

Functional Correlates of Military Sexual Assault in Male Veterans

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Despite research findings that similar numbers of male and female veterans are affected by military sexual trauma (MST), there has been considerably less research on the effects of MST specific to male veterans. The aim of the present study was to provide preliminary data describing functional correlates of military sexual assault (MSA) among male Iraq/Afghanistan-era veterans to identify potential health care needs for this population. We evaluated the following functional correlates: posttraumatic stress disorder (PTSD) symptoms, depression symptoms, alcohol use, drug use, suicidality, social support, violent behavior in the past 30 days, incarceration, disability eligibility status, and use of outpatient mental health treatment. We compared 3 groups: (a) male veterans who endorsed a history of MSA ($n = 39$), (b) a general non-MSA sample ($n = 2,003$), and (c) a matched non-MSA sample ($n = 39$) identified by matching algorithms on the basis of factors (e.g., age, education, adult premilitary sexual trauma history, childhood sexual and physical trauma history, and race) that could increase veterans' vulnerability to the functional correlates examined. MSA in men was associated with greater PTSD symptom severity, greater depression symptom severity, higher suicidality, and higher outpatient mental health treatment, above and beyond the effects of vulnerability factors. These findings suggest that, for male veterans, MSA may result in a severe and enduring overall symptom profile requiring ongoing clinical management.

Keywords: male veterans, military sexual trauma, functional correlates, outcomes

Military sexual trauma (MST) includes sexual assault, sexual battery, or repeated, threatening sexual harassment experienced during military service (U.S. Department of Veterans Affairs, Veterans Health Administration, 2010). All veterans who use Department of Veterans Affairs (VA) health services are screened for MST, and free MST-related care is available for those who screen positive (U.S. Department of Veterans Affairs, Veterans Health Administration, 2010). Like other forms of sexual trauma, MST is more common among women than among men (Hoyt, Klosterman, Rielage, & Williams, 2011; Kimerling, Gima, Smith, Street, & Frayne, 2007). For example, in fiscal year 2014, 25.0% ($N = 85,033$) of women veterans who used VA screened positive for MST as compared with 1.3% of male veterans ($N = 60,599$; Military Sexual Trauma Support Team, 2015). Thus, a striking feature of MST screening rates is that, because the majority of veterans are men, the raw number of veterans who report a history of MST are similar between males and females (Kimerling et al., 2007). As such, the experience of MST clearly crosses gender lines, yet little research has been conducted on the effects of MST on men. Accordingly, the aim of the present study was to examine diverse functional correlates of MST among male veterans. Specifically, the current study examined correlates of sexual assault among Iraq/Afghanistan-era veterans who served in the military efforts since September 11, 2001 to assist in the identification of health care needs for this population.

Sexual Trauma and Suicidality

Prior research in male veteran populations suggests a positive association between a history of sexual trauma and suicidal be-

havior (e.g., Belik, Stein, Asmundson, & Sareen, 2009; Tiet, Finney, & Moos, 2006; Zinzow, Grubaugh, Frueh, & Magruder, 2008). For example, a study of Canadian military personnel found that males with a history of sexual trauma were approximately four times more likely to have attempted suicide than those without a history of sexual trauma, even after controlling for demographic factors and lifetime psychopathology (Belik et al., 2009). Similarly, Tiet et al. (2006) reported that male veterans seeking mental health treatment who had experienced sexual assault in the last 30 days were approximately twice as likely to have made a recent suicide attempt as veterans who had not recently experienced sexual assault.

Sexual Trauma and Social Support

Sexual trauma may also negatively impact perceived social support, although evidence is mostly indirect. In a sample of male and female military personnel, sexual stressors (i.e., sexual assault, sexual harassment, and sexual identity challenges) were negatively associated with overall functioning in multiple domains, including work, family relationships, and social activities (Murdoch, Pryor, Polusny, & Gackstetter, 2007), all important factors in social support. MST has also been associated with poorer postdeployment readjustment in intimate partner relationships among male and female Iraq/Afghanistan-era veterans (Katz, Cojucar, Beheshti, Nakamura, & Murray, 2012). However, neither study (Katz et al., 2012; Murdoch et al., 2007) specifically examined the association between MST and social support among male veterans.

