15.7% of this sample of female veterans reported experiencing some type of MST during their deployment(s) to Iraq or Afghanistan. Despite the fact that only MST during deployment was assessed, this prevalence is comparable to rates reported in population based studies using administrative data from OEF/OIF women veterans using VA healthcare services [e.g., 14%–15%; (Haskell et al., 2010; Kimerling et al., 2010)]. Unfortunately, results provide more evidence that MST is a prevalent and significant problem for women in the U.S. military.

While MST has been associated with increased likelihood of mental health problems in multiple studies [e.g., (Himmelfarb, Yaeger, & Mintz, 2006; Kang, Dalager, Mahan, & Ishii, 2005; Kimerling et al., 2007; Kimerling et al., 2010; Maguen, Luxton, et al., 2012)]; relatively few studies have included combat exposure as a covariate (Scott et al., 2014). Thus, a potential criticism of much of the previous work examining MST and mental health outcomes is that the effect of MST on mental health outcomes has been overestimated due to misspecification error [i.e., omitted variable bias; (Clarke, 2005, 2009)]. Indeed, we found that MST was associated with increased combat exposure. Further, combat exposure was associated with increased PTSD and depression symptoms. Under these conditions, failing to account for combat exposure when examining the association between MST and mental health outcomes in a regression model could lead to significantly biased parameter estimates.

Our results provide strong evidence, however, that MST is uniquely associated with severity of PTSD and depression symptoms among women with service in OEF/OIF even after controlling for combat trauma and other military history factors including the presence of service-connected injury. We chose to control for presence of service-connected injury because previous work has suggested that physical impairment can be a risk factor for the development of PTSD and associated distress (Martz & Cook, 2001). Indeed, results from the current study suggest women who had experienced a military-related injury had elevated PTSD and depression symptoms. Still, MST was a unique and independent risk for

increased psychiatric symptoms. Results support the effort of the VA to ensure that free MST-related services are available to veterans. More work needs to be done to prevent military sexual assault and harassment.

Women veterans with service in Iraq and Afghanistan are at increased risk of exposure to violence and combat. Nearly 70% of participants endorsed at least one combat related experience. More than half the sample reported experiencing an improvised explosive device (IED), incoming artillery, rocket, or mortar fire, and a third had witnessed dead bodies or human remains (see Table 2). These finding are consistent with other research [e.g., (Carney et al., 2003; Hoge et al., 2007; Maguen, Luxton, et al., 2012; Scott et al., 2014; Vogt et al., 2011)] documenting significant exposure to combat among female OEF/OIF veterans.

Not surprisingly, the number of combat experiences was positively related to symptoms of PTSD and depression. The impact of combat trauma on the development and severity of PTSD is well established (Green et al., 2010). We found no evidence, however, of a synergistic effect between MST and combat exposure. This finding is consistent with results from a study of active duty soldiers (Maguen, Luxton, et al., 2012), but it is in contrast to a recent study of OEF/OIF female veterans (Scott et al., 2014). Scott and colleagues (2014) found that under conditions of high combat exposure, women with exposure to MST had increased PTSD symptoms compared to female veterans without MST suggesting a synergistic risk or dual burden of combat and sexual trauma in this population. While the relatively small sample size in the current study may have limited statistical power to detect an interaction between combat and MST in predicting mental health outcomes, differences in assessment methods between the current study and previous work [e.g., (Scott et al., 2014)] could also explain differences. In the current study, the Combat Experiences Scale [CES; (Hoge et al., 2007)] was used to assesses exposure to 17 various combat related combat experiences (scores range from 0–17), while the Scott et al. (2014) study based combat exposure scores on the Combat Exposure Scale [CES; (Keane et al., 1989)] which assesses exposure to 7 possible combat experiences and employs likert-type scales and weighted scoring to result in scores that range from 0–41. The fact that both combat measures are abbreviated as CES is likely to cause some confusion in the field. More work is needed to confirm whether there is a cumulative or synergistic risk between combat exposure and military sexual trauma.

Military Sexual Trauma and Health Care Utilization

Little research has examined the association between MST and health service use among OEF/OIF women. One previous study among non-OEF/OIF female veterans suggests that MST is associated with increased likelihood of use of VA healthcare (Kelly et al., 2008). In the current study, 48% of women with a history of MST reported use of VA healthcare compared to 33% of women without a history MST (see Table 4). It is important to note, however, that more than half (52%) of OEF/OIF women reporting a history of MST were not using any VA healthcare. The majority of research examining the physical and mental health sequelae of MST has focused on veterans using VA healthcare. More work is needed to examine how veterans who experienced MST who do not use the VA system differ from survivors using VA care. These results also highlight that increased outreach efforts may be

needed to ensure that female veterans who experienced MST are aware of care available at VA.

