HHS Public Access

Author manuscript

Trauma Violence Abuse. Author manuscript; available in PMC 2023 May 18.

Published in final edited form as:

Trauma Violence Abuse. 2021 October ; 22(4): 976–993. doi:10.1177/1524838019897338.

Military Sexual Trauma and Risky Behaviors: A Systematic Review

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Abstract

Introduction: Military sexual trauma (MST) is a serious and pervasive problem among military men and women. Recent findings have linked MST with various negative outcomes including risky, self-destructive, and health-compromising behaviors.

Objective: The current review summarizes the existing literature on the association between MST and risky behaviors among military men and women who have served in the U.S. Armed Forces.

Method: We systematically searched five electronic databases (PubMed, EMBASE, PSYCINFO, PILOTS, and CINAHL Plus) using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

Results: Of the initial 2,021 articles, 47 met the inclusion criteria. Reviewed studies revealed three patterns of findings: (1) largely studied and consistent (i.e., suicidal behaviors, disordered eating), (2) mixed and in need of future research (i.e., alcohol and drug use, smoking), and (3) underexamined (i.e., sexual behaviors, illegal/aggressive behaviors) or completely neglected (e.g., problematic technology use, gambling).

Discussion: The current systematic review advances literature by providing strong support for an association between MST and a wide range of risky behaviors. Moreover, it highlights important areas for future research.

Keywords

military sexual trauma; risky behaviors; military; substance misuse; sexual behaviors; suicidal behaviors

Military sexual trauma (MST) refers to actual or threatened sexual violence including assault, harassment, intimidation, coercion, abuse of power from a superior, or unwanted attention, such as verbal remarks, pressure for sexual favors, and physical contact,

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Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

experienced by someone on active duty, active duty for training, or inactive duty training (Allard et al., 2011; Department of Defense Sexual Assault Prevention and Response, 2012; Department of Veteran Affairs [VA], 2004). MST is a highly prevalent and pervasive problem, affecting approximately 1 in 4 women and 1 in 100 men in the military (Military Sexual Trauma Support Team, 2012; VA, 2004). Notably, a growing number of studies have begun to link MST with risky, self-destructive, and health-compromising behaviors, such as alcohol misuse (Fillo et al., 2018), drug misuse (Yalch et al., 2018), sexual behavior (Turchik et al., 2012), disordered eating (Blais et al., 2017), and suicidal behaviors (i.e., ideation, behaviors, and attempts; review of the literature to consolidate and synthesize all existing research on the MST-risky behavior relation.

Theoretical accounts underscore an association between sexual violence and risky behaviors, defined as any purposive act that has the potential for both losses/consequences and benefits/gains (Ben-Zur & Zeidner, 2009). Ben-Zur and Zeidner (2009) proposed five models to explain the relation of trauma to risky behaviors: (1) coping (maladaptive posttrauma coping strategies increase disinhibition and subsequent risky behaviors), (2) emotion regulation (risky behaviors modulate trauma-related emotions by reducing negative emotions and/or enhancing positive emotions), (3) self-related cognitions (perceived trauma-related losses motivate risky behaviors to restore personal resources/control), (4) information processing (trauma limits attentional resources and information processing resulting in discounting losses/enhancing gains associated with Bryan et al., 2015). The co-occurrence of MST and risky beha viors is clinically significant as it is associated with functional impairment (e.g., Hamilton et al., 2011; Pavao et al., 2013), concurrent and future physical health complications (e.g., Godfrey et al., 2015; Turchik et al., 2012), and elevated risk of psychopathology (e.g., Gilmore et al., 2016). To inform research, practice, and policy, we conducted a systematic risky behaviors), and (5) cortical processes (trauma-related emotions suppress higher cortical functioning interfering with the ability to sufficiently assess/inhibit risky behaviors). Consistent with theory, studies have linked sexual violence to risky behaviors (e.g., Dworkin, 2018; Dworkin et al., 2017; Gilmore et al., 2018; Madowitz et al., 2015). Yet little research has examined this link in military contexts.

Military contexts may make individuals particularly vulnerable to sexual violence and related risky behaviors. Deployment dynamics (e.g., long duration, high stress), hypermasculinity (e.g., sexism, low male to female ratio, men outranking women), and lack of consequences/deterrents for perpetration may create an environment more conducive to sexual violence (Burns et al., 2014; Turchik & Wilson, 2010). For instance, hypermasculinity is associated with a greater tolerance and acceptance of sexual harassment and rape, and institutions that adhere to more stereotypical masculine ideals tend to have higher reported rates of sexual violence (Ilies et al., 2003; Turchik & Wilson, 2010). Further, the consequences (e.g., risky behaviors) of sexual violence may be pronounced among military population as individual (e.g., high rates of premilitary psychopathology; Fink et al., 2016; Kessler et al., 2014; Nock et al., 2014) and macrolevel (e.g., lack of autonomy and high work demand; Redmond et al., 2015) factors may increase susceptibility to risky behaviors (Frone, 2016; Weiss et al., 2012). Moreover, several military-related barriers have been shown to impede disclosure and treatment-seeking for MST, including confidentiality concerns, fear of retribution through duty assignments, fear of ostracism and stigmatization,

and proximity to assailant (Holland et al., 2016; Hoyt et al., 2011; Turchik et al., 2013; Turchik et al., 2014). This may lead such individuals to seek alternative ways to cope with MST, such as risky behaviors (Weiss et al., 2012, 2015).

An important limitation of the existing literature is the lack of research synthesizing the association between MST and risky behaviors; such information is important for informing research, practice, and policy. Hence, we systematically reviewed the available literature on MST and risky behaviors with the goal of summarizing the nature of the relation between MST and risky behaviors. Doing so will help identify important gaps in the existing literature to facilitate future research and identify consistent patterns of findings to inform clinical work.

Method

This systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) statement (Moher et al., 2009). The PRISMA statement provides guidelines to ensure that the systematic review was properly executed and to ensure the accuracy and quality of conducting and reporting a systematic review. The statement includes a 27-item checklist that specifies all information required to be reported, as well as a four-phase flow diagram that details the identification, screening, eligibility, and inclusion of all articles.