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Sexual Trauma and Violent Behavior

Prior research indicates that sexual trauma and associated sequelae may also increase risk of violent behavior. In a civilian sample of individuals incarcerated for a felony charge, White males who had experienced lifetime sexual abuse were more likely to have a history of violent offenses than were White males without a sexual abuse history, although this difference was not found for Black males (Clark et al., 2012). Moreover, the association between posttraumatic stress disorder (PTSD) and anger and aggression is well established (see Worthen, 2011, for a review). Despite these findings, studies to date have not examined the relationship between sexual trauma, particularly sexual assault occurring during military service, and violent behavior within the veteran population.

Sexual Trauma and Incarceration

To our knowledge, the association between MST and incarceration among veterans has not been studied, although research on civilian sexual assault suggests that sexual abuse and assault are positively associated with risk of incarceration. For example, rates of childhood sexual abuse among male prison inmates are significantly higher than rates in the general population (41% to 59%; Fondacaro, Holt, & Powell, 1999; Johnson et al., 2006), and nearly two thirds of incarcerated civilian women reported a history of childhood sexual assault, adult sexual assault, or both (Islam-Zwart & Vik, 2004). As with the risk of violent behavior, incarceration may be an adverse consequence of behaviors intended to cope with the adverse events of sexual trauma, such as drug use and engaging in criminal behavior to please significant others, as suggested by a qualitative study of incarcerated female civilians (Fuentes, 2014).

Sexual Trauma, Military Service-Related Disability, and Mental Health Treatment Use

Rates of MST have been reported to be particularly high among veterans seeking military service-related disability compensation (i.e., service connection) for PTSD within VA. In one previous study, 4% of males and 71% of females seeking service connection for PTSD reported experiencing sexual assault, defined as attempted or completed sex against the person's will, during military service (Murdoch, Polusny, Hodges, & O'Brien, 2004). Reported rates of MST in that study may have been lower than would be expected currently, as the study (Murdoch et al., 2004) was conducted prior to legal changes implemented in 2002 that relaxed evidentiary standards within the VA for MST claims. In a more recent study, 6% of a sample of male Gulf War veterans seeking service-connected disability for PTSD reported experiencing a sexual assault during their service in the Gulf War (Murdoch et al., 2014). In concordant findings among veterans screened for MST in the VA, reported rates of service-connected disability among male veterans screening positive were 39.2% compared to 28.5% for those who did not, a statistically significant difference (Kimerling et al., 2007). Similarly, male Iraq/Afghanistan-era veterans screening positive for MST within the VA health care system were more likely than those screening negative to have a total disability rating in excess of 50% (27.6% vs. 16.6%; Kimerling et al., 2010). Such

findings are unsurprising in light of the association of MST with higher rates of both mental and physical health problems (e.g., Booth et al., 2012; Maguen, Luxton, Skopp, & Madden, 2012; Turchik, Pavao, Hyun, Mark, & Kimerling, 2012).

Stigma-related, gender-related, and knowledge barriers have been identified among males reporting MST (but who have not yet received subsequent MST-related treatment; Turchik et al., 2013). Despite a possible bias in underreporting, MST nevertheless has been associated with increased likelihood of multiple mental health disorders, especially depression and PTSD (e.g., Kang, Dalager, Mahan, & Ishii, 2005; Kimerling et al., 2007, 2010; Maguen, Cohen, et al., 2012; Maguen, Luxton, et al., 2012; Turchik et al., 2012). Given the increased rates of mental health diagnoses, male veterans who have experienced MST may have a greater likelihood of needing (and perhaps seeking) mental health treatment, whether within or outside of VA. In fact, a study of male outpatients using VA health care services noted higher use of VA health care among patients screening positive for MST (Kimerling et al., 2011). Additionally, Kelly et al. (2008), observing health care use among female veterans (both VA and non-VA users), noted that female veterans who experienced sexual assault during their military service were more likely to use VA services than were those who had not experienced military sexual assault, suggesting a bias for VA-based treatment. Looking across gender, Turchik et al. (2012) found that 55.4% of male and female Iraq/Afghanistan-era veterans who screened positive for MST had at least one MST-related mental health appointment within 1 year of their screening. Taken together, these findings suggest that despite stigma concerns, among male veterans, MST is associated with higher rates of mental health treatment. Given that research suggests active duty personnel with mental health problems often do not seek mental health treatment (e.g., Kim, Thomas, Wilk, Castro, & Hoge, 2010), it is likely that the higher rates of mental health treatment occur following military discharge. Therefore, it is possible that males who experience MST delay seeking treatment when needed, which may further exacerbate difficulties.

