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The Association between Military Sexual Stress and Psychiatric Symptoms after Controlling for Other Stressors

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Abstract

Objective: Several researchers have identified associations between exposure to occupational sexual stressors (e.g., sexual harassment) and severer psychiatric symptoms in military personnel. However, few controlled for participants' exposures to other high-magnitude stressors, which could have confounded results. We examined the unique association between military sexual stress and severity of participants' psychiatric symptoms after controlling for their other high-magnitude stressor experiences. Organizational- and individual-level predictors of military sexual stress were also assessed.

Method: We surveyed by mail all active duty troops registered in the Department of Veterans Affairs' Enrollment Database (2001–2003). The questionnaire contained well-validated measures.

Results: Eighty-four percent responded (total sample $N = 611$); of these 56% reported at least one sexual stressor exposure. A highly significant association between military sexual stress and psychiatric symptoms attenuated by two thirds and lost statistical significance once other stressor experiences were controlled. Besides sociodemographics, the strongest correlates of military sexual stress were working in an environment perceived to tolerate sexual harassment, reporting severer childhood maltreatment, and reporting more high-magnitude stressors. A gender-stratified analysis generated similar findings for men and women.

Conclusions: Little unique variance in psychiatric symptom reporting was explained by military sexual stressor exposure after controlling for other stressors. Childhood maltreatment and other high magnitude stressors acted as risk factors for and confounders of military sexual stress. Understanding how and why these stressors inter-relate could lead to better, more effective

interventions to reduce them all—and their sequelae. Findings also highlight the need to routinely include men in sexual stress research.

Keywords

Child abuse; Occupational exposure; Organizational culture; Mental health; Military personnel; Rape; Sexual harassment

More than 1.5 million United States citizens currently serve in the Armed Forces. These troops are exposed to many occupational hazards besides combat. For example, in a one- to two-year period, 74–80% of active duty men and women have reported sexually harassing experiences (Bastian, et al., 1996; Rosen & Martin, 1998; Wolfe et al., 1998) and approximately 1% to 8%, sexual assault (Bastian, et al., 1996; Lipari, et al., 2008; Martin, et al., 1998). Complications of military sexual stress are thought to be noteworthy health concerns, particularly for female service members (Murdoch et al., 2006). For example, well-described psychiatric consequences of sexual assault include increased odds of posttraumatic stress disorder (PTSD), depression, substance abuse, and suicide attempts (Cortina & Kubiak, 2006; Davis & Wood, 1998; Ullman, 2004). Additional to acute injuries, longer-term physical complications include heightened breast cancer risk and increased odds of reporting heart attacks, obesity, or asthma (Frayne, et al., 1999; Stein & Barrett-Connor, 2000). Sexual harassment, another military sexual stressor, has also been associated with greater odds of reporting depression, anxiety, and PTSD (Kang, et al., 2005; Murdoch, et al., 2006). Although men are rarely included in studies of military sexual stress, available findings suggest that they report adverse effects similar to women's (Street, et al., 2007; Vogt, et al., 2005).

Many sequelae attributed to military sexual stressors have also been associated with other high-magnitude stressors, such as childhood abuse and combat, which are likewise common in military samples. Yet, few investigators have comprehensively controlled for such stressors when examining associations between military sexual stress and psychiatric disorders (Fitzgerald, et al., 1999; Harned, et al., 2002; Street, et al., 2008). Particularly concerning is the frequent omission of childhood maltreatment, since it is both a risk factor for reporting military sexual stress and a risk factor for depression, anxiety, and PTSD (Moffitt et al., 2007; Rosen & Martin, 1998). Thus, childhood maltreatment and other stressors could confound observed associations between military sexual stress and psychiatric outcomes, mediate associations, or carry additive effects (Green et al., 2000). Failing to adequately control for such experiences could cause investigators to over- or under-estimate sexual stress' influence on psychiatric symptoms—possibly substantially so.

