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Military Sexual Assault (MSA) Among Veterans in Southern California: Associations With Physical Health, Psychological Health, and Risk Behaviors

Ashley C. Schuyler, Sara Kintzle, Carrie L. Lucas, Hadass Moore, and Carl A. Castro
University of Southern California

This study describes the relationship between military sexual assault (MSA) and various health and behavioral outcomes among a community-based sample of male (n = 2,208) and female (n = 327) veterans. Logistic regression analyses were conducted to assess the relationship of MSA with physical health symptoms (PHQ-15), probable posttraumatic stress disorder (PTSD; PCL) and depression (PHQ-9), risk-taking behaviors, and alcohol use (AUDIT-C) among men and women. Among the sample, 4.8% of male and 40.6% of female veterans reported experiencing MSA. Men who experienced MSA had approximately 4 times the odds of physical health symptoms, and probable PTSD and depression, compared with those without MSA ($p < .001$ for all). Male veterans also had significantly increased odds of taking unnecessary health risks ($p < .001$), risking a sexually transmitted disease (STD; $p = .005$), driving while intoxicated ($p = .022$), taking unnecessary life risks ($p < .001$), and using tobacco ($p = .012$) in the last year if they had experienced MSA. Women who experienced MSA had approximately double the odds of physical health symptoms ($p = .002$), 3 times the odds of depressive symptoms ($p < .001$), and almost 7 times the odds of probable PTSD ($p < .001$). Female veterans with MSA also had significantly greater odds of taking unnecessary health risks ($p = .003$), taking unnecessary life risks ($p = .001$), and using tobacco ($p = .003$) in the last year than those without MSA. These findings highlight the unique treatment needs of male and female victims of MSA, the potential long-term impact of MSA, and the need for timely assessment of MSA to help mitigate negative health outcomes among veterans.

Keywords: military sexual trauma (MST), veterans, behavioral health, sexual assault

Sexual trauma during military service—known as military sexual trauma (MST)—includes experiences of sexual harassment and sexual assault, and has been a persistent problem in the U.S. military. The most recent anonymous survey among active duty (AD) service members found that 4.9% of women and 1.0% of men reported being sexually assaulted in 2014 (Morral et al., 2015). Another recent military survey found that nearly 22% of female and 3% of male service members have experienced unwanted sexual contact since joining the military (Barlas, Higgins, Pflieger, & Diecker, 2013). Rates of military sexual assault (MSA) among veterans have ranged from 3%–54% of women and up to 3% of men, in both community samples and among those seeking care through the Department of Veterans Affairs (VA; Booth et al., 2012; Fontana & Rosenheck, 1998; Hankin et al., 1999; Kang, Dalager, Mahan, & Ishii, 2005; Sadler, Booth, Nielson, & Doebbeling, 2000; Smith, Frueh, Sawchuk, & Johnson, 1999; Street, Stafford, Mahan, & Hendricks, 2008; Surìs, Lind, Kashner, & Borman, 2007). Variation in rates of MSA may be attributable to inconsistencies in the methods of assessment and sampling strategies, as well as characteristics of the sample population (e.g., era of service; Turchik & Wilson, 2010).

Many individual and military-related factors can influence MSA risk. Some demographic characteristics—including younger age, enlisted rank, being nonmarried, and low educational achievement—have been associated with increased risk of MSA (Turchik & Wilson, 2010). A history of premilitary sexual trauma, reported by 15%–49% of women and 1.5%–22.5% of men in the military, can also confer an enhanced risk of experiencing sexual assault during service, as well as influence the psychological impact (Defense Manpower Data Center, 2012; Sadler, Booth, Cook, & Doebbeling, 2003; Turchik & Wilson, 2010). The cumulative impact of multiple incidents of interpersonal trauma over time can result in increased mental health symptoms following a subsequent sexual trauma, including those related to depression, anxiety, and posttraumatic stress disorder (PTSD; Cloitre et al., 2009; Follette, Polusny, Bechtle, & Naugle, 1996).

Certain military dynamics may also exacerbate the risk or impact of MSA. Inherent features of military life such as close living quarters, differentials in rank and power, and hypermasculine

Ashley C. Schuyler and Sara Kintzle, Center for Innovation and Research on Veterans and Military Families (CIR), School of Social Work, University of Southern California; Carrie L. Lucas and Hadass Moore, School of Social Work, University of Southern California; Carl A. Castro, Center for Innovation and Research on Veterans and Military Families (CIR), School of Social Work, University of Southern California.

Carrie L. Lucas declares she is active duty in the United States Air Force.

Correspondence concerning this article should be addressed to Ashley C. Schuyler, Center for Innovation and Research on Veterans and Military Families (CIR), School of Social Work, University of Southern California, 1150 S. Olive Street, Suite 1400, Los Angeles, CA 90015. E-mail: schuyler@usc.edu

culture, can contribute to environments which are conducive to sexual trauma (Castro, Kintzle, Schuyler, Lucas, & Warner, 2015; Hunter, 2007). Similarly, the nature of military deployments can compound the inherent characteristics of military culture to further contribute to risk (Burns, Grindlay, Holt, Manski, & Grossman, 2014). Unique dynamics of military life may also influence the impact of MSA on victims, as many victims of sexual assault must continue to work and live alongside perpetrators. Further, the experience of sexual trauma by a fellow service member conflicts with many of the military values that have been engrained within one's personal and military identity (Bell & Reardon, 2011; Hunter, 2007).