MST and Psychiatric Conditions

As noted in the preceding paragraphs, a substantial association exists between MST and diagnoses of PTSD and depression (e.g., Kimerling et al., 2007, 2010; Maguen, Cohen, et al., 2012; Maguen, Luxton, et al., 2012). Research addressing the association between MST and substance use disorders in male service members is less conclusive. Although multiple studies in veterans have described positive associations between MST and likelihood of substance use, substance-related problems, and substance use disorders (e.g., Cucciare, Ghaus, Weingardt, & Frayne, 2011; Kimerling et al., 2007, 2010; Pavao et al., 2013), other reports have failed to confirm this. For example, a study of active duty Iraq/Afghanistan-era male and female service members failed to find a relationship between MST and hazardous alcohol use (defined as a score of 8 or higher on the Alcohol Use Disorder Identification Test [AUDIT]; Maguen, Luxton, et al., 2012); it is important to note, however, that this study examined active duty personnel and MST assessed using the VA MST screening, rather than veterans and military sexual assault. A lack of association between MST and alcohol abuse was also reported by Maguen, Cohen, et al. (2012) among a

cohort of male veterans diagnosed with PTSD, although MST was positively associated with the likelihood of an individual having a nonalcohol substance abuse diagnosis.

Although extant studies of MST typically have controlled demographic variables and/or military-related variables (e.g., Kimerling et al., 2007, 2010; Maguen, Cohen, et al., 2012; Maguen, Luxton, et al., 2012), putative vulnerability factors including childhood sexual abuse and nonmilitary sexual assault have not been consistently controlled and thus remain as a possible source of confounding; this possibility is supported by Cabrera, Hoge, Bliese, Castro, and Messer's (2007) findings of positive associations between childhood trauma, PTSD, and depression symptomology in Iraq-era male veterans. Controlling for these vulnerabilities is thus an important methodological consideration in identifying functional correlates of MST.

Current Study

Empirical research characterizing MST in male veterans is limited. Additional research is especially needed in areas of maladaptive behaviors, social functioning, and treatment use. Moreover, comorbidities between MST, pre-MST history, PTSD, and depression create substantial risk of statistical confounding that may require specific methodologies to address. The aim of the present study is to examine functional correlates of a severe form of MST, the experience of sexual assault during military service (MSA), in a sample of male Iraq/Afghanistan-era veterans, active duty personnel, and reservists. Toward this end, we compared those who endorsed a history of MSA with those without such history on a variety of clinical and functional measures including PTSD, depression, alcohol use, drug use, suicidality, social support, violent behavior in the last 30 days, incarceration, disability eligibility status (presence of VA service connection), and use of mental health treatment. A significant strength of the study design was that we used two different methods of comparison. First, we compared males who experienced MSA with all remaining males in the sample who did not experience MSA. Second, we used a matching algorithm procedure to generate a comparable sample that addressed those confounding risk factors related to both MSA and outcome variables. Each of these comparisons is useful for different reasons. A particular goal of this approach was to identify those factors unique to MSA to aid clinicians, to facilitate identification of those at particular risk of experiencing MSA, and to facilitate identification of specific effects of MSA above and beyond its covariance with demographic and trauma history factors.

On the basis of the findings cited in the preceding paragraphs, we hypothesized that male veterans who endorsed MSA would (1) have higher PTSD and depression symptomatology, (2) have higher alcohol and substance use scores, (3) have higher levels of suicidality, (4) report lower levels of social support, (5) be more likely to report perceived problems controlling violence, (6) be more likely to have been incarcerated, (7) be more likely to have a VA service-connected disability, and (8) be more likely to have received outpatient mental health treatment than male veterans who did not endorse MSA.

Method

Participants

Data collection for this cross-sectional cohort study occurred between 2005 and 2013 as part of an ongoing multisite study of postdeployment mental health conducted by the Veterans Affairs Mid-Atlantic Mental Illness Research, Education and Clinical Center (MIRECC). The four MIRECC data collection sites are located in Virginia and North Carolina in which there are multiple large military bases and a large National Guard presence. Most of the veterans in this cross-sectional cohort study were registered at the VA, and approximately half were receiving medical or mental health services. Participants included 2,546 Iraq/Afghanistan-era U.S. military veterans, active duty personnel, and reserve forces members (National Guardsmen and Reservists) who had served since September 11, 2001.