Search Strategy

The following databases were searched on June 22, 2018: PubMed, EMBASE, PSYCINFO, PILOTS, and CINAHL Plus. Search terms included “military” OR “armed forces” OR “active duty” OR “troops” OR “soldier” OR “marine” OR “navy” OR “air force” OR “service member” OR “servicemember” OR “veteran” OR “national guard” OR “reservist” OR “airman” OR “seaman” OR “reserve” AND “military sexual trauma” OR “sexual trauma” OR “sexual assault” OR “sexual harassment” OR “rape” OR “sexual victimization” OR “sexual violence” OR “sexual abuse” OR “unwanted sexual” OR “unwelcome sexual” OR “sexual force” AND “risky behavior” OR “risk behavior” OR “impulsive behavior” OR “maladaptive behavior” OR “health-compromising behavior” OR “substance use” OR “substance abuse” OR “intravenous drug use” OR “overdose” OR “substance use disorder” OR “substance dependence” OR “addiction” OR “alcohol” OR “drinking” OR “drug” OR “risky sex*” OR “sexual risk” OR “HIV” OR “aggression” OR “aggressive behavior” OR “violence” OR “violent behavior” OR “disordered eating” OR “binge eating” OR “eating disorder” OR “bulimia” OR “anorexia” OR “criminal behavior” OR “crime” OR “criminality” “illegal” OR “jail” OR “prison” OR “police” OR “arrest” OR “incarceration” OR “detention” OR “offens*” OR “offend*” OR “convict*” OR “spending” OR “driving” OR “self-harm” OR “self-injury” OR “nonsuicidal self-injury” OR “deliberate self-harm” OR “parasuicid*” OR “gambling” OR “gambl*” OR “suicid* OR “problematic technology use.” Terms for risky behaviors were guided by past research in this area. Specifically, our initial list was developed using the behaviors outlined by empirically validated measures of risky behaviors including the Risky Behavior Questionnaire (Weiss et al., 2018), The Risky, Impulsive, and Self-destructive Behavior Questionnaire (Sadeh & Baskin-Sommers,

2017), and the Posttrauma Risky Behaviors Questionnaire (Contractor, Weiss et al., 2018). We extended this list to include alternative names and types of behaviors identified in the literature.

All papers generated using the above search criteria were compiled into a database. Two of the coauthors then screened all abstracts to determine eligibility. Specifically, abstracts were screened to determine whether they were eligible based on seven predefined inclusionary criteria: (1) English language; (2) published in peer review journal; (3) primarily quantitative study; (4) U.S. military sample; (5) examined MST and risky behaviors; (6) MST was experienced by someone on active duty, active duty for training, or inactive duty training; and (7) risky behaviors were being performed by the victim of MST. The reviewers rated each abstract using a coding system to identify whether they that met all predefined criteria (2 = *criteria met*, 1 = *unclear*, 0 = *not met*). Discrepancies in coding were reviewed by two different reviewers; final inclusionary determinations were made. The search strategy is illustrated in the flow diagram (see Figure 1).

The first and second authors then examined the remaining full-length articles to ensure all met predefined inclusionary criteria; those that did not were excluded. Information relevant to the study goals was extracted from each remaining article and compiled into a table: (1) sample characteristics, (2) measurement of MST, (3) type of risky behavior, and (4) selected study findings relevant to the primary goal of assessing the relation between MST and risky behaviors.

Results

Search Results

The search strategy yielded 2,021 articles (see Figure 1). After removing duplicates, the search resulted in 1,413 articles. After the initial abstract review, 1,313 articles were excluded. These articles failed to meet at least one of the seven inclusion criteria. Specifically, two independent reviewers assessed whether each article contained necessary information to warrant a full-text review, including (1) English language, (2) peer-reviewed article (i.e., article was published in a peer-reviewed journal), (3) quantitative study (i.e., excludes purely qualitative, book chapters, editorials), (5) examined MST in relation to risky behaviors (i.e., title and/or study aims referred to one of the search terms for each category: military, sexual victimization, and risky behaviors), (6) MST criterion (i.e., sexual victimization occurred in a military context; aims focused on victimization versus perpetration), and (7) risky behavior criterion (i.e., risky behavior is being performed by person that experienced MST). Following procedures outlined in the Method, the remaining articles were reviewed by two of the coauthors, and 47 were determined as meeting inclusionary criteria. The 53 full-length articles excluded at this stage were determined to not meet inclusion criteria. Specifically, upon further inspection, it was determined that 26 were not quantitative, 12 did not meet the definition for MST, 10 did not examine the MST-risky behavior relation, 3 did not assess a risky behavior, and 2 were not published in a peer-reviewed journal. These final articles were subsequently examined by all authors, and relevant information pertaining to the study goal (i.e., examining the association between MST and risky behaviors) was then extracted. Information regarding sample characteristics,

definition/measurement of MST, type of risky behaviors, prevalence of MST, and selected study findings were then compiled into a table (see Table 1).

Sample Characteristics

The remaining studies met all criterion. Of the final 47 studies, sample sizes ranged from 86 to 6,351,854 participants. Examination of demographic information indicated that 18 of the studies' samples were comprised of all female veterans and 2 were comprised of all male veterans. Of the remaining 27 studies, the majority of the samples were predominately male (ranging from 41.6% to 94.0%) and White (ranging from 25.0% to 92.0%).

Preliminary Analyses

Definition of MST.—Seventeen studies measured MST with the VA MST screen; six with the Deployment Risk and Resilience Inventory Sexual Harassment Inventory; six with a single item (two assessed unwanted sexual contact, two assessed force/threat of force to have sexual relations, one assessed past 12-month sexual harassment, and one assessed sexual assault); one with 2 items assessing forced sexual relations and sexual contact with superior to avoid consequences; five with sexual victimization items from trauma inventories; three with a modified sexual experiences questionnaire; three with administratively recorded MST; two with the definition of rape adopted by American Medical Association and the American College of Obstetricians and Gynecologists; one with an openended item inquiring about the most stressful military trauma; one with a standardized phone interview assessing completed rape and attempted sexual assault; one with four questions developed as part of a larger inventory; and one did not report how MST was measured.

Type of risky behaviors.—Thirty studies assessed one or more type of substance use (9 substances broadly, 21 alcohol, 7 drug, and 5 smoking), 16 assessed suicidal behaviors, 6 assessed disordered eating, 4 assessed sexual behaviors, and 4 assessed aggressive/illegal behavior.

Prevalence of MST.—Ranged from 2.0% (Schry et al., 2015) to 77.4% (Tiet et al., 2015).

Primary Analyses

Aggressive/illegal behaviors.—Four studies (8.5%) examined the relation between MST and aggressive/illegal behaviors. Findings revealed that veterans with a history of MST were significantly more likely to report legal problems (Backhaus et al., 2016), and transgender veterans with a history of MST were more likely to be involved with the criminal justice system (Brown & Jones, 2015); however, a history of MST was not significantly related to aggressive/violent behaviors (Tiet et al., 2015) or lifetime incarceration and trouble controlling violent behavior over the past 30 days (Schry et al., 2015).

