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 behavior (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.

Editor’s Note. This is one of thirteen articles in a special issue on Military Sexual Trauma.

Amie R. Schry, Veterans Affairs Mid-Atlantic Mental Illness Research, Education and Clinical Center; Durham Veterans Affairs Medical Center; Department of Psychiatry and Behavioral Sciences, Duke University School of Medicine; Rachel Hibberd, Durham Veterans Affairs Medical Center; H. Ryan Wagner, Veterans Affairs Mid-Atlantic Mental Illness Research, Education and Clinical Center; Durham Veterans Affairs Medical Center; Department of Psychiatry and Behavioral Sciences, Duke University School of Medicine; Jessica A. Turchik, Center for Innovation to Implementation, Veterans Affairs Palo Alto Health Care System; National Center for PTSD, Veterans Affairs Palo Alto Health Care System; Department of Psychiatry & Behavioral Sciences, Stanford University; Nathan A. Kimbrel, Veterans Affairs Mid-Atlantic Mental Illness Research, Education and Clinical Center; Durham Veterans Affairs Medical Center; Department of Psychiatry and Behavioral Sciences, Duke University School of Medicine; Madianne Wong, Veterans Affairs Mid-Atlantic Mental Illness Research, Education and Clinical Center; Durham Veterans Affairs Medical Center; Eric E. Elbogen, Veterans Affairs Mid-Atlantic Mental Illness Research, Education and Clinical Center; Durham Veterans Affairs Medical Center; Department of Psychiatry, University of North Carolina at Chapel Hill; Jennifer L. Strauss, Department of Psychiatry and Behavioral Sciences, Duke University School of Medicine; Mental Health Services, Department of Veterans Affairs, Washington, DC; Mira Brancu, Veterans Affairs Mid-Atlantic Mental Illness Research, Education and Clinical Center; Durham Veterans Affairs Medical Center; Department of Psychiatry and Behavioral Sciences, Duke University School of Medicine.

The Mid-Atlantic Mental Illness Research, Education and Clinical Center Registry Workgroup for this article includes Jean C. Beckham, PhD; Patrick S. Calhoun, PhD; John A. Fairbank, PhD; Jeffrey M. Hoerle, MS; Harold Kudler, MD; Christine E. Marx, MD, MS; Scott Moore, MD, PhD; Rajendra Morey, MD, MS; Jennifer C. Naylor, PhD; Kristy A. Straits-Tröster, PhD; Larry A. Tupler, PhD; Jason D. Kils, PhD; Steven T. Szabo, MD, PhD; Jennifer Runnals, PhD; Elizabeth Van Voorhees, PhD; Kimberly T. Green, MS; Angela C. Kirby, MS; and Richard D. Weinert, MD, PhD; Durham VA Medical Center, Durham, NC; Treven Pickett, PsyD, and Scott D. McDonald, PhD, Hunter Holmes McGuire Department of Veterans Affairs Medical Center, Richmond, VA; Robin Hurley, MD; Katherine H. Taber, PhD; Jared Rowland, PhD; and Ruth Yoash-Gantz, PsyD, W. G. Hefner VA Medical Center, Salisbury, NC; Marinell Miller-Mumford, PhD, and John Mason, PsyD, Hampton VA Medical Center, Hampton, VA; and Gregory McCarthy, PhD, Yale University, New Haven, CT.

The views expressed in this article are those of the authors and do not necessarily reflect the position or policy of the VA or the United States government. This work was supported by the Veterans Affairs Mid-Atlantic Mental Illness Research, Education, and Clinical Center and Mental Health Services, Veterans Affairs Central Office. Nathan Kimbrel was supported by a Career Development Award (IK2 CX000525) from the Clinical Science Research and Development Service of the Veterans Affairs Office of Research and Development and the Mental Health and Research Services of the Durham VA Medical Center. Amie Schry was supported by the Office of Academic Affiliations, Advanced Fellowship Program in Mental Illness Research and Treatment, Department of Veterans Affairs.