MSA has previously been associated with negative health outcomes among veterans. Experiences of MSA have been linked with a greater number of physical health symptoms (Frayne et al., 1999), poorer physical health status (Booth et al., 2012; Sadler et al., 2000; Skinner et al., 2000), and chronic health problems (Sadler, Booth, Mengeling, & Doebbeling, 2004), primarily among female veterans. Sexual trauma during service has also been linked to increased psychological distress and symptomatology, including PTSD, depression, and anxiety disorders (Kang et al., 2005; Kimerling et al., 2010; Surís & Lind, 2008). Some evidence suggests that sexual trauma in the military may be more likely to negatively impact health than sexual trauma in the civilian context (Himmelfarb, Yaeger, & Mintz, 2006; Surís, Lind, Kashner, Borman, & Petty, 2004) or other types of military trauma (Dutra et al., 2011; Fontana & Rosenheck, 1998).

MSA has been found to predict PTSD among both female and male victims (Luterek, Bittinger, & Simpson, 2011; Wolfe et al., 1998). It has also been associated with depression among veterans, particularly for women (Hankin et al., 1999; Kimerling et al., 2010; Maguen, Luxton, Skopp, & Madden, 2012; Surìs et al., 2007). Other psychological health problems associated with sexual trauma during service include eating disorders (Forman-Hoffman, Mengeling, Booth, Torner, & Sadler, 2012), sexual dysfunction and dissatisfaction (McCall-Hosenfeld, Liebschutz, Spiro, & Seaver, 2009; Turchik et al., 2012), suicidal thoughts, plans, and attempts (Bryan, Bryan, & Clemans, 2015; Stahlman et al., 2015), difficulties with adjustment (Katz, Bloor, Cojucar, & Draper, 2007), and other trauma symptoms such as interpersonal difficulties, dissociation, and emotional dysregulation (Bell & Reardon, 2011; Luterek et al., 2011).

Less is understood about the behavioral impact of MSA among veterans. Available research is largely focused on alcohol and substance use among female veterans who are victims of sexual trauma, and findings have been inconsistent. Some studies indicate that female veterans with a history of MSA report more problems with drinking or alcohol abuse than those without MSA (Hankin et al., 1999; Surìs et al., 2007), while others have failed to demonstrate a significant positive relationship between MSA and alcohol use (Booth, Mengeling, Torner, & Sadler, 2011; Creech & Borsari, 2014). Other studies among female veterans have indicated that a history of lifetime sexual assault (LSA) confers a greater risk of reporting smoking and alcohol use problems, similar to what has been found among civilians (Booth et al., 2011; Lang et al., 2003; Smith & Breiding, 2011).

While sparse, there is also some evidence linking experiences of sexual trauma with greater sexual risk among military personnel. Female veterans, as well as AD men and women, with a history of LSA have been found to demonstrate more risky sexual behavior than those without LSA, including a greater number of recent sexual partners and a greater frequency of having sex before knowing a partner's sexual history (Lang et al., 2003; Stahlman et al., 2014). In addition, female veterans with a history of MSA or MST have been found to have more diagnoses of sexually transmitted infections (STIs) than those with no sexual trauma, which can indicate sexual risk (Sadler, Mengeling, Syrop, Torner, & Booth, 2011; Turchik et al., 2012). Trading sex for goods or services has also been linked with experiences of MST among female veterans (Strauss et al., 2011).

There is little evidence describing sexual risk among male veterans in relation to sexual trauma. One study among OIF/OEF veterans found that men with a history of MST had nearly twice the odds of having an STI diagnosis, compared with men without MST (Turchik et al., 2012). Two studies have found that rates of HIV/AIDS are significantly higher among male veterans with MST, compared with those without (Kimerling, Gima, Smith, Street, & Frayne, 2007; Turchik et al., 2012). In addition, civilian research has demonstrated an association between experiences of sexual assault and sexual risk behaviors among men, including trading sex and having unprotected sex (Kalichman et al., 2001; McAndrew & Teitelman, 2008; Wells et al., 2015).

In exploring the impact of military sexual trauma on veterans' health and behavior, it is important to consider unique gender distinctions in both the experience and the effect on the victim. The context of sexual trauma may vary between men and women, and have a distinct influence on the health impact. For example, male victims of MST often report that the trauma involved more than one perpetrator, or was part of an initiation or hazing ritual, which is more common among men than women in the military (Hunter, 2007). Men who experience MSA perpetrated by other men may perceive the trauma as contradictory to their sense of masculinity or identity, which can play an important role in the resulting psychological effects (Peterson, Voller, Polusny, & Murdoch, 2011; Scarce, 1997; Walker, Archer, & Davies, 2005).