Suicidal behaviors.—Fourteen studies (29.8%) assessed the relation between MST and suicidal behaviors. MST was found to be significantly associated with suicide ideation (Bryan et al., 2015; DiMauro et al., 2018; Gradus et al., 2013a; Griffith, 2017; Klingensmith et al., 2014; Monteith et al., 2015, 2016a, 2016b; Schry et al., 2015; Stahlman et al., 2015),

suicide plan (Bryan et al., 2015; Griffith, 2017), and suicide attempt (Bryan et al., 2015; Gradus et al., 2013b; Griffith, 2017; Klingensmith et al., 2014; Monteith et al., 2016a; Rosellini et al., 2017; Stahlman et al., 2015), with one exception: Beckman et al. (2018) found that MST was not significantly associated with past year suicide ideation. Further, one study found that a history of MST was associated with increased odds of suicide mortality (Kimerling et al., 2016). Findings remained significant when controlling for other variables, with one exception (Bryan et al., 2015); MST was no longer related to suicidal behaviors when adjusting for premilitary sexual trauma.

Substances.—Thirty studies (63.8%) assessed MST and substance use (overall or the specific types of alcohol, drugs, or smoking). Nine studies assessed the relation between MST and overall substances (alcohol and/or drugs). Findings were mixed. In some studies, MST was associated with substance use disorders (Booth et al., 2011; Gilmore et al., 2016; Kimerling, 2010; Kimerling et al., 2016; Pavao et al., 2013) and substance abuse symptoms (Butterfield et al., 1998), whereas in others, it was not found to be associated with current (Booth et al., 2012) or past year substance use disorder (Booth et al., 2011). Twenty-one studies assessed the relation between MST and alcohol. Findings were mixed, with some studies documenting significant positive relations between MST and alcohol use (Hahn et al., 2015) and misuse (Creech & Borsari, 2014; Fillo et al., 2018; Frayne et al., 2003; Gradus et al., 2008; Hahn et al., 2015; Hankin et al., 1999; Hoggatt et al., 2015; Ryan et al., 2015), and others finding no relation between MST and alcohol use (Beckman et al., 2018; Godfrey et al., 2015; Jenkins et al., 2015; Rowe et al., 2009; Schuyler et al., 2017), and misuse (Gobin et al., 2015; Katz et al., 2012; Klingensmith et al., 2014; Maguen et al., 2012; Schry et al., 2015; Stahlman et al., 2014; Tiet et al., 2015; Yalch et al., 2018). Seven studies assessed the relation between MST and drugs. MST was found to be related to drug use among some studies (Beckman et al., 2018; Cichowski et al., 2017; Stahlman et al., 2015; Yalch et al., 2018), while others found a nonsignificant relation between MST and drug use (Creech et al., 2014; Klingensmith et al., 2014; Schry et al., 2015; Tiet et al., 2015). Five studies assessed the relation between MST and smoking. MST was found to be related to smoking across all (Cichowski et al., 2017; Frayne et al., 2003; Rowe et al., 2009; Schuyler et al., 2017) but one (Beckman et al., 2018).

Disordered eating.—Six studies (13%) assessed the relation between MST and disordered eating. MST was significantly associated with eating disorder diagnoses (Blais et al., 2017; Breland et al., 2018; Forman-Hoffman et al., 2012). However, findings were mixed for studies examining the specific types of disordered eating behaviors. In one study, MST was significantly associated with a composite score of overall disordered eating symptoms (i.e., binge eating, dieting, diet pill use, self-induced vomiting, vigorous exercising, laxative use; Harned & Fitzgerald, 2002). Conversely, Rowe et al. (2009) found that although veterans with a history of MST were more likely to report starving behavior, they were not more likely to report bingeing, purging, laxative use, or overexercise. Bartlett et al. (2018) found MST was significantly associated with disordered eating among women, but not men.

Sexual behavior.—Four studies (8.7%) assessed the relation between MST and sexual behavior; all findings supported this association (Schuyler et al., 2017; Strauss et al., 2011; Turchik et al., 2012). Regarding specific sexual behaviors, both men and women with a history of MST were more likely to be diagnosed with a sexually transmitted disease (STD) and/or sexual disorder (Turchik et al., 2012); however, men with a history of MST were significantly more likely to indicate STD risk (Schuyler et al., 2017), and women with a history of MST were significantly more likely to report trading sex (Strauss et al., 2011). MST was also found to be associated with reports of higher numbers of sexual partners among men and women as well as reports of sexually transmitted infections among men (Stahlman et al., 2014).

Other.—Men and women with a history of MST were more likely to take unnecessary health and life risks ("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;" Schuyler et al., 2017).

Discussion

The purpose of this review was to synthesize all the previous research on the association between MST and risky behaviors. Our results indicated three patterns of findings: (1) largely studied and consistent (e.g., suicidal behaviors), (2) mixed and in need of future research (e.g., alcohol and drug use), and (3) underexamined (e.g., sexual behaviors, illegal/aggressive behaviors) or completely neglected (e.g., problematic technology use, gambling). These findings have important implications for future research and practice, which we detail below.

First, our findings revealed that MST is consistently associated with suicidal behaviors. Of the 15 studies that examined this relation, the link between MST and suicidal behaviors held, despite diverse methods, including type of military sample (e.g., treatment-seeking, previously deployed, reserve components), MST assessment (e.g., VA MST screen, single question), MST conceptualization (sexual harassment, assault), and gender. These findings are consistent with previous literature that has found sexual violence to be a risk factor for suicidal behaviors (e.g., Devries et al., 2011; Devries et al., 2013; Ullman, 2004; Ullman & Brecklin, 2002) and with theoretical propositions that suggest suicidal behaviors may function to modulate trauma-related symptoms or distress (Connors, 1996a; Davis et al., 2014; Smith et al., 2014). Of note, we identified one study that did not find a significant relation between MST and suicidal behaviors. One explanation for this finding may be the use of a single-item assessment of suicide ideation that only assessed past year suicidal ideation (i.e., "How often have you thought about killing yourself in the past year?" Beckman et al., 2018). In addition, some findings did not remain significant when adjusting for other relevant variables. For instance, one study found that the relation between MST and suicide ideation, planning, and attempts was no longer significant when controlling for premilitary sexual assault (Bryan et al., 2015). This finding is consistent with previous research that suggests that early sexual trauma is an important risk factor in both revictimization (Classen et al., 2005) and later suicide risk (Joiner et al., 2007). Considering

the largely consistent findings in the current systematic review, individuals who experience MST should be assessed for suicidal behaviors.