In the present paper, we extend a previous analysis (Murdoch, et al., 2007) to examine the unique contribution of military sexual stress on psychiatric symptoms after controlling for other high-magnitude stressor experiences, such as prior childhood maltreatment and combat exposure. We hypothesized that, while there would likely be high co-occurrence across different stressor experiences (Murdoch, et al., 2006; Nishith, et al., 2000; Polusny & Follette, 1995; Rosen & Martin, 1998; Sadler, et al., 2003; Sadler, et al., 2004; Wolfe et al., 1998), military sexual stress, childhood maltreatment, combat, and other high-magnitude

stressor experiences would nonetheless each have unique, additive effects on psychiatric symptom reporting. Given well-described associations between cumulative sexual trauma and psychiatric outcomes (Follette, et al., 1996), we also explore whether associations between military sexual stress and psychiatric symptom-reporting differed according to participants' childhood history of sexual abuse. We anticipated any associations between military sexual stress and psychiatric symptom-reporting would be stronger in troops with a history of childhood sexual abuse compared to those without such history.

These research questions are set within a larger analytical framework examining potential risk and protective factors for military sexual stress. Sexual stressors are an avoidable occupational hazard, and eradicating them would obviously eliminate any downstream, negative sequelae. Identifying opportunities for intervention is thus an independently important enterprise. Furthermore, several posited risk factors for military sexual stress have been shown to directly affect psychiatric symptom reporting. For example, workplace tolerance of sexual harassment has been associated with greater psychological distress, even among employees not personally targeted for harassment (Fitzgerald, et al., 1997; Glomb et al., 1997).

From prior models of occupational sexual stress, we hypothesized that military sexual stress would occur as a function of organizational characteristics and individual factors. In terms of organizational factors, we hypothesized that working in a unit where local social norms conveyed tolerance of sexual harassment, working with more men than women, having a male supervisor, and being a job "gender-pioneer" (the first of one's sex in an occupation) would each be associated with higher odds of reporting military sexual stress (Fitzgerald, et al., 1997; Gutek & Morasch, 1982; Pryor, et al., 1993; Tangri, et al., 1982). We also anticipated that harassment-tolerant norms would have direct, increased effects on psychiatric symptom reporting, while working in a generally professional, supportive, and caring environment would be related to lower odds of reporting sexual stress and to reporting fewer psychiatric symptoms (Rosen & Martin, 1997). In terms of individual factors, we anticipated that sociodemographic characteristics often associated with lower organizational power, such as younger age, female gender, minority race/ethnicity, unmarried status, lower education, and lower rank or fewer years in the service, would be related to higher odds of reporting military sexual stress (Tangri, et al., 1982). Sociodemographic characteristics were also posited to have direct effects on psychiatric symptom reporting. Because sexual stress has been so rarely studied in men, a secondary goal was to evaluate whether findings differed by gender.

Materials and Methods

Sample and Design

The Department of Veterans Affairs (VA) Enrollment Database is a national administrative database that tracks all individuals who apply for VA health care benefits, regardless of whether they actually take advantage of those benefits. The VA's national Outpatient Clinic Files (OPC) compiles all outpatient visits made by all individuals to any VA medical facility within fiscal years. All 681 persons confirmed as active duty in one or both of these databases between January 1998 and June 2002 who indicated willingness to complete a

mailed survey were mailed a 22-page questionnaire, \$20 incentive, and cover letter between December 2001 and February 2003. Fifty-one other confirmed active duty persons refused participation. The cover letter described the study's risk and benefits and emphasized the confidential and voluntary nature of participation; return of the survey indicated subjects' consent to participate. We used follow-up mailings to maximize response rate, which was 84% ($n = 570$). An earlier pilot study yielded 41 more surveys, for a total of 611. The Minneapolis Veterans Affairs Medical Center's Human Studies Subcommittee approved the study's protocol.