Emerging research describing specific gender distinctions in the impact of sexual trauma among veterans has produced mixed results. Some studies assessing MST, largely among VA samples of OIF/OEF veterans, have found that female victims are at greater risk of developing symptoms of depression and PTSD than male victims (Driscoll et al., 2015; Kimerling et al., 2007; Maguen, Cohen, et al., 2012; Shipherd, Pineles, Gradus, & Resick, 2009; Tiet, Leyva, Blau, Turchik, & Rosen, 2015). Concurrently, some research has suggested that men experience more serious psychological consequences following MST than women (Kang et al., 2005; O'Brien, Gaher, Pope, & Smiley, 2008). Among a sample of military personnel and veterans attending college, experiences of MSA during service were more strongly related to suicidal ideation and planning among men than among women (Bryan et al., 2015). This aligns with civilian research which suggests that men with a history of sexual assault report more symptoms of trauma and distress than women (Elliott, Mok, & Briere, 2004). There is also evidence suggesting that men and women who experience MST are at similar risk of developing PTSD (Kang et al., 2005). Thus, the relationships between gender, MSA, and related health and behavioral outcomes are complex and not well understood, warranting further exploration. In addition, few studies have specifically assessed the impact of MSA among both men and women

with regards to health outcomes or risk behaviors, or examined these relationships across multiple eras of service.

The current analyses examine the prevalence of MSA as reported by male and female veterans residing in Southern California, and its association with various health and behavioral outcomes. Specifically, relationships between MSA and self-reported physical, depressive, and PTSD symptoms, and various risk behaviors, were explored. Results are examined by gender in an effort to provide insight into distinctions between male and female victims of MSA. The objective of the current analyses was to focus on MSA, rather than broader experiences of military sexual trauma (MST), due to the importance of delineating relationships between specific types of sexual trauma and related outcomes. Experiences of sexual assault and their impact are distinct from those related to sexual harassment, and thus it is critical to examine relationships that are specific to individual forms of sexual trauma. To our knowledge, this is the first analysis to examine MSA and related outcomes, as well as gender differences, among a community sample of male and female veterans living in Southern California.

Method

Data and Participants

Data for these analyses were obtained via two survey initiatives among veterans residing in two Southern California counties in 2013–2014. The surveys focused on exploring the needs of veterans across various aspects of life (e.g., health, housing, employment) among a nonprobabilistic, convenience sample of veterans. To ensure that the sample was representative, and to achieve maximum variability and generalizability among potential participants, a multiprong recruitment strategy was utilized within each county. The first two strategies involved collaboration with state and county agencies, which provided contact information for veterans who either reported residence in the state of California at their separation from the military, or who utilized county information call centers. Veterans were sent a copy of the survey link via e-mail, or mailed a paper copy to be completed and returned. A third sampling strategy involved collaboration with a national veterans' organization who identified members through county zip codes. Those living within the sampling area were e-mailed by the organization and invited to participate via an online survey link.

The fourth sampling strategy utilized partnerships with local agencies that serve veterans, and involved both online and onground methods. Local agencies sent veterans in their database e-mail invitations to take the online survey using the online survey link, and also worked with the study team to organize data collection events within their agency. This two-method approach was also utilized in a fifth sampling strategy, targeted at college veterans' agencies and organizations. A final sampling strategy utilized TV and print advertisements, public service announcements, and social media to establish a presence within the local communities. Participants received a $15 gift card for completing the survey, which took an average of 60–90 min. All data collection procedures were approved by the research university's Institutional Review Board.

Measures

Military sexual assault (MSA). The survey instrument assessed for experiences of military sexual trauma (MST) with the two-item screen utilized by the Department of Veterans Affairs (VA). Participants were asked to answer yes or no to the following questions:

> During your military service: (a) Did you receive any uninvited and unwanted sexual attention, such as touching, cornering, pressure for sexual favors, or verbal remarks? (b) Did someone ever use force or threat of force to have sexual contact with you against your will?

Participants who endorsed experiencing forced sexual contact during military service were identified as victims of MSA.

Physical health symptoms. Physical health symptoms were measured using Patient Health Questionnaire (PHQ-15; Kroenke, Spitzer, & Williams, 2002). This self-report measure assesses the severity of 15 somatic symptoms or symptom clusters (e.g., gastrointestinal, musculoskeletal, cardiac, etc.), and items include the most prevalent *DSM-V* somatization disorder somatic symptoms (American Psychiatric Association, 2013). Participants were asked to rate the severity of symptoms over the previous 4 weeks on a 3-point scale: 0 = *not bothered at all*, 1 = *bothered a little*, and 2 = *bothered a lot*. The total PHQ-15 score ranges from 0–30, with a cutoff score of 10 indicating moderate to severe symptom severity. The PHQ-15 has previously been found to have good construct validity and internal consistency, and is considered a reliable and valid self-report measure for somatization in both health care settings and the general population (de Vroege, Hoedeman, Nuyen, Sijtsma, & van der Feltz-Cornelis, 2012; Kocalevent, Hinz, & Brähler, 2013; Kroenke et al., 2002; Kroenke, Spitzer, Williams, & Löwe, 2010). Data from the study sample indicated good reliability (Cronbach's $\alpha = .89$).

PTSD symptoms. The PTSD Checklist (PCL; Weathers & Ford, 1996) was utilized to assess PTSD symptomatology. The PCL is a 17-item self-report measure in which respondents indicate how much they were bothered by particular symptoms within the previous 30 days. Responses are given on a Likert scale, ranging from 0 = *not at all* to 5 = *extremely*. Total scores range from 17–85, with higher scores indicating greater PTSD symptomatology. Consistent with previous research among veterans (Scott et al., 2013; Street, Gradus, Giasson, Vogt, & Resick, 2013; Tanielian & Jaycox, 2008) a total score of 50 or more on the PCL was used to indicate probable PTSD. The PCL has demonstrated good psychometric properties, including internal consistency as well as convergent and discriminant validity, among previous samples of veterans (Wilkins, Lang, & Norman, 2011). Reliability scores from the current sample were excellent (Cronbach's $\alpha = .98$).