Participants were recruited from a variety of sources, including flyers, VA clinic referrals, and invitational letters. The institutional review board at each collaborating site approved the protocol prior to initiating the study. All participants were given a verbal description of the protocol prior to providing written informed consent. Participants completed a structured diagnostic interview and a battery of self-report measures, typically within one study visit. Of the 2,546 total subjects, 2,042 were male and approximately 2% of the male respondents ($n = 39$) endorsed MSA; this is consistent with reported prevalence rates for MSA in the current literature (e.g., Morral et al., 2015). Approximately half ($n = 1,027$; 50.2%) of the sample reported their race as White, 44.4% ($n = 907$) reported their race as Black, and the remaining 5.4% ($n = 108$) reported they were Asian, Pacific Islander, Native American, multiracial, or did not provide information about their race. Regarding marital status, 54.6% ($n = 1,115$) of participants reported they were married, 4.6% ($n = 93$) reported they were remarried, 7.1% ($n = 145$) reported they were separated, 14.4% ($n = 295$) reported they were divorced, and 19.1% ($n = 391$) reported they were never married. Two participants reported they were widowed, and 1 participant did not report his marital status.

Measures

Demographic information. Demographic data were gathered for all participants, including gender, race, marital status, age, and level of education. Four questions on this form were used to assess violence, incarceration, service connection, and outpatient mental health treatment use. Perceived problems controlling violent behavior was assessed with a dichotomous (*yes/no*) question (i.e., "During the last 30 days, have you had trouble controlling violent behavior [e.g. hitting someone]?"). Participants reported on lifetime incarceration (i.e., "Have you ever been in jail or prison in your life?"); answer choices were *no*, *for less than 2 weeks*, or *for more than 2 weeks*. For the purposes of this study, the item was dichotomized (*yes/no*). Veterans were also asked to indicate whether they have a VA service-connected disability; if they reported they were service-connected, they were asked to report their total percentage of service connection (with higher percentage serving as a proxy for higher disability level). Finally, participants were asked whether they had received outpatient mental health treatment in their lifetime; response options were *no*; *yes*, *at*

a VA hospital; yes, at a non-VA hospital; and yes, at both a VA and non-VA hospital. Given the small cell sizes, these were dichotomized (yes/no).

Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996). The BDI-II is one of the most widely used instruments for measuring the severity of depression. It is a 21-item multiple-choice, self-report inventory that includes psychological and physical symptoms and cognitions associated with depression. Responses are scored on a scale value of 0 to 3, and higher total scores indicate higher severity. Research indicates it has excellent criterion-related validity and reliability ($\alpha = .92$ for outpatient population; 1-week test-retest correlation of .93).

Beck Scale for Suicide Ideation (BSSI; Beck & Steer, 1991). The BSSI consists of 21 items that evaluate active and passive suicidal desire and specific plans for suicide. Each item is rated on a 3-point scale, ranging from 0 to 2 with higher total scores indicating greater suicide ideation severity. The scale has good internal consistency ($\alpha = .89$) and validity.

Combat Exposure Scale (CES; Lund, Foy, Sippelle, & Strachan, 1984). The CES is a 7-item self-report measure that assesses frequency and intensity of combat-related stressors on a 5-point scale, with frequency counts based on each question. The total CES score (ranging from 0 to 40) is calculated by using a sum of weighted scores, classified into categories of combat exposure ranging from "light" to "heavy." The CES has been found to have high internal consistency and high test-retest reliability (Keane et al., 1989).

Medical Outcomes Study: Social Support Survey (MOS; Sherbourne & Stewart, 1991). The MOS Social Support Survey is a 19-item self-administered measure of perceived access to various types of social support (e.g., "Someone you can count on to listen to you when you need to talk"), using a 5-point Likert scale (1 = none of the time; 5 = all of the time). Higher scores indicate higher perceived social support. Research indicates high convergent and discriminant validity and good reliability ($\alpha = .91$).

Traumatic Life Events Questionnaire (TLEQ; Kubany et al., 2000). The TLEQ is a 23-item self-report measure of 22 types of potentially traumatic events, including natural disasters, exposure to warfare, robbery involving a weapon, and physical abuse and sexual abuse. For each event, respondents provide frequency of occurrence (ranging from never to more than five times). The measure was adapted to include whether each trauma occurred before, during, or after the military (Clancy et al., 2006). The psychometric properties of the TLEQ have been widely documented, including acceptable reliability for Iraq/Afghanistan-era Veterans (Clancy et al., 2006; Dedert et al., 2009; Kubany et al., 2000). The presence of MSA was identified by an endorsement of sexual assault as an adult (defined as at least one event occurring after one's 18th birthday involving unwanted touching of sexual parts that may or may not have involved threat, force, or consequent injury) that occurred during the military. Notably, this item assesses a more restricted range of sexually traumatic experiences than those captured by the term MST, which also includes verbal sexual harassment. Premilitary adult sexual assault was defined as endorsing the same item as occurring before the military. Childhood sexual trauma was defined by three items (sexual abuse before age 13 by someone at least 5 years older, before age 13 by someone close in age, and during adolescence; Kubany et al.,