Additionally, among the studies we reviewed, we consistently found significant relations between MST and eating disorder diagnosis (Blais et al., 2017; Breland et al., 2018; Forman-Hoffman et al., 2012). This finding is consistent with research that has identified sexual violence as a risk factor for eating disorder pathology (Chen et al., 2010). Maladaptive eating patterns may emerge when emotions are perceived as overwhelming or unmanageable, and individuals may rely on maladaptive eating patterns to regulate undesirable emotions (Haynos & Fruzzetti, 2011) such as those elicited by trauma. Alternatively, certain patterns of eating may develop to restore perceptions of control compromised by the traumatic experience (consistent with enhancing self-related cognitions model; Ben-Zur & Zeidner, 2009). However, our findings were inconsistent for specific disordered eating behaviors. Specifically, MST was found to be related to starving behaviors but not bingeing, purging, laxative use, or overexercise. This may reflect that MST is associated with more severe manifestations of disordered eating (i.e., eating disorder diagnosis). Alternatively, this nonsignificant finding may be due to the assessment; specifically, each of these behaviors was assessed using a single-item checklist, which may be less valid than structured diagnostic interviews and comprehensive measures (Diamantopoulos et al., 2012). Overall, our findings revealed that MST was consistently related to eating disorder diagnosis, and thus individuals who experience MST should be assessed for eating disorder risk. Future research is needed to specify the relation between MST and specific forms of disordered eating using comprehensive assessments.

Second, there were a considerable number of studies that assessed MST in relation to substance use (alcohol and/or drug use, smoking). Most studies found significant relations between MST and alcohol, drug, smoking, and substance use disorders (e.g., Fillo et al., 2018; Frayne et al., 2003; Pavao et al., 2013; Ryan et al., 2015). The observed relation between MST and these behaviors supports empirical and theoretical frameworks linking sexual violence and substance use (Choudhary et al., 2008; Ullman et al., 2013; Xu et al., 2013). In the context of trauma and trauma-related distress (e.g., post-traumatic stress disorder [PTSD]), substances have been theorized to escape or alleviate trauma-related symptom and distress (Baker et al., 2004; Khantzian, 1997). Notably, however, findings were not consistent across all studies, with some finding no significant relation between MST and substance use (e.g., Booth et al., 2012). Mixed findings highlight the need for future research. One explanation could be use of the Alcohol Use Disorders Identification Test-C (AUDIT-C) as majority of all nonsignificant alcohol use findings used this measure (Beckman et al., 2018; Godfrey et al., 2015; Schuyler et al., 2017). This pattern may suggest that individuals with (vs. without) a history of MST do not experience more problematic alcohol consumption in particular. In addition, nonsignificant findings for substance use disorders may reflect the recency of the substance use problems. For instance, MST was found to be significantly associated with lifetime (Booth et al., 2011) but not current and past year substance use disorder (Booth et al., 2011, 2012). It is also possible that there is an indirect relationship between MST to substance use outcomes through some other mechanism, such as PTSD (Breslau et al., 2003). More research is needed to examine both MST and MST-related PTSD in relation to substance use.

Third, only three studies examined illegal/aggressive behaviors and four sexual behaviors. While the findings of these studies generally suggest a significant association of MST to these risky behaviors, more research is needed before we can draw conclusions. Furthermore, there are a broad range of risky behaviors that have not yet been assessed in relation to MST, such as gambling, reckless spending, reckless driving, and problematic technology use. Drawing from models of risky behaviors (e.g., Weiss et al., 2015), these behaviors may also develop in response to MST to modulate emotional experiences and/or enhance self-related cognitions. Alternatively, trauma-related emotions may limit attentional resources/information processing interfering with the ability to sufficiently inhibit risky behaviors (Ben-Zur & Zeidner, 2009). Previous research has found links between some of these risky behaviors and sexual violence (e.g., gambling; Korman et al., 2008); however, more research is needed to examine these behaviors in relation to MST.

This review has several limitations that warrant consideration. First, we included studies with varying definitions and assessments of MST. Specifically, how MST was operationalized varied across papers as some assessed MST specifically in a deployment context or focused on one specific type of MST (i.e., assault, harassment, unwanted sexual contact). As a result, prevalence rates may not be completely representative of MST within those samples and discrepancies in our findings may be due in part to differences in MST conceptualization. Similarly, the use of varying definitions of MST and types of risky behaviors necessitates future research to examine the nature and severity of MST (i.e., type, frequency, duration, context) in relation to each unique risky behavior. In addition, using the VA MST screen derived from VA administrative data may impact disclosure of victimization (Wilson, 2018). This review included studies that varied in terms of sampling, methodology, and research quality. We did this to ensure our study was inclusive and consider this to be a strength of our review. However, these differences should be taken into consideration when interpreting results as they may contribute to conflicting findings. Additionally, this review defined risky behaviors according to categories of behavior identified by empirically validated measures (Contractor et al., in press; Sadeh & Baskin-Sommers, 2017; Weiss et al., 2018). Thus, our list of risky behaviors may not have been exhaustive. Future research should examine additional behaviors that may have been excluded from the current review. Further, we only included studies that explicitly identified a risky behavior in the abstract. This was necessary to allow us to feasibly screen through the extensive list of abstracts. However, it means that our review may have excluded findings from studies that labeled these behaviors under broader terms in the abstract (e.g., psychiatric difficulties, behavioral health outcomes). Similarly, MST was defined as events that occurred in the context of the military, as such, studies that assessed sexual trauma without specifying whether the event occurred during military service were not included in the review (i.e., lifetime sexual trauma, adult sexual trauma). Additionally, this review discusses risky behaviors as a consequence of MST, but it is important to note that there is evidence for a bidirectional relation between trauma and risky behaviors more broadly (Windle, 1994), and thus a similar bidirectional relation may be observed between MST and risky behaviors, such that risky behaviors precede MST (i.e., certain risky behaviors can impair ability to assess risk increasing susceptibility to trauma). However, the majority of the studies included in this review used cross-sectional designs, precluding the determination of causal

conclusions or temporal ordering. Future studies should examine the co-occurrence of MST and risky behaviors using prospective and longitudinal designs to better understand the nature and directionality of this relation. Lastly, the majority of these findings were derived from predominately White samples. Future work is needed to replicate and extend these findings across individuals from diverse racial and ethnic backgrounds. Furthermore, only two studies examined these relations among transgender veterans (Beckman et al., 2018; Brown & Jones, 2015). More research is needed to examine MST across diverse military groups, especially considering that MST-exposed veterans from marginalized groups may be at greater risk of certain risky behaviors (i.e., suicide; Sexton et al., 2018). Thus, more research is needed to examine the associations of MST and risky behaviors among diverse military groups to better inform prevention and treatment efforts.

The current systematic reviews advances literature by providing strong support for an association between MST and a wide range of risky behaviors. Our findings suggest the need for additional research on the relation of MST to risky behaviors (e.g., those with inconsistent findings or that have been understudied). Examination of military-specific factors may clarify discrepant findings. Further, mechanisms that underlie the MST-risky behaviors association need to be identified. Research that addresses these questions will inform intervention and prevention efforts aimed at reducing risky behaviors among individuals with a history of MST.