Depressive symptoms. The PHQ-9 (Spitzer, Kroenke, & Williams, 1999) was utilized to assess depressive symptoms. This nine-item self-report measure asks respondents to rate the frequency of depressive symptoms on a 4-point scale: 0 = *not at all* to 3 = *all the time*. Total scores range from 0 to 27, with the recommended score of 10 indicating depressive symptomatology. The PHQ-9 has previously demonstrated excellent psychometric properties (Kroenke, Spitzer, & Williams, 2001; Kroenke et al., 2010; Martin, Rief, Klaiberg, & Braehler, 2006), including an internal consistency of 0.90 or greater among prior veteran sam-

ples (Afari et al., 2015; Hassija, Jakupcak, Maguen, & Shipherd, 2012). Data from the current sample indicated excellent reliability (Cronbach's $\alpha = .94$).

Risk behaviors. Participants were asked about behavioral activities within the previous 12 months using 15 dichotomous (yes/no) items. The following six behaviors were chosen for the current analysis to represent various types of behavioral risk:

> Have you engaged in any of the following activities in the last 12 months: (a) took unnecessary risks to life; (b) took unnecessary health risks; (c) risked getting a sexually transmitted disease; (d) drove after several drinks; (e) smoked tobacco; (f) used smokeless tobacco.

Variables related to tobacco were condensed into one dichotomous variable used to assess overall tobacco use. Risk behavior items used in this study have been previously assessed among active-duty soldiers (Adler, Britt, Castro, McGurk, & Bliese, 2011), and were originally developed based on comments made by soldiers recently returned from Iraq, during their postdeployment transition (Adler, Bliese, McGurk, Hoge, & Castro, 2009).

In addition, problematic drinking was assessed using the three alcohol consumption questions from the Alcohol Use Disorders Identification Test (AUDIT/AUDIT-C). Items on the AUDIT-C assess for drinking frequency and consumption. Each AUDIT-C question is scored from 0 to 4 points, and total scores can range from 0 to 12. For the current study, a cutoff score of 5 was chosen to indicate problematic drinking among men and women. The decision to use a higher cutoff score for the AUDIT-C was made in light of generally high rates of alcohol use among veterans, and the need to identify associations between MSA and more serious drinking problems, rather than alcohol use that is borderline or subthreshold. Previous research which has utilized a cutoff score of 5 or above has indicated good sensitivity (0.73–0.94) and moderate specificity (0.58–0.88) among general population and primary care samples (Aalto, Tuunanen, Sillanaukee, & Seppä, 2006; Bush, Kivlahan, McDonell, Fihn, & Bradley, 1998; Dawson, Grant, Stinson, & Zhou, 2005; Rumpf, Hapke, Meyer, & John, 2002; Seale et al., 2006). Data from the current sample indicated good reliability (Cronbach's $\alpha = .81$).

Demographic and military-related factors. Demographic and military-related variables utilized in these analyses included gender, age, race/ethnicity, marital status, and era of military service (i.e., pre-9/11 vs. post-9/11). Those veterans who reported any military service after September 11th, 2001 were categorized as post-9/11 veterans, and those who did not serve after this date were categorized as pre-9/11 veterans. Participants were asked questions related to demographic and military factors in the initial portion of the survey.

Analyses

All analyses were conducted using IBM SPSS 22 data analysis software. The prevalence of MST among male and female veterans in our study was estimated as proportions of the total number of male and female veterans in the sample. Each MST-related variable was assessed for prevalence individually, and the variable indicating forced sexual contact was used to indicate MSA for the remaining analyses. Demographic and military-related factors were assessed and compared among men and women with and without MSA using cross-tabulations. Age was categorized into three groups: 18–40 years, 41–60 years, and 61 or more years. Marital status was classified as married and nonmarried (i.e., single, divorced, separated, widowed, or domestic partnership). The statistical significance of the relationships between MSA and demographic variables was determined using Pearson's chi-square test.

The prevalence of health and behavioral outcomes among male and female veterans with and without MSA were calculated using cross-tabulations. To determine the relationship between experiences of MSA and each outcome variable, binary logistic regressions with odds ratios were conducted for male and female samples. For each regression model, control variables included those demographic factors which were found to be significantly related to MSA among men and women in the first set of analyses. Odds ratios with 95% confidence intervals and adjusted p values are presented.

Results

Sample Characteristics and Prevalence of Military Sexual Trauma

A total of 2,208 male veterans and 327 female veterans completed the survey and were thus eligible for these analyses. Demographic characteristics, as well as the frequencies of military sexual harassment and assault and health and behavioral outcomes, are described in Table 1. Among veterans in the sample, 4.8% of men and 40.6% of women reported experiencing forced sexual contact (i.e., military sexual assault [MSA]).

The demographic characteristics of male and female veterans with and without MSA are described in Table 2. Male veterans' experiences of MSA were significantly associated with age ($p = .001$), race/ethnicity ($p < .001$), and marital status ($p < .001$). Among female veterans, MSA was significantly associated with age ($p = .035$) and marital status ($p = .006$).

