# Eating Disorders, Post-Traumatic Stress, and Sexual Trauma in Women Veterans

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**ABSTRACT** We examine lifetime eating disorders (EDOs) and associations with post-traumatic stress disorder (PTSD) and sexual trauma during various stages of the life course (childhood, during military service, and lifetime) among women veterans. The sample included 1,004 women aged 20 to 52 years who had enrolled at 2 Midwestern Veterans Affairs Medical Centers or outlying clinics completed a retrospective telephone interview. Over 16% reported a lifetime EDO (4.7% had received a diagnosis, and an additional 11.5% self-reported suffering from an EDO). Associations were found between lifetime EDO, PTSD, and sexual trauma. Relationships maintained significance for both diagnosed and self-reported EDOs as well as lifetime completed rape and attempted sexual assaults. Sexual trauma during military service was more strongly associated with lifetime EDOs than childhood sexual trauma. The significant associations found between EDOs, PTSD, and sexual trauma indicate that EDO screening among women veterans with PTSD or histories of sexual trauma may be warranted.

## INTRODUCTION

Eating disorders (EDOs) in military and veteran populations have begun to be investigated in recent years. The few estimates of either lifetime or current EDO prevalence have varied across studies, in part because of methodological differences. Striegel-Moore et al[1] found that 0.3% of hospitalized veterans had a current EDO diagnosis, whereas another medical record review study of U.S. military service members determined an annual incidence of 0.4% in 2006[2] among active duty service members. Given that females are approximately 10 times as likely as males to have a current or lifetime EDO,[3] studies focused on women service members or veterans have found higher prevalence estimates. Using self-reported information collected via survey methodology, studies have estimated that 8% of active duty women[4] and 5% of U.S. Military Academy female cadets have a lifetime history of EDOs.[5] A study by McNulty et al[6] conducted on active duty service women found that 1.1% reported anorexia nervosa, 8.1% reported bulimia nervosa, and 62.8% reported eating disorder-not otherwise specified. In addition, approximately one-fifth to one-third of active duty women engage in behaviors that put them at risk for developing an EDO[7,8] based on self-reported screening instruments.

Service members may be at increased risk for EDOs, given the weight standards requirements of recruits.[9–11] EDOs are an important area of investigation in military and veteran populations, given the increasing incidence[2] and increased risk of premature mortality, functional impairment, and medical conditions including cardiovascular, renal, and endocrine dysfunction among those suffering from EDOs. In addition, whereas there is an increased risk of comorbidity with other psychiatric disorders,[1] the relationship among these requires clarification.

In addition, there appears to be a significant association between traumatic events (as well as potential sequelae of traumatic events like post-traumatic stress disorder [PTSD]) and EDOs. Several studies have found that individuals with a current or lifetime EDO are more likely to report experiences of traumatic events and dissociation.[12–15] Specific types of trauma such as childhood maltreatment[16] and childhood sexual abuse have been identified as risk factors for EDOs,[13,17–25] with about one-half of patients with an EDO also having a history of sexual abuse.[18,26] In addition to traumatic events, significant associations have been found between EDO pathology and symptoms of PTSD.[27–29] A study by Tagay et al[30] found that 10% of patients with anorexia nervosa and 14.1% of patients with bulimia nervosa experienced concurrent PTSD.

The association between traumatic events, PTSD, and EDOs also appears to have a synergistic effect, with the presence of two risk factors increasing the likelihood of the other occurring. For example, traumatic events have been found to increase the risk of psychiatric comorbidity, including PTSD in those with EDOs.[13] The presence of synergistic risk factors also appears to increase the risk of other psychopathology. For example, a study by Fullerton et al[31] found that female EDO patients who were sexually abused as children suffered more depression than patients who were not sexually abused. Other research has determined an association between recent adult sexual assault and current EDO symptoms, even after controlling for childhood sexual abuse.[32] These relationships, however, have not been widely studied.

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The associations between EDOs, traumatic events and PTSD found in civilian female samples have not been thoroughly investigated in military and veteran populations. Although one study by Striegel-Moore et al[1] found that hospitalized veterans with a medical record diagnosis of an EDO had a significantly elevated risk of co-occurring PTSD, the associations have not been replicated. In an attempt to address this research gap as well as the paucity of evidence examining the association between trauma, PTSD, and EDOs in military and veteran populations, this study has several objectives. First, this study will examine lifetime self-reported and diagnosed EDOs and related attitudes and behaviors in a sample of Veterans Affairs (VA)-enrolled women veterans. Second, this study will examine the association between sexual trauma during various stages of the life course (childhood, during military service, and lifetime), PTSD, and EDOs.