Implications for Research, Practice, and Policy

- There is strong support for an association between a history of MST and risky behaviors; specifically, sexual trauma exposure in military samples appears to increase susceptibility for engagement in risky, self-destructive, and health-compromising behaviors.
- Interventions should be tailored to reduce the consequent effects of sexual trauma exposure in military samples (i.e., risky behavior engagement).
- Clinicians should be trained and encouraged to assess for the presence of risky behaviors among individuals with MST histories.
- Military individuals who disclose sexual trauma should be taught coping strategies to help manage undesirable thoughts and emotions that may motivate maladaptive coping strategies (i.e., risky behavior engagement).
- Continued efforts are needed to reduce barriers and destigmatize treatment among military individuals with sexual trauma histories as these risky behaviors may function to avoid or escape aversive experiential states associated with the sexual trauma.
- Findings can bring awareness to the potential consequences of MST and motivate policy changes to prevent immediate punitive action (i.e., separation, demotion) for individuals with MST histories engaging in risky behaviors that violate military policies (e.g., zero tolerance policy for substance use).

- Medical professionals and law enforcement should routinely assess for trauma history among military individuals engaging in risky, self-destructive, and health-compromising behaviors.
- Sexual violence prevention efforts should be strengthened through education and stricter policies against perpetration.

Critical Findings

- MST was found to be consistently associated with suicidal behaviors (i.e., ideation, attempts, mortality) and eating disorder diagnosis.
- Many studies found significant relations between MST and alcohol, drug, smoking, and substance use disorders, but findings were mixed.
- There has been limited research on the relation between MST and illegal/aggressive behaviors and sexual behaviors. While the findings of these studies generally suggest a significant association between MST and these behaviors, more research is needed.
- There are a broad range of behaviors that have not yet been assessed in relation to MST, such as gambling, reckless spending, reckless driving, and problematic technology use.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: Work on this article by the second author (NHW) was supported, in part, by National Institute on Drug Abuse [grants no: K23DA039327 and L30DA038349].

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Nicole H. Weiss, PhD, is an assistant professor in the Department of Psychology at the University of Rhode Island and director of the Study of Trauma, Risk-taking, Emotions, and Stress Symptoms (STRESS) Lab. Her clinical and research interests focus on the role of emotion dysregulation in PTSD and co-occurring risky, self-destructive, and health-compromising behaviors, most notably substance use and HIV/sexual risk. She is also interested in the influence of cultural and contextual factors, including race/ethnicity and gender, on the interrelations among PTSD, emotion dysregulation, and risky behaviors.

Svetlana Goncharenko, BA, is a second-year PhD student in the Clinical Psychology program at the University of Rhode Island. Her research focuses on the role of emotion dysregulation in the etiology and treatment of PTSD, particularly as it relates to maladaptive coping such as substance use and risky sexual behavior.

Joseph Mammay is an undergraduate student at the University of Rhode Island studying psychology. His research interests include child maltreatment, post-traumatic stress disorder, military trauma, and suicidality.

Michael Church is an undergraduate student at the University of Rhode Island studying psychology. His research interests include military trauma, post-traumatic stress disorder, and risky and impulsive behaviors.

Ateka A. Contractor, PhD, is an assistant professor at the Department of Psychology, University of North Texas. Her program of research examines heterogeneity/diversity in post-traumatic stress disorder (PTSD) symptoms, heterogeneity (pattern and types) of traumatic experiences, transdiagnostic constructs/mechanisms driving PTSD's relationship with depression and reckless behaviors (including positive memory processes and emotional dysregulation), and the inter-section between cultural factors and PTSD symptoms. She has published over 70 peer-reviewed articles in these research areas.

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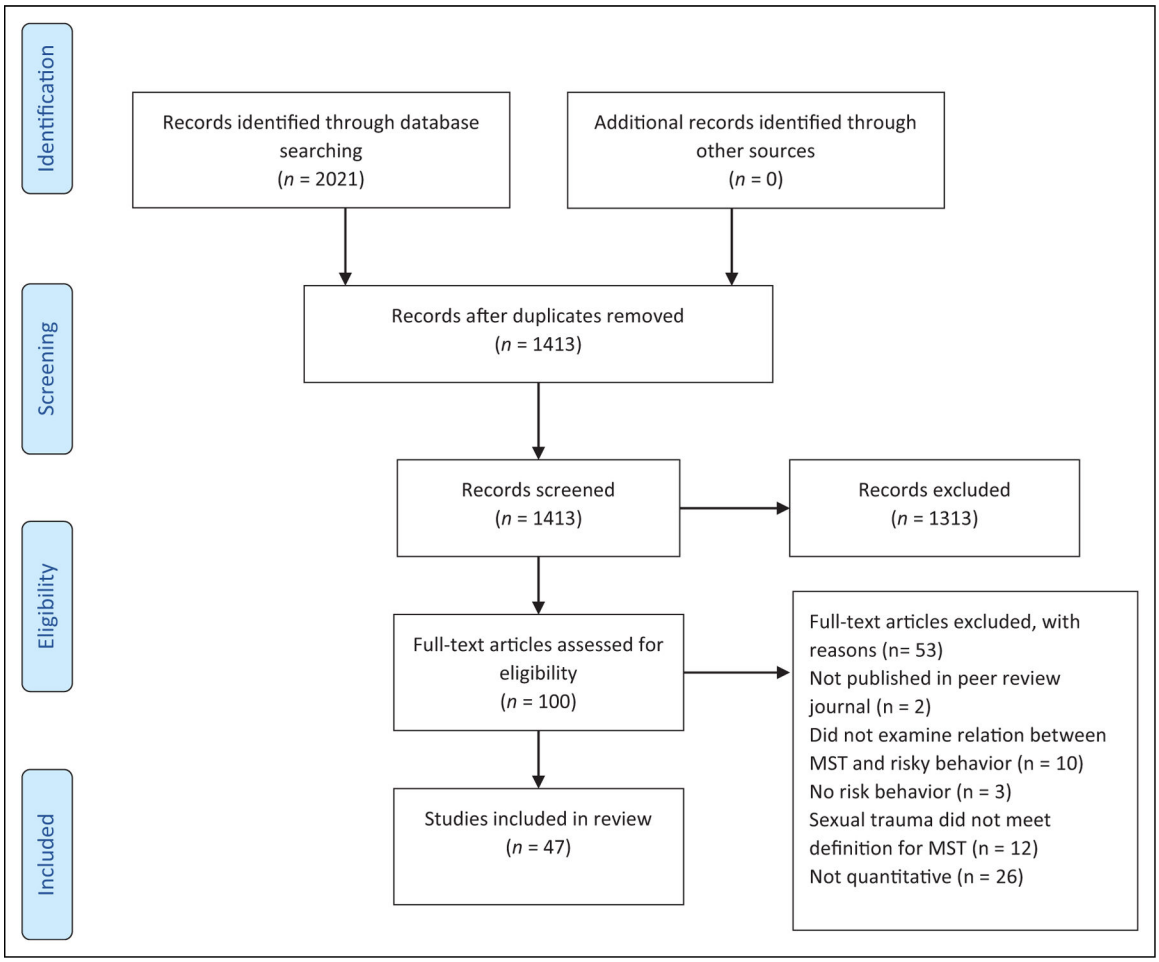

Figure 1.
Flow diagram for systematic review procedure.