Health and Behavioral Outcomes Associated With MSA

The prevalence of health and behavioral outcomes among male and female veterans with and without MSA are presented in Table 3. Among men, MSA was significantly associated with self-reported physical health and depressive symptoms and probable PTSD. Specifically, men with MSA had approximately four times the odds of reporting physical and psychological health symptoms, compared with those without MSA. Men with a history of MSA were also significantly more likely to report engaging in all risk behaviors except for problematic alcohol use, with approximately two to three times greater odds compared with those without MSA.

Among female veterans, MSA was significantly related to physical health and depressive symptoms, and probable PTSD. The odds of reporting physical and psychological health symptoms among women with MSA were approximately two to seven times greater compared with those without MSA. MSA was also significantly related to several risk behaviors among women—including taking unnecessary risks to health or life and using tobacco—with approximately two to four times greater odds compared with those without MSA.

Table 1
Sample Characteristics

Gender		
Male	2,208 (87.1%)	
Female	327 (12.9%)	
	Men	Women
Age category		
18–40	739 (33.5%)	162 (49.5%)
41–60	805 (36.5%)	133 (40.7%)
61 or older	664 (30.1%)	32 (9.8%)
Race/ethnicity		
American Indian/Alaska Native	45 (2.1%)	3 (.9%)
Asian	107 (4.9%)	11 (3.4%)
Black/African American	389 (17.8%)	74 (22.7%)
Native Hawaiian/Pacific Islander	21 (1.0%)	1 (.3%)
White (not Hispanic)	1,052 (48.1%)	119 (36.5%)
Hispanic/Latino	443 (20.2%)	82 (25.2%)
Other	55 (2.5%)	14 (4.3%)
Multiracial	77 (3.5%)	22 (6.7%)
Marital status		
Not married	1,224 (55.7%)	214 (65.8%)
Married	972 (44.3%)	111 (34.2%)
Education		
High school diploma/GED or less	318 (14.4%)	18 (5.5%)
Trade/associates/some college	1,105 (50.2%)	173 (52.9%)
Bachelor's degree	462 (21.0%)	85 (26.0%)
Master's degree or higher	288 (13.1%)	44 (13.5%)
Other	30 (1.4%)	7 (2.1%)
Era of service		
Pre-9/11	1,251 (61.8%)	142 (45.5%)
Post-9/11	774 (38.2%)	170 (54.5%)
Military sexual trauma		
Experienced uninvited/unwanted sexual attention	166 (8.9%)	177 (64.1%)
Experienced sexual contact against his/her will	90 (4.8%)	112 (40.6%)
Physical health symptom severity		
None to low	1,105 (63.7%)	132 (50.2%)
Moderate to high	630 (36.3%)	131 (49.8%)
Probable PTSD	644 (34.8%)	96 (34.9%)
Depressive symptom severity		
None to mild	1,156 (62.6%)	159 (58.2%)
Moderate to severe	692 (37.4%)	114 (41.8%)
Problematic alcohol use	455 (27.9%)	42 (17.7%)
In the last 12 months		
Took unnecessary risks to health	343 (16.4%)	40 (13.4%)
Risked getting an STD	258 (12.3%)	31 (10.4%)
Drove while intoxicated	347 (16.6%)	39 (13.1%)
Used any tobacco products	734 (35.2%)	83 (27.9%)
Took unnecessary risks to life	293 (15.9%)	27 (10.8%)

Discussion

This study presents data from a community-based sample of veterans living in Southern California which highlights the important relationships between military sexual assault, physical and psychological health, and risk behavior. Nearly 5% of male and more than 40% of female veterans in our study reported experiences of unwanted sexual contact during their military service; similar rates were found among a recent population-based sample of OEF/OIF veterans (Barth et al., 2016). Although these rates of MSA are higher than those previously reported among other population-based samples of veterans (Kang et al., 2005; Klingensmith, Tsai, Mota, Southwick, & Pietrzak, 2014; Street et al., 2008), they are within the ranges reported among samples derived from the VA health care system (Booth et al., 2012; Fontana & Rosenheck, 1998; Hankin et al., 1999; Mondragon et al., 2015; Sadler et al., 2003; Surìs et al., 2007).

Demographic characteristics associated with MSA among our sample—including age, race/ethnicity and marital status—are consistent with prior research (Barth et al., 2016; Murdoch et al., 2014; Skinner et al., 2000; Turchik & Wilson, 2010). Veterans in our study who experienced MSA were largely unmarried and between the ages of 18 and 60 years, with nearly half of women within the 18–40 year age group. While some demographic factors have been identified as potential risk factors for MSA victimization, explanations remain unclear. It is possible that the demographic composition of the military—often with individuals who are younger, unmarried, non-White, and with less education, as compared with the general population—may place individuals at enhanced risk for sexual assault given that these factors have been linked to sexual victimization (Turchik & Wilson, 2010). With regards to age, our results may reflect shifts in military culture that could impact the likelihood of disclosing MSA, as policies are