Measures

Psychiatric symptoms.—Using structural equation modeling, respondents' psychiatric symptoms were modeled as a single latent variable underlying troops' symptoms of PTSD, depression, anxiety, and somatization. *PTSD symptom severity* was assessed using the Penn Inventory for Post-traumatic Stress Disorder (Hammarberg, 1992); scores of 35 or higher identify PTSD in military veterans with approximately 93% accuracy ($\alpha = 0.91$).

Depression was measured using the 5-item RAND Mental Health Battery (Berwick et al., 1991); scores of 17 or more have 48% sensitivity for major depression, but almost 95% specificity ($\alpha = 0.80$). *Anxiety* and *somatic concerns* were assessed using the 3-item and 16-item PRIME-MD screeners (Spitzer et al., 1994), respectively. These have 94% sensitivity and 53% specificity for any anxiety disorder ($\alpha = 0.63$) and 100% sensitivity and 37% specificity for somatization disorder ($\alpha = 0.83$). For all psychiatric measures, higher scores indicate severer symptoms.

Military sexual stress.—Military sexual stress was conceptualized to include three related, but distinct stressor types: sexual harassment, sexual assault, and sexual identity challenges. Sexual identity challenges, in particular, have never been systematically assessed in a military sample, yet would likely be highly salient to them (DuBois, et al., 1998; Magley, et al., 1999). These behaviors challenge service members' sexual orientation while establishing and reinforcing hypermasculinized, heterosexist ideals. Originally described in men and thought to be more upsetting to them than sexual harassment per se (Stockdale, et al., 1999; Waldo, et al., 1998), they are also common in women (Murdoch, et al., 2007).

The Sexual Harassment Inventory (Murdoch & McGovern, 1998) assessed respondents' *sexual harassment* and *sexual assault* experiences since entering the military. The Sexual Harassment Inventory is a behaviorally-specific measure that evaluates hostile, sexualized work environments; *quid pro quo* demands for sexual favors in exchange for better treatment; and criminal sexual misconduct—including sexual assault—by coworkers and supervisors. An additional item asked about sexual assault by “someone other than a co-worker or supervisor” ($\alpha = 0.92$ to 0.95). *Sexual identity challenges* were measured using 5 items from the gender role enforcement subscale of the Sexual Harassment of Men scale (Waldo, et al., 1998), which were adapted to assess both genders' experiences (Murdoch, et al., 2007).

While we explored the benefits of treating each sexual stressor as a continuous variable, the most informative modeling strategy involved creating a manifest variable comprised of 4

military sexual stressor categories ordered according to their hypothesized severity: 0 = no sexual stressors ($n = 269$), 1 = sexual identity challenges or sexual harassment only ($n = 193$), 2 = sexual identity challenges plus sexual harassment ($n = 111$), and 3 = sexual assault plus sexual harassment with or without sexual identity challenges ($n = 30$). No subject reported sexual assault without sexual harassment. Incomplete responses precluded categorizing 8 participants.

Childhood maltreatment.—This construct was modeled as a latent variable using items from the Physical Abuse ($\alpha = 0.88$) and Sexual Abuse ($\alpha = 0.93$) subscales of the Childhood Trauma Questionnaire (Bernstein et al., 1994) and one item from its Emotional Neglect subscale. Higher scores indicate more maltreatment.

Combat exposure.—An adapted Combat Exposure Inventory (Janes, et al., 1991) assessed respondents' combat exposure since entering the military. The adapted Combat Exposure Inventory correlated 0.94 with the original and included experiences reflective of more recent US conflicts ($\alpha = 0.89$). We used continuous combat scores for analysis of variance but, because of skew, dichotomized responses as any combat versus none for structural equation modeling.

Other high magnitude stressors.—Six items adapted from the Life Stressor Index (Wolfe, et al., 1996) assessed respondents' exposure to other high magnitude stressors since entering the military. Yes/no questions asked about serious accidents and natural disasters; life-threatening personal or close family illnesses; traumatic separation from a child (e.g., kidnapping); the traumatic and unexpected death of a loved one; and criminal victimizations by strangers. Responses were summed and treated as a manifest variable.