Table 1.

Summary of Finals Studies.

Study	Sample Characteristics	MST Measure	Risk Behavior	Selected Findings	MST Prevalence
Backhaus et al. (2016)	1,250 Previously deployed OEF/OIF veterans using VA health care (14.8% female, 56.3% White, M_{age} = 31.3)	VA MST screen	Legal problems	Participants with (vs. without) a history of MST were significantly more likely to report legal problems. This finding remained significant when adjusting for PTSD symptom severity, traumatic brain injury, and combat exposure.	7.2%
Bartlett et al. (2018)	840 Veterans (76.4% male)	Sexual victimization items from Trauma Questionnaire	Disordered eating	MST predicted disordered eating symptoms among women but not men.	55.7% of women, 0.9% of men
Beckman et al. (2018)	221 transgender veterans (88.2% White, M_{age} = 48.83)	Sexual experiences survey, modified to assess sexual assault during military service	Suicidal behaviors, alcohol, smoking, drug	Participants with (vs. without) a history of MST were significantly more likely to report drug use but not unhealthy alcohol use, smoking, or suicidal ideation. At zero order, MST was not significantly correlated to drug use, unhealthy alcohol use, smoking, or suicidal ideation. MST was significantly associated with drug use but not unhealthy alcohol use, smoking, or suicidal ideation, when adjusting for gender identity, race, and age.	17.2%
Blais et al. (2017)	595,525 Previously deployed OEF/OIF/OND veterans that utilized VA health care	VA MST screen	Substances, disordered eating	In both follow-up periods (1 and 5 years), male and female veterans with a positive screen for MST had significantly higher rates of co-occurring eating disorder diagnoses. A positive history of MST increased the likelihood of being diagnosed with eating disorders regardless of psychiatric comorbidities, including PTSD. The increased likelihood conferred by MST for an eating disorder diagnosis was differentially stronger among male veterans than female veterans in the 1-year cohort.	3.0%
Booth et al. (2012)	1,004 Female veterans utilizing VA health care (80% White, M_{age} = 38.3)	Rape	Substances	MST was not significantly associated with current substance use disorder.	24.6%
Booth et al (2011)	1,004 Female veterans utilizing VA health care (80% White)	Rape	Substances	Individuals with (vs. without) a history of MST were significantly more likely to report lifetime, but not past year, substance use disorder. Adjusting for rape and sex partnership, MST was significantly associated with lifetime SUD.	24.6%
Breland et al. (2018)	407 Female veterans utilizing VA health care (60% White, M_{age} = 49.0)	VA MST screen	Disordered eating	Individuals with (vs. without) a history of MST had twice the odds of an eating disorder when adjusting for age, race/ethnicity, education, service branch, and combat exposure.	66.0%
Brown and Jones (2015)	18,418 Veterans who utilized VA health care, including a large cohort of transgender veterans (30.5% female, 80.7% White)	Administratively recorded	Criminal justice involvement	Transgender veterans with a history of MST (vs. without) were more likely to be involved with the criminal justice system.	Not reported
Bryan et al. (2015)	464 Military personnel and veterans enrolled in college/university classes (29.3% female, 83% White, M_{age} = 36.2)	Sexual victimization items from Trauma Questionnaire	Suicidal behaviors	Sexual assault and other unwanted sexual experiences occurring during military service were independently associated with suicide ideation, suicide plan, and suicide attempt, with only one exception: Sexual assault during military service was not associated with suicide attempts; these findings did not remain significant when adjusting for premilitary sexual trauma.	15.2%

Study	Sample Characteristics	MST Measure	Risk Behavior	Selected Findings	MST Prevalence
Butterfield et al. (1998)	632 Previously deployed female veterans utilizing VA health care (M_{age} = 40.0)	Sexual victimization items from Trauma Questionnaire	Substances	Women with a history of multiple traumatic exposures, at least one occurring during military service, had a higher prevalence of substance abuse symptoms.	33.0%
Cichowski et al. (2017)	516,950 Female veterans utilizing VA health care (53.3% White)	Administratively recorded	Drug, smoking	MST was associated with drug abuse and overdose and current smoking.	22.5%
Creech and Borsari (2014)	93 Female veterans that have utilized VA health care (73.1% White, M_{age} = 46.2)	VA MST screen	Alcohol	MST was associated with alcohol use and misuse before adjusting for depression and alcohol outcome expectancies/valuations.	69.9%
DiMauro et al. (2018)	255 Female veterans in monogamous relationships (82.2% White, M_{age} = 32.6)	Open-ended item regarding stressful military trauma	Suicidal behaviors	Participants with (vs. without) a history of MST reported significantly greater suicidal behaviors.	60.0%
Fillo et al. (2018)	248 Past deployed army reserve/ national guard male soldiers (81.1% White, M_{age} = 33.4)	The Deployment Risk and Resilience Inventory Sexual Harassment Scale	Alcohol	MST exposure during most recent deployment was related to greater likelihood of frequent heavy drinking and alcohol-related problems, even adjusting for PTSD symptoms and age.	17.3%
Forman-Hoffman et al. (2012)	1,004 Female veterans utilizing VA health care (79.9% White)	Standardized phone interview assessing completed rape and attempted sexual assault	Disordered eating	Individuals with completed rape and attempted sexual assault during military service were significantly more likely to report diagnosed and self-reported lifetime eating disorders. This pattern of findings remained when adjusting for demographic, service-level, behavioral, and other mental health characteristics, except that those with attempted sexual assault during military service were not more likely to report self-reported lifetime eating disorders.	32.5%
Frayne et al. (2003)	3,632 Female veterans utilizing VA health care		Smoking, alcohol	After adjusting for age, individuals with (vs. without) a history of MST were significantly more likely to smoke and screen positive for hazardous alcohol use.	23.0%
Gilmore et al. (2016)	494,822 Previously deployed OEF/OIF/OND veterans utilizing VA health care (12.5% female)	VA MST screen	Substances	Women and men with a positive (vs. negative) MST screen, separately, reported significantly higher rates of SUD, any single disorder (SUD, PTSD, or MDD), or any co-occurring disorder (combinations of SUD, PTSD, and MDD). Further, they were significantly more likely to have diagnoses of SUD only; co-occurring SUD-PTSD; co-occurring SUD-MDD; co-occurring SUD-PTSD-MDD; and significantly less likely to have no SUD, PTSD, and MDD.	2.9%
Gobin et al. (2015)	369 Female veterans that utilized VA health care in the New England region (83.5% White, M_{age} = 55.7)	Sexual victimization items from Trauma Questionnaire	Alcohol	Interpersonal alcohol-related concerns were associated with a history of MST but not intrapersonal, unsafe drinking levels, or incipience or presence of an alcohol use disorder.	48.2%
Godfrey et al. (2015)	1,294 Veterans that using VA health care (15.0% female, 62.9% White, M_{age} = 31.0)	VA MST screen	Alcohol	A history of MST was not significantly associated with a higher rate of hazardous alcohol consumption.	6.2%
Gradus et al. (2008)	3,946 Former reservists (59.0% female)	Sexual harassment, assessed with the military version of the Sexual Experiences Questionnaire	Alcohol	A positive association between sexual harassment and alcohol use was found among women but not among men.	72.5% women, 41.6% men