While MST was significantly related to use of VA mental health service utilization in bivariate analyses, this effect was no longer significant after controlling for PTSD and depression symptoms suggesting that the association between MST and VA mental health treatment utilization may be mediated by mental health burden. This finding has important policy implications, because it indicates that many individuals who have experienced MST may not want or need mental health treatment. Historically, there has been controversy over the utility of screening for MST given that it is not a diagnosis or construct with clear treatment implications (Council on Scientific Affairs - American Medical Assocaition, 1992; Kimerling et al., 2007; U.S. Preventive Services Task Force, 2004). The psychological response to MST is likely to be varied based on the type, intensity, and duration of the stressful and traumatic event(s) (e.g., (Wolfe et al., 1998) as well as, previous trauma history [e.g., (Campbell, Greeson, Bybee, & Raja, 2008; Zinzow, Grubaugh, Frueh, & Magruder, 2008)], social support [e.g., (Martin, Rosen, Durand, Knudson, & Stretch, 2000)], and the survivor's capacity to recover from negative and stressful experiences [e.g., (Green et al., 2010; Wingo et al., 2010)]. A recent population based study using administrative medical record data of OEF/OIF veterans using VA healthcare indicated that 51% of women who screen positive for MST have a diagnosis of PTSD, and 56% have a diagnosis of depression (Kimerling et al., 2010). While not all women with a history of MST will require mental health treatment, universal screening for MST has been shown to promote access to VHA mental health services for those that do (Kimerling, Street, Gima, & Smith, 2008). More work is needed that examine barriers and facilitators of treatment engagement among women with psychiatric symptoms and history of MST.

Limitations and Future Directions

It is important to recognize that rates of endorsement of MST vary based on assessment methods (Suris & Lind, 2008). The current study used a two-item measure to assess MST. Specifically, the questions used required participants to identify their experiences as sexual harassment or sexual assault in order to report them on the survey. However, this assessment strategy follows the screening questions used to identify MST in VA healthcare. Consistent with previous research, current results suggest rates of sexual assault victimization in female veterans are lower than the proportion who experience harassment (DeRoma, Root, & Smith Jr, 2003; Kessler, Chiu, Demler, & Walters, 2005; Skinner et al., 2000; Street, Stafford, Mahan, & Hendricks, 2008). Optimally, the assessment of MST would employ behaviorally specific measures of sexual assault and harassment [e.g., the Sexual Experiences Survey; (Koss et al., 2007)]. Additional research using behaviorally specific measures that do not require individuals to apply specific labels to experiences (e.g., sexual harassment or sexual assault) among veterans is needed to gain a more accurate estimate of the prevalence of MST as well as to evaluate the differential effects of types of MST. Additionally, the VA definition of MST (and therefore the definition used in this study) confounds sexual assault and sexual harassment, which is potentially problematic, as sexual assault meets DSM-5 (American Psychiatric Association, 2013) PTSD Criterion A for a traumatic event whereas

not all instances of sexual harassment will meet this criterion [e.g., (Weathers & Keane, 2007)].

Several additional limitations of this study deserve discussion. First, analyses were restricted to a relatively small sample of female OEF/OIF veterans. The response rate (29%) observed in the OEF/OIF Veterans Needs Assessment Survey is low, but is consistent with population based, mail surveys of OEF/OIF veterans [e.g., 21.9%–33%; (Calhoun, Elter, Jones Jr, Kudler, & Straits-Troster, 2008; Eisen et al., 2012; R. Pietrzak et al., 2010; R. H. Pietrzak, Johnson, Goldstein, Malley, & Southwick, 2009; Vogt et al., 2011)] and is significantly higher than a recent MST-focused survey of female OEF/OIF veterans using VA healthcare (Scott et al., 2014). Concerns about potential representativeness of the sample are tempered by a lack of demographic and clinical differences between early and late survey responders (Lin & Schaeffer, 1995; Voogt et al., 1998). Still, results may not generalize to all women who served in support of the wars in Iraq and Afghanistan. While different assessment methodologies do not allow for direct comparisons to studies using the VA's two item MST screen, observed rates of MST in the current study were similar to large studies of OEF/OIF veterans conducted using the VA two item screen (Haskell et al., 2010; Kimerling et al., 2010). Importantly, rates of MST observed in the current study are likely conservative estimates given that assessment of MST was limited to experiences during deployment and because sexual trauma is typically underreported (Campbell & Raja, 2005; Leibowitz, Jeffreys, Copeland, & Noel, 2008). Given the cross-sectional nature of the study, causal attributions between MST, combat and mental health problems cannot be determined.