Job gender context.—Three items from prior Department of Defense surveys (Bastian, et al., 1996) assessed the ratio of men to women at participants' worksite, their supervisor's sex, and their job gender-pioneer status. Each was treated as a separate manifest variable.

Organizational tolerance of sexual harassment.—The 6-item Perceived Tolerance of Sexual Harassment in the Military scale (Murdoch, et al., 2009) evaluated respondents' perceptions of local work norms toward sexual harassment ($\alpha = 0.89$). Higher scores indicate more perceived tolerance.

Professional, supportive, and caring work environment.—This construct was modeled as a latent variable using the Military Environment Inventory-short form (Moos, 1986), which contains 28 "true/false" items that measure respondents' personal investment in their units' functioning; their autonomy and opportunities for self-actualization; their cohesion with and support from peers; relationships with higher-ranking staff, including the clarity of authority lines in their units; the orderliness of their unit; and their chain of command's supervisory style ($\alpha = 0.88$). Higher scores indicate a more positive climate.

Sociodemographic characteristics.—Age, race/ethnicity, gender, education, married status, rank, and years in the military were each assessed using single survey items and treated as separate manifest variables.

Statistical analysis

We compared unadjusted scale scores across military sexual stressor categories using analysis of variance. We used structural equation modeling (SEM) to examine military sexual stress' direct effects on psychiatric symptoms while accounting for other factors' direct and indirect effects. To examine how controlling for respondents' other high-magnitude stressors would affect the association between military sexual stress and psychiatric symptoms, we considered two SEMs: 1) a nested, "reduced model" that excluded the relationships between other high-magnitude stressors and the main outcomes of military sexual stressors and psychiatric disorders, and 2) a "full model" that included them. We compared the difference in these models' fit using the χ^2 -change test.

Both models included all sociodemographic variables as exogenous predictors of military sexual stress and psychiatric symptoms and allowed all exogenous variables to freely correlate. To account for some variables' ordered categorical nature, including the military sexual stress variable, we used polychoric correlations for analyses. All SEM were performed using Mplus 5.0. Regression coefficients are reported as standardized betas (B).

For the primary analysis, we combined men and women's responses. Two exploratory, two-group SEMs investigated potential differences by childhood sexual abuse history and by gender. The two-group analyses fixed the factor loadings of latent variables to be the same across groups but allowed direct paths in the structural model to vary.

Results

Descriptive statistics

Among respondents, 62% were male; 66% were white; 20%, black or African-American; 6% other race; and 12%, Hispanic or Latino ethnicity. Eighty-five percent reported at least some college experience, and 63% were married. Fifty-two percent served in the Army; 32%, in the Air Force; 11%, in the Navy; and 4%, in the Marine Corps. Mean (SD) years of military service was 14.8 (7.6). Most (82%) were in the enlisted ranks. The 51 troops who refused participation in the study were similar to the 681 willing troops in terms of gender, enlisted status, and paygrade. Among the 681, survey respondents and non-respondents were similar in terms of gender and enlisted status, but non-respondents' mean paygrade was 1.4 points lower ($p=0.001$).

Overall, almost 22% of respondents reported childhood sexual abuse, 16% had experienced some combat, and 78% described experiencing at least one other high-magnitude stressor since entering the military. Among women, 20.1% were in Military Sexual Stressor Category 0 (none); 40.6%, in Category 1 (either sexual identity challenges or sexual harassment); 27.5%, in Category 2 (both sexual identity challenges and sexual harassment); and 11.8%, in Category 3 (sexual harassment and sexual assault with or without sexual identity challenges). Among men, 59.6% were in Category 0; 26.7% were in Category 1; 12.8% were in Category 2; and 0.8%, in Category 3.

Overall, 7.4% of respondents met survey criterion for PTSD and 8.6%, survey criterion for depression. Nearly 59% of respondents met survey screening criterion for anxiety and 45%,

for somatization; however, PRIME-MD cut-points tend to be overly sensitive for these two conditions, and scores are best interpreted dimensionally.