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Study	Sample Characteristics	MST Measure	Risk Behavior	Selected Findings	MST Prevalence
Gradus et al. (2013a)	2,321 Previously deployed OEF/OIF veterans (51% female, 77.2% White)	The Deployment Risk and Resilience Inventory Sexual Harassment Scale	Suicidal behaviors	Sexual harassment was associated with suicidal ideation before and after including PTSD, depression, and alcohol use symptoms in the model among women.	Not reported
Gradus et al. (2013b)	680 Marine recruits beginning training (53.4% female, 64.1% White)	Sexual Experiences Questionnaire	Suicidal behaviors	MST during training was associated with increased odds of suicide attempt in 10 years following training.	17.9%
Griffith (2017)	12,567 Army National Guard soldiers	"Within the last 12 months, have you been sexually harassed in your unit?"	Suicidal behaviors	Sexual harassment increased risk of suicide thoughts, suicidal plans, and suicidal attempts.	2.2%
Hahn et al. (2015)	86 OEF/OIF veteran current drinkers (35.0% female; 92.0% White; M_{age} = 28.9)	The Deployment Risk and Resilience Inventory Sexual Harassment Scale	Alcohol	MST was significantly positively associated with alcohol use and alcohol-related problems.	26.0%
Hankin et al. (1999)	3,632 Woman veterans receiving VA ambulatory care (76.0% White)	"Did you ever have an experience where someone used force or the threat of force to have sexual relations with you against your will while you were in the military?"	Alcohol	Participants with (vs. without) a history of MST had greater symptoms of alcohol use. The odds of screening positively for symptoms of current alcohol abuse were nearly 2 times higher for those who reported a history of MST.	23.0%
Harned and Fitzgerald (2002)	Sample 1: 472 Active duty female military personnel (48.0% White, M_{age} = 27.56); Sample 2: 254 Active duty male military personnel (53.0% White, M_{age} = 27.85)	Sexual harassment assessed using the Short form of the Sexual Experiences Questionnaire and sexual assault assessed using the Sexual Experiences Survey	Disordered eating	For women, sexual harassment and assault were significantly positively associated with disordered eating symptoms, whereas for men, only sexual harassment was significantly associated with disordered eating symptoms.	Not reported
Hoggatt et al. (2015)	3,585 Female veterans	Two questions: (a) forced to have sexual relations against one's will while in the military or (b) had sexual contact with a superior while in the military to avoid negative consequences	Alcohol	Prevalence rates of alcohol misuse were higher among VA nonusers that reported a history of MST.	Not reported
Jenkins et al. (2015)	917 OEF/OIF/OND veterans registering for care at San Diego Healthcare Systems (15.9% female, 56.6% White)	VA MST screen	Alcohol	MST was not significantly associated with alcohol use.	9%
Katz et al. (2012)	255 Postdeployed service members (12.2% female, 25.0% White, M_{age} = 29.7)	Four questions developed to assess MST during war	Alcohol	MST was not significantly associated with alcohol misuse.	Not reported
Kimerling (2010)	125,729 Postdeployed OEF/OIF veterans (14.0% female, 66.0% White)	VA MST screen	Substances	MST was associated with increased odds of having a substance use disorder.	15.1% women, 0.7% men
Kimerling et al. (2016)	6,351,854 Veterans who utilized VA health care (5.7% female)	VA MST screen	Substances, suicidal behaviors	Suicide mortality was higher among those with a history of MST (vs. without). Veterans with a history of MST (vs. without) also had greater odds of being diagnosed with a substance use disorder.	2.2% (21.2% women, 1.1% men)