Conclusion

Despite these limitations, the current study extends previous work examining the association between MST and mental health problems among female OEF/OIF veterans. It provides some of the first data examining MST and use of health care in this cohort. While women who reported a history of MST were more likely to use the VA for mental healthcare, results indicate that approximately half of women reporting MST had not used any VA healthcare services. More work is needed to examine potential differences in women who experienced MST between those who use VA healthcare and those who do not. Continued outreach and education initiatives may be needed to ensure veterans understand the resources available to address MST related mental and physical health problems through VA.

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Table 1

Demographic and Clinical Characteristics of Participants by MST Status

Characteristic	Full Sample *N* = 185 *N*	(%)	Positive for Military Sexual Trauma *n* = 29 *N*	(%)	Negative for Military Sexual Trauma *n* = 156 *N*	(%)	χ^2(df)
Race							0.14(2)
African-American	41	(22.2)	6	(20.7)	35	(22.4)	
Caucasian	110	(59.5)	17	(58.6)	93	(59.6)	
Asian, Native American, Other	34	(18.4)	6	(20.7)	28	(18.0)	
Marital Status							4.37(2)
Married or Living Together	96	(51.9)	10	(34.5)	86	(55.1)	
Single	41	(22.2)	8	(27.6)	33	(21.2)	
Divorced, Separated, Other	48	(26.0)	11	(37.9)	37	(23.7)	
Dependent children in household	106	(57.3)	12	(41.4)	94	(60.3)	3.22(1)
Household income							3.47(2)
< $20,000	18	(9.7)	5	(17.2)	13	(8.3)	
$20,000 – $74,999	97	(52.4)	16	(55.2)	81	(51.9)	
> $75,000	67	(36.2)	7	(24.1)	60	(38.5)	
Employment status							6.23(5)
Employed Full Time	115	(62.2)	15	(51.7)	100	(64.1)	
Employed Part Time	14	(7.6)	1	(3.5)	13	(8.3)	
Unemployed	11	(6.0)	1	(3.5)	10	(6.4)	
Unemployed: Retired/Disabled	9	(4.9)	3	(10.3)	6	(3.9)	
Unemployed: Student	20	(10.8)	5	(17.2)	15	(9.6)	
Unemployed: Homemaker	16	(8.7)	4	(13.8)	12	(7.7)	
Military Branch							6.84(4)
Air Force	30	(16.2)	3	(10.3)	27	(17.3)	
Army	90	(48.6)	20	(69.0)	70	(44.9)	
Coast Guard	1	(0.5)	0	(0.0)	1	(0.6)	
Marines	8	(4.3)	0	(0.0)	8	(5.1)	
Navy	52	(28.1)	5	(17.2)	47	(30.1)	
Military Component							1.19(1)

Characteristic	Full Sample *N* = 185 *N*	(%)	Positive for Military Sexual Trauma *n* = 29 *N*	(%)	Negative for Military Sexual Trauma *n* = 156 *N*	(%)	χ^2(df)
Regular Active Duty	116	(62.7)	16	(55.2)	100	(64.1)	
Reserves or National Guard	65	(35.1)	13	(44.8)	52	(33.3)	
Military Rank							2.83(1)
Enlisted	143	(77.3)	26	(89.7)	117	(75.0)	
Officer	41	(22.2)	3	(10.3)	38	(24.4)	
Suffered a Service-Connected Injury during Deployment	62	(33.5)	12	(41.4)	50	(32.1)	1.19(1)
Multiple Deployments	54	(29.2)	8	(27.6)	46	(29.5)	0.01(1)
Exposed to Combat	128	(69.2)	24	(82.8)	104	(66.7)	2.97(1)
Probable PTSD (PCL)	31	(16.8)	11	(35.5)	18	(11.7)	11.05(1) *
Probable Depression (PHQ-2)	34	(18.4)	12	(41.4)	22	(14.1)	12.13(1) *

Note. MST = Military Sexual Trauma; PCL = PTSD Checklist; PHQ-2 = Patient Health Questionnaire-2