Analysis of variance

As Table 1 shows, there was a statistically significant, stepwise increase in participants' mean psychiatric symptoms as they reported more types of military sexual stressors. Troops who reported more types of military sexual stress also reported more childhood maltreatment and more other high-magnitude events. Associations between organizational factors and military sexual stressor category were in the direction expected. Pairwise comparisons between those reporting no military sexual stress and those reporting at least one type of military sexual stressor were all statistically significant and in the direction expected (all $p < 0.05$; data not shown).

Structural equation models

Table 2 shows fit indices for the nested, reduced SEM and for the full SEM. Although model-fit χ^2 was large and statistically significant for both, this parameter tends to increase with sample size and must be interpreted in the context of other indices. As Table 2 shows, these demonstrated acceptable fit. The χ^2 change between the full and reduced models indicated that model-fit improved substantially by including respondents' childhood maltreatment, combat, and other high-magnitude stressor experiences. The full model explained 13% more variance in respondents' psychiatric symptoms than the reduced model and 5% more variance in their military sexual stress categorization.

Psychiatric symptoms.—The reduced model (see Supplementary Figure) demonstrated a direct, highly significant association between military sexual stress category and psychiatric symptoms ($B = 0.20$, $p < 0.001$). However, as Figure 1 shows, once respondents' other stressor experiences were controlled, this association attenuated by more than two-thirds and was no longer statistically significant ($B = 0.07$, $p = 0.24$). Instead, childhood maltreatment and other high-magnitude stressors emerged as positive correlates of psychiatric symptoms, though, unexpectedly, combat did not ($B = -0.01$, $p = 0.82$). Race and ethnicity were the only sociodemographic characteristics associated with psychiatric symptoms (Table 3).

Military sexual stressor category.—Significant correlates of military sexual stress category in the full model (Figure 1) included childhood maltreatment; reporting more high-magnitude stressors; and seeing the military as tolerating sexual harassment, which also fully mediated an inverse relationship between a supportive, professional work environment and military sexual stressor category. Being a job “gender-pioneer” was marginally associated with military sexual stressor category. Older age and male gender were inversely associated with military sexual stress category, as expected. Reporting some college experience was unexpectedly positively associated (Table 3).

Exploratory, two-group structural equation models

Childhood sexual abuse (CSA).—Contrary to expectations, we found no association between military sexual stressor category and psychiatric symptoms in those with (CSA+, n

=132) or without childhood sexual abuse history (CSA-, $n = 472$) after controlling for other stressor experiences ($B_{CSA+} = 0.09, p = 0.37$; $B_{CSA-} = 0.08, p = 0.11$).

Gender.—For both genders, military sexual stressor category was significantly associated with psychiatric symptoms in the reduced model ($B_{\text{reduced model-men}} = 0.16, p = 0.001$; $B_{\text{reduced model-women}} = 0.20, p < 0.01$) but not in the full model ($B_{\text{full model-men}} = 0.06, p = 0.31$; $B_{\text{full model-women}} = 0.09, p = 0.22$). In the full models' remaining paths, combat was inversely associated with women's psychiatric symptoms ($B_{\text{full model-women}} = -0.13, p < 0.05$) but not men's ($B_{\text{full model-men}} = 0.03, p = 0.57$); perceived organizational tolerance for sexual harassment was associated with men's psychiatric symptoms ($B_{\text{full model-men}} = 0.16, p < 0.05$) but not women's ($B_{\text{full model-women}} = 0.10, p = 0.24$); and being a job gender-pioneer was not associated with men's sexual stressor categorization ($B_{\text{full model-men}} = 0.01, p = 0.78$), but showed a stronger association for women's than in the main analysis ($B_{\text{full model-women}} = 0.15, p < 0.01$).