## METHODS

### Materials and Methods

*Sample and Sources of Data*

This was a cross-sectional study that examined 1,004 women ≤51 years of age who had enrolled at two Midwestern VA Medical Centers or outlying clinics within the 5 years preceding study interviews (July 2005 through August 2008). Women veterans enrolled after June 2005 and before the study completion were periodically identified and added to the cohort. VA enrollment could have been initiated to receive health care, complete a disability claim, enroll in a registry, or in response to veteran outreach.

An introductory letter and consent forms with postage-paid, preaddressed return envelopes were mailed to 2,414 potential subjects providing them with a toll-free number so that they could address any further questions, schedule interviews, or refuse participation. Two weeks following the introductory letter, potential subjects not initiating contact were recruited by telephone. Institutional Review Board-approved mail and phone protocols were continued until contact was made or subjects were deemed unreachable. When address or phone problems occurred, effort was taken to find current contact information using internet white pages, VA's Computerized Patient Record System, and Accurint (a confidential Lexis Nexis research tool).[33] Of the 2,414 potential subjects, 707 were unreachable, 30 were ineligible, and 7 were deceased. Sixty-nine percent (1,670/2,414) of the sample were located and invited to participate in the study. One thousand, fifty-five subjects consented to participate, resulting in a response rate of 63%. Women refusing participation were asked why they refused and to answer three questions related to the original purpose of the study (gynecologic health) to allow comparison with participants: (1) "In general would you say your health is: excellent, very good, good, fair, or poor?"; (2) "Have you ever been told you have had an abnormal Pap smear?"; and, (3) "In the last year, approximately how many times have you seen a doctor or health care provider for gynecologic health issues?" No significant differences were found between participants and refusers with regard to average age (38.3 years vs. 37.9 years), self-report of very good or excellent health (43.5% vs. 45.1%), number of gynecologic visits in last year (2.1 vs. 1.7), or ever being told by a provider they had an abnormal Pap test (56.9% vs. 51.2%).

For reasons related to the original study of gynecologic health,[34] screening before interview excluded women who were (1) aware of in utero diethylstilbesterol exposure ($n = 10$), (2) currently receiving treatment with immunosupressants ($n = 7$), or (3) greater than age 51 years at time of sample selection ($n = 3$). One woman turned 52 at time of interview, which is the age reported herein. An additional 21 subjects could not be reached by phone and 13 were unable to complete the interview, resulting in 1,004 subjects who completed the interview. The study was approved by the University of Iowa and Iowa City VA Medical Center Institutional Review Boards.

Following return of signed consents and meeting inclusion criteria, participants completed a computer-assisted telephone interview (CATI). The CATI provides a structured interview that standardizes interviews across participants. Participants were asked questions and almost always given the response options (e.g., yes/no, agree/disagree, etc.). The only "open response" items were ones that couldn't be reduced to a small finite set of options (e.g., age), although on many of these, appropriate ranges were programmed into the interview (e.g., ages 18–60 years). This was done to increase the reliability and validity of the data collected. Skip patterns were also programmed into the tailored interview such that questions that did not apply to a specific participant were not asked. For example, if a woman never experienced a sexual assault, then follow-up questions, such as when and where, were not asked. Every item included response options "Don't know" and "Refuse." Interviewers did not probe further into responses of "Don't know" or "Refuse."

The CATI assessed demographics and service-related characteristics, health history including eating and weight-related thoughts and behaviors, as well as reports of ever having had an EDO and reported lifetime mental disorder diagnoses including EDOs, PTSD, depression and substance use (alcohol or drug) disorders (abuse or dependence), smoking, self-reported weight and exercise, and sexual assault experiences (lifetime, during military service, and during childhood). The average interview took 1 hour and 16 minutes in length, and the majority of subjects (89%) completed it in one call. Subjects who completed the interview were reimbursed $30.00 for their participation.

*Measures*

The primary outcome for this study was a three-level variable regarding ever having an EDO. If a woman responded "yes" to the question, "have you ever been diagnosed with an eating disorder?," she was coded as having a diagnosed lifetime eating disorder (DX-EDO). Otherwise, if a women responded

"yes" to the question, "have you ever suffered from an eating disorder?," she was coded as having a lifetime EDO. If a woman responded "no" to both EDO survey questions, she was assigned as having no lifetime EDO (NO-EDO), which was used as the reference category in analyses.