2000). The total number of childhood sexual trauma incidents was computed. Additionally, the total number of childhood physical abuse incidents was computed by summing two items (physical punishment that resulted in injuries and witnessing family violence while growing up). The total number of types of other premilitary trauma experienced was computed by counting the number of other traumatic events (i.e., excluding sexual trauma and childhood physical abuse) that the participant reported experiencing at least once before joining the military.

Davidson Trauma Scale (DTS; Davidson et al., 1997). The DTS is a 17-item self-report measure of frequency and severity of the 17 DSM-IV PTSD symptoms (i.e., re-experiencing, avoidance, and hyperarousal), rated on a 5-point scale (frequency: 0 = not at all, 4 = every day; severity: 0 = not at all distressing, 4 = extremely distressing). The total score (frequency plus severity) was used for the purpose of this study, with higher scores indicating greater symptomatology or severity of current symptoms. The DTS has good test-retest reliability and discriminant validity among U.S. military veterans who have served since September 11, 2001 (McDonald, Beckham, Morey, & Calhoun, 2009).

Alcohol Use Disorders Identification Test (AUDIT; Babor, Biddle-Higgins, Saunders, & Monteiro, 2001). The AUDIT is a 10-item screening questionnaire designed by the World Health Organization to identify alcohol misuse. Items ask about amount and frequency, dependence, and problems associated with alcohol use. The AUDIT total score has demonstrated good internal consistency across diverse populations (Saunders, Aasland, Babor, de la Fuente, & Grant, 1993).

Drug Abuse Screening Test (DAST-20; Skinner, 1982). The DAST-20 is a shortened version of the DAST that is highly correlated with the original 28-item DAST (Skinner, 1982). The DAST-20 assesses problematic drug use, including abuse of prescription drugs, on the basis of responses to a dichotomous response scale (yes/no). Previous research has demonstrated good internal consistency of the items (Saltstone, Halliwell, & Hayslip, 1994; Skinner, 1982).

Data Analysis Plan

Differences in matching variables between subjects reporting incidents of MSA versus those not reporting incidents of MSA were tested using chi-square procedures for dichotomous variables and nonparametric Kruskal-Wallis-Wilcoxon's rank procedures for ordinal items. Multivariable models were estimated using generalized linear regression procedures, including logistic regressions for dichotomous outcome measures and gamma regressions for ordinal items. The primary focus of the latter tests was on a dichotomous MSA proxy coded positive for subjects reporting an episode of MSA; matching covariates included age, Caucasian race, current marital status (yes/no), years of education, combat status, reports of preenlistment adult sexual assault (any), counts of incidents of childhood sexual abuse and physical abuse, and a count of types of traumatic events reported prior to enlistment.

Putative effects of MSA were evaluated in two separate sets of comparisons, an initial comparison of the group that experienced MSA (i.e., MSA+; $n = 39$) against the remaining non-MSA cohort (MSA-; $n = 2003$). Then, we compared the same MSA+ group ($n = 39$) against a subsample of MSA- participants ($n = 39$) selectively matched with the MST+ group on a number of preex-

posure dimensions (see preceding text). This second analysis was designed to minimize the numerous potential biases and confoundings (e.g., selection bias, covariate imbalance) characteristic of analyses based on observational data (Ho, Imai, King, & Stuart, 2007). Thus, using nonparametric matching procedures implemented in the R software “MatchIt” (Ho, Imai, King, & Stuart, 2011), a comparison subgroup of MST– subjects was identified using genetic search matching algorithms. The latter approach identifies a set of covariate weights leading to optimal subgroup balance between covariates (Diamond & Sekhon, 2013; Tsai & Peace, 2011) and is well-suited for matching when numerous covariates are involved. Complete datasets required for the “Matchit” procedure were derived using chained imputation techniques to address any missing data (R: MICE; van Buuren & Groothuis-Oudshoorn, 2011).