Study	Sample Characteristics	MST Measure	Risk Behavior	Selected Findings	MST Prevalence
Klingensmith et al. (2014)	1,484 Nationally representative sample of veterans (10.1% female, 75.7% White, M_{age} = 60.4)	VA MST screen	Alcohol, drug, suicidal behaviors	After adjusting for sociodemographic and military characteristics, veterans with (vs. without) a history of MST were more likely to report suicidal ideation and a suicide attempt but were not significantly more likely to have lifetime alcohol use disorder, drug use disorder, or nicotine dependence	7.6% (32.4% women, 4.8% men)
Maguen et al. (2012)	7,251 Active duty soldiers in OEF/OIF (7.5% female, 64.0% White, M_{age} = 25.7)	VA MST screen	Alcohol	MST was not a significant predictor of postdeployment alcohol use, including after adjusting for predeployment mental health.	12.0% women, 1.0% men
Monteith et al. (2016a)	354 Veterans in VHA care (12.4% female, 55.9% White, M_{age} = 49.6)	VA MST screen	Suicidal behaviors	Participants with (vs. without) a history of MST were more likely to report a previous suicide attempt, including adjusting for age, gender, combat, depressive disorders, PTSD, negative affect, and lifetime history of suicide attempt. One third (33.3%) of veterans with MST reported current suicidal ideation, compared to 21.2% without MST.	13.6%
Monteith et al. (2016b)	199 previously deployed OEF/OIF/OND veterans in trauma-focused inpatient VA treatment (14.2% female, 61.3% White, M_{age}= 32.5)	The Deployment Risk and Resilience Inventory Sexual Harassment Scale	Suicidal behaviors	Four types of MST—threatened for not being sexually cooperative, unwanted attempts to stroke or fondle, unwanted attempts to have sex, and forced to have sex—were significantly and positively associated with suicidal ideation.	Not reported
Monteith et al. (2015)	199 Previously deployed OEF/OIF/OND veterans in trauma-focused inpatient VA treatment (14.2% female, 61.3% White, M_{age} = 32.5)	The Deployment Risk and Resilience Inventory Sexual Harassment Scale	Suicidal behaviors	Severity of MST was significantly and positively associated with suicidal ideation, including adjusting for age, gender, and combat exposure.	27.6%
Pavao et al. (2013)	126,598 Homeless veterans who used VHA care (7.0% female, 49.4% White)	VA MST screen	Substances, suicidal behaviors	Men and women, separately, who had a history of MST were significantly more likely to have diagnoses of substance use disorders and suicide behaviors.	39.7% women; 3.3% men
Rosellini et al. (2017)	153,250 female U.S. Army soldiers with MST	Administratively recorded MST	Suicidal behaviors	Participants with (vs. without) a history of MST had significantly elevated fully adjusted odds of suicide attempt	Not reported
Rowe et al. (2009)	232 Female veterans utilizing VA care (74.6% White, M_{age} = 45.0)	VA MST screen	Disordered eating smoking; alcohol	Participants with (vs. without) a history of MST were significantly more likely to report starving behavior but not bingeing, purging, laxative use, overexercise, smoking, or alcohol use	70.3%
Ryan et al. (2015)	133 Previously deployed OEF/OIF/OND female veterans (80.6% White, M_{age} = 37.1)	The Deployment Risk and Resilience Inventory Sexual Harassment Scale	Alcohol	At zero order and when adjusting for combat trauma and exposure to aftermath, MST was significantly and positively associated with alcohol misuse.	33.3%
Schry et al. (2015)	2,042 Male Iraq/Afghanistan-era military veterans, active duty personnel, and reserve forces members (50.2% White, M_{age} = 37.29)	Sexual victimization items from Trauma Questionnaire	Alcohol; drug; aggressive/ illegal behaviors; suicidal behaviors	There was no significant difference between those with (vs. without) a history of MST on rates of incarceration, difficulty controlling violent behavior, and drug and alcohol misuse. Those with a history of MST (vs. without) had significantly higher levels of suicidal ideation.	2.0%
Schuyler et al. (2017)	2,535 Community-based veterans (12.9% female, 46.2% White)	VA MST screen	Alcohol; sexual behavior; smoking	Men and women, separately, with (vs. without) a history of MST were significantly more likely to report taking unnecessary health and life risks and smoking tobacco. Men, but not women, with (vs. without) a history of MST were significantly more likely to	40.6% women, 4.8% men

Study	Sample Characteristics	MST Measure	Risk Behavior	Selected Findings	MST Prevalence
				report STD risk and drink driving. Neither men nor women with (vs. without) a history of MST were significantly more likely to report alcohol misuse.	
Stahlman et al. (2015)	7,415 Female veterans (53.4% White)	Unwanted sexual contact "Has anyone ever made or pressured you into having some type of unwanted sexual contact—since entering the military? By sexual contact we mean any contact between someone else and your private parts or between you and someone else's private parts."	Alcohol, drug, substance, suicidal behaviors	MST was associated with certain types of prescription drug misuse (i.e., tranquilizers/muscle relaxers) but not illicit substance use or binge drinking. MST was also more prevalent among those reporting suicidal ideation and attempt.	13.4%
Stahlman et al. (2014)	10,250 Sexually active and unmarried military personnel (33% women, 59.3% White)	Unwanted sexual contact "Has anyone ever made or pressured you into having some type of unwanted sexual contact—since entering the military? By sexual contact we mean any contact between someone else and your private parts or between you and someone else's private parts."	Sexual behaviors	MST was associated with the more sexual partners among men and women, and report of a sexually transmitted infection in the past 12 months among men only.	2.9% of men, 14.2% of women
Strauss et al. (2011)	200 Women veterans receiving outpatient mental health care (53.0% White, M_{age} = 45.5)	VA MST screen	Sexual behaviors	Participants with (vs. without) a history of MST reported a higher odds of trading sex, even when adjusting for current substance use, childhood sexual trauma, and education level.	67.0%
Tiet et al. (2015)	837 Veterans in treatment for PTSD at a VA (13.3% female, 63.4% White, M_{age} = 50.1)	"Were you ever sexually assaulted while you were in the military?"	Aggressive behavior, alcohol, drug	For both men and women, separately, MST was not significantly related to aggressive/violence behavior and alcohol and drug use at baseline and aggressive/violence behavior and drug use at 4-month follow-up. Men (but not women) with (vs. without) a history of MST reported lower levels of alcohol use at 4-month follow-up.	77.4% women, 5.8% men
Turchik et al. (2012)	420,725 OEF/OIF veterans utilizing VA health care (12.5% female, 49.5% White)	VA MST screen	Sexual behaviors	Women with (vs. without) a history of MST were more likely to have a diagnosis of any sexually transmitted infection, any HPV, HPV—genital/anal warts, HPV—cervical dysplasia, candidiasis/ vulvovaginitis, pelvic inflammatory disorder, herpes simplex, trichomoniasis, HIV/AIDS, scabies/pubic lice, other venereal disease, any sexual desire disorder, sexual pain disorders, sexual desire disorders, sexual arousal disorders, and orgasmic disorders. Men with (vs. without) a history of MST were more likely to have a diagnosis of any sexually transmitted infection, any HPV, HPV—genital/anal warts, herpes simplex, HIV/AIDS, scabies/pubic lice, syphilis, other venereal disease, any sexual desire disorder, sexual desire disorders, and sexual arousal disorders.	16.7% women, 0.7% men
Yalch et al. (2018)	407 Women veterans utilizing VA health care (59.0% White, M_{age} = 49.0)	"During your service, did anyone use force, threat of force, or coerce[d] you to have sex against your will."	Alcohol, drug	Participants with (vs. without) a history of MST reported significantly higher drug, but not alcohol misuse, even when adjusting for number of other military stressors. Further, results suggest that participants exposed to both MST and other military stressors were at increased risk of developing co-occurring SUD and PTSD (vs. those exposed only to MST).	33.0%

Note. VA MST Screen: "While you were in the military … (1) Did you ever receive uninvited or unwanted sexual attention, such as touching, cornering, pressure for sexual favors, or verbal remarks? (2) Did someone ever use force or the threat of force to have sex against your will?" Demographic information (i.e., age, gender, and race) and MST prevalence rates are only reported if they were provided for the full sample. HPV human papillomavirus; MST military sexual trauma; OEF = Operation Enduring Freedom; OIF = Operation Iraqi Freedom; OND = Operation New Dawn; PTSD = post-traumatic stress disorder; VA = veteran affairs; VHA = veterans health administration.