Table 2
Characteristics of Men and Women With and Without a History of MSA

	History of MSA		No history of MSA			
Male	90 (4.8%)		1,790 (95.2%)			
Female	112 (40.6%		164 (59.4%)			
					p	
	Men	Women	Men	Women	Men	Women
Age category					.001	.035
18–40	27 (30.0%)	47 (42.0%)	605 (33.8%)	90 (54.9%)		
41–60	48 (53.3%)	55 (49.1%)	635 (35.5%)	55 (33.5%)		
61 or older	15 (16.7%)	10 (8.9%)	550 (30.7%)	19 (11.6%)		
Race/ethnicity					<.001	.285
American Indian/Alaska Native	9 (10.0%)	0 (.0%)	32 (1.8%)	2 (1.2%)		
Asian	1 (1.1%)	2 (1.8%)	90 (5.1%)	7 (4.3%)		
Black/African American	24 (26.7%)	33 (29.5%)	322 (18.1%)	28 (17.2%)		
Native Hawaiian/Pacific Islander	1 (1.1%)	0 (.0%)	19 (1.1%)	1 (.6%)		
White (not Hispanic)	34 (37.8%)	39 (34.8%)	859 (48.4%)	60 (36.8%)		
Hispanic/Latino	11 (12.2%)	25 (22.3%)	359 (20.2%)	43 (26.4%)		
Other	1 (1.1%)	5 (4.5%)	42 (2.4%)	8 (4.9%)		
Multiracial	9 (10.0%)	8 (7.1%)	53 (3.0%)	14 (8.6%)		
Marital status					<.001	.006
Not married	68 (78.2%)	84 (76.4%)	1,006 (56.4%)	99 (60.4%)		
Married	19 (21.8%)	26 (23.6%)	779 (43.6%)	65 (39.6%)		
Education					.059	.196
High school diploma/GED or less	19 (21.1%)	4 (3.6%)	246 (13.8%)	12 (7.3%)		
Trade/associates/some college	50 (55.6%)	66 (58.9%)	893 (50.0%)	84 (51.2%)		
Bachelor's degree	15 (16.7%)	25 (22.3%)	378 (21.2%)	44 (26.8%)		
Master's degree or higher	5 (5.6%)	12 (10.7%)	249 (13.9%)	22 (13.4%)		
Other	1 (1.1%)	5 (4.5%)	20 (1.1%)	2 (1.2%)		

moving toward greater awareness and recognition of MSA and more support for MSA victims is being generated. The age and marital status of veterans with MSA in our study at the time of the assault is not known; thus, it is difficult to discern whether these factors may have contributed to an enhanced risk of victimization. What is clear is that additional research in this area is needed, both to delineate and explain potential demographic risk factors for MSA and explore how they may influence the impact of and recovery from MSA over time.

Among both male and female veterans in our sample, experiences of MSA were significantly related to reports of subsequent physical and psychological health symptoms, after controlling for associated demographic factors. These findings indicate that individuals who experience MSA are still suffering a substantial health impact from the assault, often many years later. The increased odds of physical health symptoms is consistent with previous research among female veterans (Frayne et al., 1999); research among male veterans related to the physical health impact of MSA/MST has been sparse, and thus our study may be one of the first to report on this relationship.

The greater odds of probable PTSD among MSA victims in our study aligns with prior literature among population-based and treatment-seeking samples of male and female veterans (Kang et al., 2005; Surís et al., 2004). Our findings related to the greater odds of depressive symptoms among female veterans with MSA also align with prior research (Hankin et al., 1999; Kimerling et al., 2007; Surìs et al., 2007). To our knowledge, our study is the first to report a more than fourfold increase in the odds of depressive symptoms among male veterans with MSA. One recent study found a fivefold increased odds of depressive symptoms among men with MSA; however, the sample was still actively serving in the military and thus the assault likely occurred more recently than among men in our sample (Millegan, Wang, LeardMann, Miletich, & Street, 2016). Findings from our study indicate that experiences of sexual assault among both men and women in the military can take a significant toll on their psychological health, even years after the trauma occurred.

Experiences of MSA among male and female veterans in our sample were also linked to self-reported risk behaviors. Overall, these findings indicate that men and women who experience MSA are at greater risk of a potentially long-term negative behavioral impact following the trauma, compared with those without MSA. Our results related to alcohol use and MSA add to existing literature indicating a complex relationship between sexual trauma and alcohol use among veterans. Women with MSA in our study were not more likely than women without MSA to report problematic alcohol use, as has been reported previously among other inconsistent findings. It may be possible that the relationship between MSA and alcohol use among female veterans is linked to one's era of military service, given that prior research has demonstrated a positive association between experiences of MSA/MST and subsequent alcohol use among female veterans from the pre-9/11 era (Hankin et al., 1999) Further research is needed to explore these relationships in more depth.

Male veterans in our sample who experienced MSA reported higher rates of problematic alcohol use than those without MSA, though the difference was not statistically significant. Prior research has found that male OIF/OEF veterans with MST report

Table 3
Health and Behavioral Outcomes and Their Association With MSA Among Men and Women