Balance between treatment and case subgroups by using these methods can be assessed in numerous ways, including presentation of postmatch mean differences as a percentage of control group standard deviations (as was done in the current study). Derived models using these algorithms were based on the set of covariates described in preceding paragraphs in the multivariable case. Post-match analysis was conducted using standard analytic methods, also as described earlier; outcomes included measures of function (violence, jail, disability), substance abuse (AUDIT, DAST), mental health status (BSS, BDI, DTS), and use (outpatient mental health treatment).

Results

Cohort characteristics among matching covariates for the complete cohort ($N = 2,042$) and by MSA case status subgroups ($n_{\text{MSA}-} = 2003$; $n_{\text{MSA}+} = 39$) are presented in Table 1. The number of instances of childhood sexual abuse ($\chi^2 = 7.61$; $p = .006$), childhood physical abuse ($\chi^2 = 51.34$; $p < .0001$), and the number of types of traumatic life events experienced prior to enlistment ($\chi^2 = 4.63$; $p = .031$) were significantly higher in participants reporting instances of MST. Between-groups differences on remaining covariates were not significant. This imbalance was markedly reduced after the matching procedures as indicated

by the postmatch comparisons (MST– vs. MST+): Incidents of childhood sexual abuse, physical abuse, and traumatic life events were 4.28 versus 4.49, 2.74 versus 2.87, and 3.23 versus 3.23, respectively.

Results of analyses examining functional outcomes are presented in Table 2. Rates of incarceration and difficulty controlling violent behavior did not differ significantly between the MSA groups. In contrast, the rate of VA service-connected disability was significantly greater among MSA+ subjects relative to MSA– subjects. Social support (as measured by the MOS) did not differ significantly between groups, neither did measures of alcohol (AUDIT) or drug (DAST) use. Among clinical indices, suicidal ideation (BSSI), depression severity (BDI-II), and symptoms associated with PTSD (DTS) were substantially and significantly elevated among subjects endorsing MSA. Concordantly, use of outpatient mental health services was also significantly increased among subjects reporting MSA.

Repeating the analysis with the matched non-MSA cohort, differences between case and control conditions were consistently smaller but nonetheless remained significant in all instances excepting differences in service-related disability. For the latter, rates of disability among subjects endorsing MSA (74.6%) remained higher relative to matched non-MSA subjects (66.7%), but the difference was no longer significant. Group differences in indices of mental health status and treatment, although reduced after matching, remained substantial and significant. To the extent that matching was effective in reducing spurious differences due to selection bias or covariate imbalance, results support that MSA has substantial adverse effects on subsequent mental health, as evidenced by higher scores on measures of suicidality, depression, PTSD, and outpatient mental health service use.

Discussion

The aim of this study was to examine functional correlates associated with MSA among male Iraq/Afghanistan-era veterans. Male veterans who endorsed MSA were compared to males in the full sample and to a matched sample of male veterans who did not

Table 1
Demographic Information for Matched Variables

Matching Variable	Full sample $N = 2,042$		MSA+ $n = 39$		MSA– $n = 2,003$		Group comparison (MSA+ vs. MSA–)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	χ^2	<i>p</i>
Age	37.29	10.11	35.72	8.22	37.32	10.14	.47	.492
Years of education	13.31	3.58	12.90	3.17	13.31	3.58	.17	.680
Child sexual abuse	2.18	3.62	4.49	5.21	2.13	3.57	7.61	.006
Child physical abuse	.49	1.75	2.87	4.34	.44	1.63	51.34	<.001
Other premilitary traumatic events	2.24	2.28	3.23	2.92	2.22	2.26	4.63	.031
CES total score	12.58	10.84	12.51	10.25	12.58	10.85	.04	.850
	<i>n</i>	%	<i>N</i>	%	<i>N</i>	%	χ^2	<i>p</i>
Race (White)	1051	51.5	22	56.4	1029	51.4	.39	.533
Married	1208	59.2	20	51.3	1188	59.3	1.02	.312
Premilitary adult sexual assault	21	1.0	1	2.6	20	1.0	.92	.337

Note. Kruskal-Wallis-Wilcoxon chi-square tests were used for group comparisons. CES = Combat Exposure Scale; MSA+ = reported experiencing military sexual assault; MSA– = did not report experiencing military sexual assault.