Correspondence concerning this article should be addressed to Mira Brancu, VA Mid-Atlantic Mental Illness Research, Education and Clinical Center, Durham VA Medical Center, 508 Fulton Street, Durham, NC 27705. E-mail: mira.brancau@va.gov
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, Skropp, & 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, Maher, & 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
A significant strength of the study design was that we used two different methods of comparison. First, we compared males who experienced 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., Morrall 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
someone close in age, and during adolescence; Kubany et al., before age 13 by someone at least 5 years older, before age 13 by
hood sexual trauma was defined by three items (sexual abuse endorsing the same item as occurring before the military. Child-
sexual harassment. Premilitary adult sexual assault was defined as
parts that may or may not have involved threat, force, or conse-
tinuous injury) that occurred during the military. Notably, this item
documented, including acceptable reliability for Iraq/Afghanistan-era
The psychometric properties of the TLEQ have been widely doc-
occurred before, during, or after the military (Clancy et al., 2006).

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 psycho-
logical and physical symptoms and perceptions 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 (α = .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 (α = .89) and validity.

Combat Exposure Scale (CES; Lund, Foy, Sippel, & Stra-
chon, 1984). The CES is a 7-item self-report measure that as-
sesses 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 Sur-
vey 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 (α = .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 doc-
dumented, 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 conse-
quent 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. Child-
hood 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 premil-
itary 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 indicat-
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 con-
sistency 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 pre-
scription drugs, on the basis of responses to a dichotomous re-
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 gen-
eralized linear regression procedures, including logistic regres-
sions 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-
Results

Cohort characteristics among matching covariates for the complete cohort (N = 2,042) and by MSA case status subgroups (n_MSA− = 2003; n_MSA+ = 39) are presented in Table 1. The number of instances of childhood sexual abuse ($\chi^2 = 7.61; p = .006$), childhood physical abuse ($\chi^2 = 51344; p < .0001$), 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
Comparisons of Functional Outcomes Between Males Reporting MSA and Males not Reporting MSA

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>MSA+</th>
<th>Full Sample</th>
<th>Group Comparison</th>
<th>Matched Sample</th>
<th>Group Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>N = 2,003</td>
<td></td>
<td>n = 39</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>χ², p</td>
<td>n</td>
<td>χ², p</td>
</tr>
<tr>
<td>Jail (lifetime)</td>
<td>13</td>
<td>33.3</td>
<td>496, 24.8</td>
<td>.01, .750</td>
<td>19</td>
</tr>
<tr>
<td>Perceived problems controlling violence</td>
<td>5</td>
<td>12.8</td>
<td>188, 9.4</td>
<td>.15, .703</td>
<td>5</td>
</tr>
<tr>
<td>Any service-connected disability</td>
<td>29</td>
<td>74.4</td>
<td>1059, 52.9</td>
<td>.64, .001</td>
<td>26</td>
</tr>
<tr>
<td>Outpatient mental health treatment</td>
<td>30</td>
<td>76.9</td>
<td>969, 48.4</td>
<td>7.73, .005</td>
<td>21</td>
</tr>
</tbody>
</table>

Dependent variable: MSA+ represents males who reported MSA, MSA− represents males who did not report MSA. 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.

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 MSA, 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, we expected that parameters associated with MST, such as higher levels of suicidality. However, our findings did not support this relationship, which may be due to the sample size or other factors not accounted for in the analysis.

Summary of Hypotheses and Results

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Supported</th>
<th>Partially supported</th>
<th>Not supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. MSA+ participants would have higher PTSD and depression symptomatology/severity.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. MSA+ participants would have higher alcohol and substance use scores.</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>3. MSA+ participants would report higher levels of suicidality.</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>4. MSA+ participants would report lower levels of social support.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. MSA+ participants would be more likely to endorse perceived problems controlling violence.</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>6. MSA+ participants would be more likely to have been incarcerated.</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>7. MSA+ participants would be more likely to have a service connected disability.</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>8. MSA+ participants would be more likely to have received outpatient mental health treatment.</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
Correlates of Military Sexual Assault in Male Veterans

Participants 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 repeated, 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.

References


Received October 31, 2014
Revision received July 20, 2015
Accepted July 30, 2015