Discussion

Contrary to expectations, controlling for childhood maltreatment history and other high-magnitude stressors reduced military sexual stressors' association with psychiatric symptoms by a factor of almost three. While others have identified persisting associations between military sexual stress and psychiatric symptoms after controlling for childhood maltreatment alone (Rosen & Martin, 1998), combat alone (Kang, et al., 2005; Vogt, et al., 2005), or combat and intervening life stressors (Murdoch, et al., 2006; Wolfe et al., 1998), we found that when all three were controlled, the effects of childhood maltreatment and high-magnitude stressors on psychiatric symptoms surpassed that of military sexual stress by almost 3- to 5-fold. Other examples where comprehensively measured control stressors proved more influential on psychiatric symptoms than the targeted stressor include Solomon and colleagues' (2008) longitudinal study of Israeli soldiers and Briere and Elliot's (2000) national survey evaluating post-disaster sequelae. In Solomon et al., negative childhood and postwar events influenced veterans' current PTSD symptom severity far more substantially than did the dangerousness and intensity of their battle experiences, whereas in Briere and Elliot, disaster exposure contributed some unique variance to participants' PTSD symptoms, but the contribution of interpersonal violence exposure was about four to seven times greater.

As these studies show, even when focusing on one particular stressor type, one must account for participants' complex trauma histories to avoid misleading or biased results (Green et al., 2000). This may be especially true in military samples, where job-related trauma exposures are usually complex and multiple. Although combat is the best known military occupational stressor, on average, just 15% of troops serve in direct combat roles. Yet estimates of exposures to other traumas and high-magnitude stressors range from 60% to 97% in military samples (Bolton, et al., 2001; Freeman & Ryan, 1997; Seedat, et al., 2003; Stern et al., 2000). Furthermore, physical or sexual violence affects approximately 54% of women prior to entering the Armed Forces (Sadler, et al., 2004), while Merrill and colleagues (1997) identified a childhood sexual abuse rate of 22% in their mixed gender sample of US Navy Basic Trainees. Our sample's trauma and combat history is well in line with this.

Unexpectedly, combat exposure was not associated with reporting more psychiatric symptoms. Others have also failed to identify statistically significant associations between psychiatric symptoms and combat after controlling for other factors (e.g., Baker, et al., 1998; Vogt, et al., 2005) or, when findings were statistically significant, identified fairly small clinical effects. For example, in a sample of Somali peacekeepers, being fired on accounted for just 0.5% of the variance in men's PTSD symptoms (Fontana, et al., 2000). In a sample of former disability applicants, a more comprehensive combat measure accounted for only 2.7% of the variance in men's PTSD symptoms (Murdoch, et al., 2006). However, considerably larger associations (e.g., 26%–38% of the variance in PTSD symptoms) have been described in Vietnam Conflict veterans (Fontana & Rosenheck, 1994; Fontana, et al., 1997; King, et al., 1998). Although combat exposure in the present study was commensurate with that of the military overall at the time of data collection, their combat exposure scores suggest that they experienced lower combat severity than many Vietnam Conflict veterans.

Despite being a well-established risk factor for adult sexual victimization and interpersonal violence, childhood sexual abuse has only rarely been examined as a possible risk factor for military sexual stress. In the present paper, childhood maltreatment was associated with both psychiatric symptoms and military sexual stress, thus confounding what would otherwise have appeared to be a highly significant association between military sexual stress and psychiatric symptoms. Reasons childhood maltreatment might confer heightened risk for adult sexual victimization have not been satisfactorily worked out, though factors related to health, culture, socialization, religion, economics, and psychological processes may play roles (Sadler, et al., 2004). More recently, Binder, et al. (2008) have suggested that childhood maltreatment may alter some individuals' stress-gene expression, which then increases their PTSD risk when they are re-traumatized as adults. Unfortunately, when stressors are not measured comprehensively, linkages between earlier and later experiences may go unrecognized, and opportunities to prevent the later stressors, overlooked. For example, interventions directed toward troops maltreated as children might reduce their military sexual stressor experiences *and* their psychiatric symptoms. However, any such interventions would have to be carefully and sensitively implemented to avoid stigmatizing affected individuals (Robinson et al., 2008).