Table 2
Comparisons of Functional Outcomes Between Males Reporting MSA and Males not Reporting MSA

Dependent variable	MSA+ n = 39		Full Sample MSA- N = 2,003		Group Comparison MSA+ vs. full sample MSA-		Matched Sample MSA n = 39		Group Comparison MSA+ vs. matched sample MSA-	
	n	%	n	%	χ^2	p	n	%	χ^2	p
Jail (lifetime)	13	33.3	496	24.8	.10	.750	19	48.7	2.24	.135
Perceived problems controlling violence	5	12.8	188	9.4	.15	.703	5	12.8	.08	.773
Any service-connected disability	29	74.4	1059	52.9	6.64	.001	26	66.7	.91	.339
Outpatient mental health treatment	30	76.9	969	48.4	7.73	.005	21	53.8	6.81	.009
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	χ^2	p	<i>M</i>	<i>SD</i>	χ^2	p
BSSI	4.36	5.30	1.96	3.28	16.10	<.001	3.23	5.86	5.74	.017
BDI-II	25.00	12.98	14.88	12.47	9.55	.002	18.26	11.35	4.46	.035
DTS	68.26	37.89	41.69	39.66	10.34	.001	47.13	37.00	5.56	.019
MOS	67.33	25.85	74.41	25.94	.56	.455	72.96	25.97	1.00	.317
AUDIT	6.95	6.66	6.42	6.19	.32	.570	7.62	6.86	.29	.588
DAST-20	1.77	3.21	1.49	2.75	.00	.978	1.77	3.41	.76	.382

Note. Wald χ^2 were used for these comparisons. All models adjusted for: Age, race, education, marital status, combat exposure, adult sexual abuse, childhood sexual abuse, childhood physical abuse, and traumatic life events prior to enlistment. BDI-II = Beck Depression Inventory-II; BSSI = Beck Scale for Suicide Ideation; DTS = Davidson Trauma Scale; MOS = Medical Outcomes Study: Social Support Survey; AUDIT = Alcohol Use Disorders Identification Test; DAST-20 = Drug Abuse Screening Test, 20 item version.

report MSA. See Table 3 for a summary of hypotheses and findings.

When compared with a general sample of male Iraq/Afghanistan-era veterans, veterans who reported MSA endorsed higher levels of negative functional and psychiatric outcomes as anticipated. These included increased likelihood of reporting a service-connected disability, increased likelihood of receipt of outpatient mental health treatment in the past three years, higher levels of PTSD symptoms, higher levels of depression symptoms, and higher levels of suicidality. However, several functional outcomes, including history of incarcerations, reported difficulty controlling violent behavior, and past year substance use, were not elevated among respondents experiencing MSA as expected. Additionally, levels of self-reported social support were equivalent between groups.

Repeating the analyses with the cohort matched on a host of variables (childhood sexual trauma, childhood physical abuse, premilitary adult sexual assault, other premilitary trauma, age, race, education, marital status, and combat exposure), we still found psychiatric distress (i.e., PTSD symptoms, depressive

symptoms, and suicidal ideation) was elevated among male veterans with MSA, whereas differences in incarceration history, perceived problems controlling violence, social support, and substance use continued to be nonsignificant. Thus, levels of PTSD symptoms, depressive symptoms, and suicidal ideation remained significantly higher among respondents who experienced MSA, even when controlling for selection and confounding factors. Differences in VA service connection between the MSA and general non-MSA full cohort group were no longer significant after matching, but differences in use of outpatient mental health treatment remained significant. This finding may reflect current VA policy that provides free MST-related VA care for those who have experienced MST, regardless of disability status.

It is notable that several of the hypotheses were not supported (see Table 3). Although some studies have found a relationship between MST and increased substance use (e.g., Cucciare et al., 2011; Kimberling et al., 2007, 2010; Pavao et al., 2013), others have failed to find a relationship (e.g., Maguen, Cohen, et al., 2012; Maguen, Luxton, et al., 2012). Therefore, although we expected that par-

Table 3
Summary of Hypotheses and Results

Hypothesis	Supported	Partially supported	Not supported
1. MSA+ participants would have higher PTSD and depression symptomatology/severity.	✓		
2. MSA+ participants would have higher alcohol and substance use scores.			✓
3. MSA+ participants would report higher levels of suicidality.	✓		
4. MSA+ participants would report lower levels of social support.			✓
5. MSA+ participants would be more likely to endorse perceived problems controlling violence.			✓
6. MSA+ participants would be more likely to have been incarcerated.			✓
7. MSA+ participants would be more like to have a service connected disability.		✓	
8. MSA+ participants would be more likely to have received outpatient mental health treatment.	✓		

ticipants who experienced MSA would report higher levels of substance use than participants who did not experience MSA, others have also previously failed to note an association between MST and substance abuse. It will be important for future research to identify potential moderators of the relationship between MST and substance use in order to attempt to explain the varied findings in the literature. The finding that perceived social support did not differ between groups is encouraging, as social support has been demonstrated to be a protective factor among military personnel who experienced trauma (e.g., Martin, Rosen, Durand, Knudson, & Stretch, 2000).