Health and behavioral outcomes	History of MSA		No history of MSA		Odds Ratio [95% CI]	p^{**}
	N	%	*N*	%		
			Men			
Physical and mental health						
Physical health symptoms (med–high severity)	56	66.7%	545	32.2%	3.86 [2.39, 6.23]	<.001
Depression (moderate–severe)	59	72.0%	591	34.9%	4.26 [2.57, 7.05]	<.001
Probable PTSD	57	69.5%	544	34.0%	4.53 [2.76, 7.45]	<.001
Risky behaviors						
Took unnecessary health risks	35	39.8%	292	16.4%	3.22 [2.03, 5.13]	<.001
Risked getting STD	23	25.8%	227	12.7%	2.11 [1.25, 3.54]	.005
Drove while intoxicated	26	29.2%	315	17.6%	1.80 [1.09, 2.98]	.022
Took unnecessary life risks	31	40.3%	247	15.7%	3.19 [1.93, 5.27]	<.001
Used tobacco	50	56.8%	664	37.2%	1.79 [1.14, 2.83]	.012
Problematic alcohol use	28	38.4%	415	27.5%	1.61 [.96, 2.70]	.069
			Women			
Physical and mental health						
Physical health symptoms (med-high severity)	63	60.6%	60	40.3%	2.33 [1.37, 3.98]	.002
Depression (moderate–severe)	61	57.5%	47	30.7%	3.31 [1.95, 5.64]	<.001
Probable PTSD	61	57.5%	28	18.1%	6.76 [3.74, 12.24]	<.001
Risky behaviors						
Took unnecessary health risks	24	21.6%	14	8.5%	3.00 [1.45, 6.17]	.003
Risked getting STD	17	15.3%	13	7.9%	2.06 [.93, 4.57]	.075
Drove while intoxicated	19	17.3%	17	10.4%	1.75 [.85, 3.60]	.128
Took unnecessary life risks	18	20.5%	8	5.6%	4.36 [1.79, 10.62]	.001
Used tobacco	43	39.1%	36	22.0%	2.27 [1.32, 3.92]	.003
Problematic alcohol use	15	15.8%	22	16.7%	.92 [.44, 1.94]	.829

[*] *p* values indicate the statistical significance of the relationship between a history of MSA and designated outcome variables, obtained via binomial logistic regression after controlling for age, race, and marital status among men and age and marital status among women.

greater rates of hazardous alcohol use than those without MST, although this difference was also not statistically significant (Scott et al., 2013). These findings may be indicative of the generally high rates of alcohol use among male veterans, along with their propensity to engage in substance use following trauma (Afari et al., 2015; Hoggatt et al., 2015; Maguen, Luxton, et al., 2012; Maguen, Ren, Bosch, Marmar, & Seal, 2010)

Our finding that female veterans with MSA were more likely to report tobacco use is similar to what has been found previously among women accessing the VA (Frayne, Skinner, Sullivan, & Freund, 2003; Lang et al., 2003). Little to no prior research has reported rates of tobacco use associated with MSA or MST among male veterans. Other self-reported behaviors assessed in our study, including taking unnecessary health or life risks or risking an STD, have not previously been examined in relation to MSA or MST; to our knowledge they have only been assessed among a sample of largely male AD service members (Adler et al., 2011). If self-reported risk of getting an STD is interpreted as sexual risk, our finding indicate a significantly greater sexual risk among male veterans with MSA is similar to prior research demonstrating an increased risk of STI diagnoses associated with MST among men (Turchik et al., 2012). The relationship between STD risk and MSA among women in our sample, though not statistically significant, may be indicative of enhanced sexual risk associated with MSA as has been previously found among samples of female veterans (Strauss et al., 2011; Turchik et al., 2012).

Research among veterans of OIF/OEF has demonstrated high rates of psychological comorbidities for men and women with MST; more than half of veterans with both MST and PTSD have described having three or more psychological comorbidities (Maguen, Cohen, et al., 2012). In our cross-sectional study, health and behavioral outcomes were assessed independently and within concurrent time frames; thus temporality and co-occurrence cannot be discerned. However, it is clear that relationships between military sexual assault, health, and behavior among veterans are multifaceted and require additional research into their unique dynamics and complexities.

Implications

The results of this study have important implications for the treatment and care of veterans who experience MSA, as well as future research directions. The data presented here add to a body of literature indicating complex treatment needs among victims of MSA and highlight the importance of assessment. Previously, MST has been described as a unique type of trauma characterized by factors which pose a distinct set of challenges to the treatment and care of victims (Northcut & Kienow, 2014). Unlike civilian sexual trauma, experiences of MSA and MST are explicitly linked to the victim's personal and professional identity, as perpetrators are often within the victim's military family and thus the trauma represents a significant betrayal of trust. Additionally, factors associated with military culture may enhance the risk of revictimization and have further detrimental effects. Victims of MST often present with complex and nonspecific symptoms, and thus treatment approaches should aim to address the impact of trauma from

a holistic perspective, considering effects on the mind, body, and behavior (Baltrushes & Karnik, 2013; Northcut & Kienow, 2014).

It is also critical to consider important gender differences in both the experience and impact of MSA, as these distinctions may be particularly relevant in the treatment and care of victims. There are factors within the military which are different for men and women, and which may uniquely contribute to victims' experiences and impact of sexual trauma. The masculinist nature of the military (Weitz, 2015) is experienced differently by men and women, and can contribute to gendered experiences during deployment and service. The "band of brothers" mentality is considered a military institution, and women may feel isolated if they are not embraced by their fellow service members, which could impact the risk and health effects of MSA. In turn, this mentality can have a detrimental effect among men who experience MSA, as fear and shame associated with betraying a brother by disclosing the abuse may lead to greater psychological distress (Morris, Smith, Farooqui, & Surís, 2014; Turchik et al., 2013). In addition, experiences of deployment and combat may vary greatly between men and women, and MSA within this context may thus have a distinct effect.