* $p < .001$

Table 2

Combat Experiences of Female OEF/OIF Veterans

Experience	*n*	(%)
Being attacked or ambushed	25	(13.5)
Receiving incoming artillery, rocket, or mortar fire, or an IED	94	(50.8)
Being shot at or receiving small arms fire	35	(18.9)
Shooting at or directing fire at the enemy	10	(5.4)
Being responsible for the death of an enemy combatant	4	(2.2)
Being responsible for the death of a non-combatant	2	(1.1)
Seeing dead bodies or human remains	61	(33.0)
Handling or uncovering human remain	25	(13.5)
Seeing dead or seriously injured Americans	55	(29.7)
Knowing someone seriously injured or killed	98	(53.0)
Participating in demeaning operations	16	(8.6)
Seeing ill or injured women and children whom you could not help	28	(15.1)
Had a close call, was shot at or hit, but protective gear saved you	11	(5.9)
Had a buddy shot or hit who was near you	5	(2.7)
Clearing or searching buildings	16	(8.6)
Engaging in hand-to-hand combat	3	(1.6)
Saved the life of a soldier or civilian	11	(5.9)
None of these	57	(30.8)

Table 3

Linear Multiple Regression Results examining the Association of MST with PTSD and Depression Symptoms among OEF/OIF Female Veterans

Model	Variable	*β*	*t*	*p*
PTSD Symptoms (PCL)				
	Age	0.42	0.64	.52
	Race	−0.14	−2.25	.026
	Marital Status	−0.03	−0.43	.66
	Employment Status	0.03	0.49	.63
	SC Injury	0.23	3.38	.001
	Military Component	0.11	1.54	.12
	Military Branch	−0.01	−0.11	.91
	Rank	−0.11	−1.77	.08
	Multiple Deployments	−0.05	−0.75	.45
	Combat Total	0.44	6.39	<.0001
	MST	0.16	2.60	.010
Depression (PHQ-2)				
	Age	−0.02	−0.24	.81
	Race	−0.12	−1.69	.093
	Marital Status	−0.11	−1.53	0.13
	Employment Status	−0.04	−0.55	0.58
	SC Injury	0.25	3.37	.001
	Military Component	0.11	1.42	.16
	Military Branch	−0.10	−1.23	.22
	Rank	−0.09	−1.34	.18
	Multiple Deployments	−0.08	−1.18	.24
	Combat Total	0.19	2.44	.016
	MST	0.20	2.80	.006

Note. OEF = Operation Enduring Freedom. OIF = Operation Iraqi Freedom. SC Injury = Suffered a service-connected injury during deployment. Age and combat total were continuous variables. All other variables were dichotomous. Coding of dichotomous variables: Race (Non-White = 0, White = 1), Marital Status (Single/Divorced/Separated = 0, Married/Living Together = 1), Employment Status (Unemployed = 0, Employed = 1), SC Injury (No = 0, Yes = 1), Military Component (Reserves or National Guard = 0, Regular Active Duty = 1), Military Branch (Army = 0, Navy, Marines, Coast Guard, or Air Force = 1), Rank (Enlisted = 0, Officer = 1), Multiple Deployments (No = 0, Yes = 1), MST (No = 0, Yes = 1).

Table 4

Logistic Regression Results Examining the Association of Military Sexual Trauma and Use of VA and non-VA Healthcare Services among OEF/OIF Female Veterans

Services	MST + *n* = 29	MST − *n* = 156	Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
Any Healthcare	89.7%	83.3%	1.79 (0.48 – 6.15)	1.50 (0.41 – 5.55)
Any Non-VA Healthcare	62.1%	64.1%	0.92 (0.40 – 2.08)	1.10 (0.46 – 2.60)
Any VA Healthcare	48.3%	33.3%	1.87 (0.84 – 4.16)	1.31 (0.55 – 3.14)
Any Mental Healthcare	48.3%	28.9%	2.30 (1.03 – 5.16) *	1.40 (0.56 – 3.46)
Non-VA Mental Healthcare	20.7%	21.8%	0.91 (0.34 – 2.40)	0.75 (0.26 – 2.14)
VA Mental Healthcare	27.6%	7.1%	4.88 (1.76 – 13.54) **	2.31 (0.61 – 8.70)

Note. OEF = Operation Enduring Freedom. OIF = Operation Iraqi Freedom. CI = Confidence Interval; Non-VA Mental Healthcare was defined as mental health counseling from a chaplain/religious leader or from a non-VA provider; VA Mental Healthcare was defined as mental health treatment from a VA hospital/clinic or a Vet Center; Adjusted Odds Ratio compares likelihood of service use in military sexual trauma positive versus military sexual trauma negative women adjusting for presence of PTSD and depression symptoms.

* $p < 0.05$,

** $p < 0.01$