The need to inquire thoroughly about individuals' trauma histories is well exemplified by male combat veterans who, despite not meeting usual rape-victim stereotypes, report surprisingly high rates of sexual victimization (Murdoch, et al., 2004). Overall, military men experience job-related sexual stress at rates higher than civilian men. Because they outnumber military women by almost 6 to 1, the absolute numbers of men subjected to military sexual stressors may actually exceed that of women. Until men are routinely included in sexual stress research, however, providers will find it difficult to challenge inappropriate victim stereotypes (e.g., as being exclusively female or "weak"), which in turn may prevent male victims from disclosing and seeking help. Excluding men from sexual stress research also precludes identifying appropriate strategies to avert such stressors in men. With the possible exception of job gender-pioneer status, our data suggest that the predictors of military sexual stress are similar for men and women. Thus, interventions designed to reduce military sexual stress in one group would likely also benefit the other.

In contrast to individual factors, such as age or gender, workplace tolerance of sexual harassment is potentially modifiable. Consistent with others' research (Fitzgerald, et al., 1997; Rosen & Martin, 1997), it emerged as one of the most influential correlates of military sexual stressor category. This factor also correlated negatively with workplace professionalism and independently predicted troops' psychiatric symptoms. Even when troops are not personally targeted, ambient sexual harassment may demoralize them, make them fear being the next target, undercut their unit's cohesion, and lower their combat readiness (Harned, et al., 2002; Rosen & Martin, 1997; Stockdale, et al., 1999). Eradicating sexual harassment tolerance might therefore generate several benefits in addition to reducing sexual stressors. Our more in-depth examination of this suggests that targeting peers' and immediate supervisors' tolerance of sexual harassment for intervention might be more important than targeting senior officers' tolerance (Murdoch, et al., 2009).

This study's strengths include its relatively comprehensive assessment of childhood and other high-magnitude stressors; a broader, more inclusive definition of military sexual stress than most prior studies; the collection of data while participants were still in the military, thus minimizing recall errors; men's inclusion; and a sophisticated modeling strategy that examined the relationship between military sexual stress and psychiatric symptoms within the context of other influential factors. While modeling military sexual stress as an ordinal variable risked discarding variance and—consequently—type II error, the ordinal variable actually captured most of the three sexual stress measures' variance. Sensitivity analyses using several different modeling strategies (e.g., treating each stressor as an independent variable using the full range of its available scale) did not alter results. Study limitations include its cross-sectional design: cause-and-effect cannot be determined, and mono-method variance bias may have inflated the apparent associations between some variables. Stressors were treated as inputs into our model, and we did not assess their subjective impact. Although we used valid measures of psychiatric symptoms, these instruments cannot substitute for gold standard, clinical examinations. The response rate, while excellent, does not preclude non-response bias. Our absence of primary data from perpetrators regrettably applies to most existing studies.

We also studied a select sample of long-term military troops who carried several advantages that might have protected them from psychiatric distress, including relatively greater maturity, more education, and married status. Furthermore, our respondents maintained lengthy military careers despite describing levels of sexual stress comparable to the military overall (Bastian, et al., 1996; Rosen & Martin, 1998). Thus, they may have been naturally more resistant or resilient to military sexual stress than most US troops. These potential selection biases could have dampened any underlying associations between military sexual stress and psychiatric symptoms. Marines were also under-represented in our sample compared to general US Armed Forces. Thus findings may not apply to the Marine Corps. Our findings, while provocative, need to be interpreted cautiously, and replication in other samples using prospective designs is needed. Findings of the present study do not necessarily preclude a causal relationship between military sexual stress and psychiatric symptoms, but rather suggest that any such association must account for troops' other stressor experiences. Understanding how and why stressors inter-relate could lead to better, more effective interventions to reduce them all, as well as their sequelae.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Military Sexual Stress and Psychiatric Symptoms

Figure 1.

Active Duty Enrollees in the Department of Veterans Affairs Database, 2001–2003 ($N = 611$); Standardized regression coefficients (B) for the full structural equation model that included respondents' other stressor experiences.