Importantly, male and female victims of MSA may present with unique sets of treatment needs in a clinical setting. Our findings add to literature demonstrating mixed results related to gender differences in the impact of MSA or MST. In our study, the relationships between MSA and some outcomes—including physical health and depressive symptoms—were stronger among men than among women. However, the relationship between MSA and PTSD was stronger among women than men, as were the relationships between MSA and taking unnecessary life risks, and using tobacco. These inconsistencies align with prior research (Driscoll et al., 2015; Kang et al., 2005; Kimerling et al., 2007; O'Brien et al., 2008; Polusny et al., 2014; Shipherd et al., 2009), highlighting the importance of considering distinct gender differences related to specific health and behavioral outcomes that can have important implications for treatment and recovery among MSA victims.

Findings from our study also support the notion that MST/MSA can have a long-term impact among victims. Nearly two thirds of men and almost half of women in our sample served in the military before 9/11, and their current health problems and risk behaviors may be linked to a sexual trauma that occurred many years ago. Cumulative trauma over one's lifetime can contribute to a "global sense of psychological discomfort and common physical health complaints" among military personnel (Martin, Rosen, Durand, Knudson, & Stretch, 2000). Women who have experienced MST in the context of other trauma history, such as childhood sexual abuse, have demonstrated more health problems and a greater utilization of health services compared with those with fewer trauma exposures (Campbell, Greeson, Bybee, & Raja, 2008). The burden of chronic stress associated with a history of sexual trauma can also increase the likelihood of engaging in negative coping behaviors, such as substance use or unsafe sexual behavior (Smith & Breiding, 2011). Providers who are treating veterans with MSA must take this into account and consider the implications of long-standing stress related to a history of trauma.

Prior research has noted the lack of guiding theoretical frameworks to describe the relationships between MST and veterans' health and well-being, and also highlighted the importance of resilience in the development and management of health symptoms following MST (Kelly, Skelton, Patel, & Bradley, 2011). In addition to factors related to resilience, it is possible that veterans' transition out of the military may have a substantial impact on subsequent physical and psychological health, as well as risk behaviors, related to experiences of MST/MSA. The Military Transition Theory (Castro, 2015) provides a way of explaining the challenges encountered before, during, and after transition from military to civilian life, and their relationship with various outcomes. This theory posits that the process of transition is defined by three interacting phases: approaching the transition, managing the transition, and assessing the transition. Factors within all three phases can have an impact on outcomes, which are often interconnected.

In conceptualizing relationships between MST/MSA and health and behavioral outcomes, factors at all three phases of transition may have a distinct influence. For example, facets of approaching transition—including experiences of MST/MSA, the peer and institutional response to disclosure of the trauma, the relationship with the perpetrator, and the type of military discharge or separation—may impact the development of physical or psychological health symptoms among victims. Given that nearly two thirds of AD women who report MSA describe subsequent experiences of professional or social retaliation (Morral et al., 2015), and considering the potential relationship between institutional retaliation and the development of psychological health symptoms (Campbell & Raja, 2005), the military's response to victims' disclosure of the trauma is likely an especially influential factor. Within the managing transition phase, factors such as victims' access to resources and social support from both military and nonmilitary sources could potentially influence the health and behavioral outcomes among victims. Finally, factors within the assessing phase—including outcomes related to transition as well as seeking of care—can have a direct impact on victims' health and well-being. Future research and programming within both the military and veteran sphere should consider factors related to transition, and ways to mitigate the negative effects of MST/MSA during this period in an effort to prevent long-term health and behavioral problems. One potential strategy could include early assessment for MST/MSA and referral to appropriate care at the time of transition, with coordination of treatment and care between both military and veteran health care systems.

Limitations

The current study is not without limitations. The use of cross-sectional data limits the temporality of our findings, despite examining current symptoms associated with a past exposure. In addition, our study used one item from the VA's MST screener to measure experiences of MSA, but it is possible that this may not account for all instances of military sexual assault among our sample. The most recent anonymous survey of sexual trauma among active-duty service members utilized more specific behaviorally based questions to assess for sexual trauma, and results demonstrated higher rates than were found with previously used assessment strategies (Morral et al., 2015). Therefore, rates of MSA among our sample may be underestimated compared to rates that would be elicited by behaviorally based questions. However, a strength of our study is the focus on MSA alone, rather than MST, among a community-based sample of male and female

veterans. This allowed us to delineate gender-specific health and behavioral outcomes associated with experiences which specifically constitute sexual assault, rather than sexual trauma more generally. Our study also utilized self-reported measures of sexual trauma, health outcomes, and risk behaviors, and thus responses may be subject to bias. Additionally, we did not specifically assess for other contextual factors—such as disclosure of the assault, sources of social support, and other military-related factors—which may have an important impact on the relationships between MSA, health, and behavior. Lastly, our study sample was located within a limited area of the country and thus may not be representative of all veterans or those living in other parts of the country.

Conclusion

The data presented here indicate a significant burden of health problems and risky behaviors among male and female veterans who have experienced MSA. The unique and complex needs of victims, as well as important gender differences in the experience and impact of MSA, are vital to acknowledge when seeing victims in a clinical setting. There is a need for appropriate and timely assessment for MSA/MST among military personnel, such as prior to leaving the military, in order to mitigate related negative health effects and risk behaviors, and provide linkages to sensitive and appropriate sources of care.

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