Although participants who experienced MSA were not more likely to report difficulties controlling violent behaviors in the past two weeks, it is important to note that previous studies have repeatedly demonstrated a relationship between PTSD and violent behavior (see Worthen, 2011, for a review). Therefore, it is possible that a single dichotomous question was not sensitive enough to detect differences which may be meaningful or that results reflect a reporting artifact. Future research using multi-item questionnaires about aggressive and violent behaviors is recommended. Similarly, future studies may wish to examine having gone to prison, rather than jail, as well as gathering specific information about when the incarceration occurred. It is possible that we did not find an effect because being arrested has a relatively high base rate in the civilian population (e.g., approximately 30% of Americans have been arrested at least once by the age of 23; Goode, 2011).

It is important to note that the definition of MST applied in the current study was more stringent than those used in prior studies. Nevertheless, the observed lifetime prevalence of MSA in this sample (i.e., 1.8%) is consistent with and, in some instances, even slightly higher than previously reported levels in studies of male veterans that have examined a broader spectrum of experiences associated with MST, including sexual assault and harassment (e.g., Kimerling et al., 2007, 2010; Maguen, Cohen, et al., 2012; Maguen, Luxton, et al., 2012). Our observation of greater severity of depression and PTSD symptoms among males who have experienced MSA corroborates previous reports of similar high rates of multiple mental health diagnoses associated with exposure (e.g., Kang et al., 2005; Kimerling et al., 2007, 2010; Maguen, Cohen, et al., 2012; Maguen, Luxton, et al., 2012; Turchik et al., 2012). Our observation of elevated levels of suicidality associated with MSA is also consistent with previous research (e.g., Belik et al., 2009; Tiet et al., 2006; Zinzow et al., 2008) and highlights the enduring distress associated with such trauma. Using matching, our results build on those previous studies by demonstrating MSA is uniquely associated with depression, PTSD, and suicide symptom severity beyond demographic factors and trauma history.

Limitations and Future Directions

Limitations of the current study include the relatively small sample of men who experienced MSA, cross-sectional design (limiting our ability to determine temporal causality), retrospective assessment of MSA, and convenience sampling of veterans within the mid-Atlantic region of the United States (potentially limiting generalizability). It should also be noted that MSA is a relatively severe and specific form of MST, which includes a broader range of experiences, including sexual assault, sexual battery, and re-

peated, threatening sexual harassment during military service (U.S. Department of Veterans Affairs, Veterans Health Administration, 2010). Our focus on the more restrictive category of MSA likely increased the probability that the individuals included in the MSA group (relative to the broader population of veterans who have experienced any form of MST) may have met criteria for PTSD.

Additionally, we did not assess whether the sexual assault occurred within or outside a military setting or whether it occurred predeployment, during, or postdeployment; examining differences between these types of MSA is an important consideration for future research. It is also important to note that our sample contained mostly veterans, and therefore, these results may not generalize to active duty personnel, who may have more recent histories of MSA and receive treatment in a different health care system. Thus, examination of these relationships among active duty service members is an important direction for future research. Finally, we only assessed whether participants were currently receiving compensation related to a service-connected condition; however, it is possible that some participants may have been awaiting evaluations related to service-connection. Thus, our findings should be interpreted accordingly.

Clinical Implications

The results of the current study address a notable gap in knowledge concerning MSA and provide initial findings concerning functional correlates for a male Iraq/Afghanistan-era veteran population. A strength of the current study was the ability to identify a sample of participants matched on a number of potentially confounding variables. Of particular importance for clinicians are the findings that, in a male veteran sample, MSA was associated with greater PTSD symptom severity, greater depression symptom severity, higher suicidality, and higher outpatient mental health treatment utilization. As noted by others (e.g., Kimerling et al., 2007, 2010), MSA/MST is not a female-only issue and screening is important for all patients (men and women). Many sexual assault survivors, especially men, are reticent to report or discuss this experience with providers (Steiger et al., 2010), perhaps particularly so if sexual trauma occurred during military service (Turchik et al., 2013). To the extent that a provider knows that a patient has a history of MSA/MST, the current findings suggest careful screening and ongoing monitoring of mental health conditions, symptom severity, and suicidality among these patients. Risk assessment and safety planning may be particularly important for this group of veterans.

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