Table 1.
Survey Respondents' Unadjusted Mean (SD) Scale Scores Overall and by Military Sexual Stressor Category

Scale	Overall		Military Sexual Stressor Category								F	df
			0: None n = 269		1: Either SH or SIC n = 193		2: Both SH & SIC n = 111		3: SH & SA +/- SIC n = 30			
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Psychiatric Symptoms:												
Posttraumatic stress disorder	15.5	10.5	14.9	9.4	17.8	1.0	21.9	11.5	23.7	12.1	15.7	3,558***
Depression	10.6	3.7	9.8	3.5	10.7	3.5	11.9	3.8	12.5	4.0	12.5	3,592***
Anxiety	1.0	1.0	0.8	0.9	0.9	0.9	1.2	1.0	1.5	1.0	9.8	3,590***
Somatization	3.9	3.4	3.0	3.0	3.8	3.2	5.3	3.8	6.4	3.9	19.2	3,569***
Other Stressors:												
Childhood Maltreatment												
Childhood physical abuse	11.6	4.6	10.8	4.2	11.8	4.8	12.9	4.8	12.8	5.5	6.9	3,593***
Childhood sexual abuse	5.0	2.6	4.3	1.2	5.3	2.6	5.5	3.2	7.8	4.8	22.7	3,592***
Childhood neglect	1.8	1.0	1.7	1.0	1.8	1.0	1.9	1.0	2.3	1.4	3.3	3,595*
Combat exposure	0.7	2.1	0.9	2.4	0.6	2.0	0.6	1.9	0.1	0.4	1.8	3,574
Other high-magnitude stressors	1.7	1.4	1.4	1.2	1.8	1.4	1.7	1.5	2.1	1.5	4.7	3,593***
Organizational Factors:												
Tolerance of sexual harassment	11.8	4.9	10.5	4.5	11.9	4.7	14.0	4.9	15.8	6.3	22.1	3,589***
Supportive, professional environment	18.9	6.1	19.5	6.0	19.7	6.0	16.7	6.1	16.9	5.1	7.1	3,525***

SD = Standard deviation; df = degrees of freedom; SH = Sexual harassment; SIC = Sexual identity challenges; SA = Sexual assault.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

Table 2.

Fit Statistics for Structural Equation Models Examining Psychiatric Symptoms and Military Sexual Stressor Category.

Model	Fit Indices				Variance (R^2) Explained		χ^2 -change	df
	χ^2	χ^2 df	CFI	RMSEA	RMSEA 95% CI	Psychiatric symptoms	MSS Category	
Nested, Reduced Model ^a	941.23	424 ***	0.91	0.045	0.041, 0.049	29%	29%	NA
Full Model	799.86	418 ***	0.93	0.039	0.035, 0.043	42%	34%	141.37 6 ***

df = degrees of freedom; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; CI = Confidence Intervals; MSS = Military Sexual Stressor; NA = Not Applicable.

 $p < 0.001$

^aThe nested, reduced model excludes childhood maltreatment, combat, and other high magnitude stressors, which are included in the full model.

Table 3.

Standardized Regression Coefficients (B) Between Socio-Demographic Characteristics, Psychiatric Symptoms, and Military Sexual Stressor Category in the Full Structural Equation Model

Characteristic	Outcome	
	Psychiatric Symptoms B	Military Sexual Stressor Category B
Age	−0.05	−0.17 **
Male gender	0.03	−0.31 ***
Hispanic ethnicity	−0.13 *	0.03
Black or African American	0.01	−0.07
Non-Hispanic, Non-black	0.14 *	−0.09
At least some college experience	0.01	0.11 **
Married	−0.04	−0.06
Warrant officer (compared to enlisted rank)	−0.05	0.00
Officer (compared to enlisted rank)	−0.04	0.04
Years in the military	−0.09	0.10

*
 $p < 0.05$

**
 $p < 0.01$

 $p < 0.001$