The main independent variables of interest included (1) ever diagnosed with PTSD and (2) sexual trauma experiences at any time during lifetime, during military service, and during childhood (less than 18 years old). PTSD was queried with the question "Have you ever been diagnosed with PTSD?" Sexual traumas were queried with multiple questions regarding the type and time period of attempted sexual assaults and completed rapes. Responses to the sexual trauma questions were collapsed into three mutually exclusive categories: completed rape, attempted sexual assault (no reported completed rape), and no sexual trauma (no reported completed rape or attempted sexual assault). Completed rape was assessed using the legal definition adopted by the American Medical Association and the American College of Obstetricians and Gynecologists, and commonly used in sexual violence research (American Medical[35] and American College of Obstetricians[36]). If a respondent answered "yes" to any of the questions assessing completed sexual penetration of the vagina, mouth, or anus using force or threat of harm, she was coded as having a completed rape. Otherwise, if she reported "yes" to the attempted sexual assault question, "has anyone, male or female, using force or threat of harm, ever attempted to sexually assault you? By attempted sexual assault, I mean that an attempt was made but penetration did not occur," she was coded as having an attempted sexual assault. If the respondent answered "no" to both the completed rape and the attempted sexual assault question, she was coded as having no sexual trauma. Three sexual trauma variables were created using this algorithm, each corresponding to a different time period: (1) lifetime (completed rape, attempted sexual assault, no sexual trauma ever), (2) during military service (completed rape, attempted sexual assault, no sexual trauma during military service), and (3) during childhood before 18 years old (completed rape, attempted sexual assault, no sexual trauma before 18 years old).

Patient demographics included age (grouped into ages 20–34, 35–44, and 45–52), race/ethnicity (white, nonwhite, multi [more than one racial/ethnicity]), education level (high school, some college or technical training, or completed college or graduate training), employment (employed, retired, student, or unemployed), and marital status (married, divorced, or single). Service-related characteristics included service (Active Component [AC] only, Reserve or National Guard (RNG) only, or both AC and RNG), pay grade (officer or enlisted), and service in a military combat area or war zone. Behavioral characteristics included current weight category based on self-reported height and weight (underweight body mass index [BMI] <19, normal weight BMI 19–25, overweight BMI 25–30, obese BMI 30+), and exercise (none, 1–90 min/wk, more than 90 min/wk). Eating and weight-related thoughts and behaviors included self-reported satisfaction with eating patterns, eating in secret, and agreement with the statement "weight affects how I feel." Lifetime mental disorder diagnoses (self-reported) included depression and substance use (alcohol or drug) disorders (abuse or dependence).

### *Analyses*

Examination of univariate frequencies of all study variables, bivariate crosstabs, and $\chi^2$ analyses were conducted between the three-level lifetime EDO indicator (DX-EDO, EDO, and NO-EDO) and each demographic, service-related, behavioral, sexual trauma, and mental disorder variable of interest, including PTSD. Next, the proportion of the sample who had each individual or combined experiences of a lifetime EDO (either DX-EDO or EDO), lifetime sexual trauma (completed rape or attempted sexual assault), or PTSD diagnosis were calculated to evaluate the extent of overlap of these experiences. Next, both unadjusted and adjusted multinomial regression models were constructed to determine whether each three-level sexual trauma variable and PTSD diagnosis was significantly related to the three-level EDO outcome variable (DX-EDO, EDO, and NO-EDO). The NO-EDO group was used as the reference category; thus, odds ratios (ORs) were reported for the DX-EDO group vs. the NO-EDO group and the EDO group vs. the NO-EDO group in each multinomial regression model. Each adjusted model included age, race/ethnicity, education, employment, marital status, service, served in combat/war zone, weight category, weekly exercise, lifetime depression diagnosis, and lifetime substance use (drug or alcohol) disorder (abuse or dependence) as covariates. The first adjusted model included PTSD diagnosis, the three-level lifetime sexual trauma variable (lifetime completed rape, attempted sexual assault, no sexual trauma [reference group]), and covariates. The second adjusted model included PTSD diagnosis, the three-level sexual trauma during military service variable (completed rape, attempted sexual assault, no sexual trauma during military service [reference group]), and covariates. The third adjusted model included PTSD diagnosis, the three-level sexual trauma during childhood variable (completed rape, attempted sexual assault, no sexual trauma during childhood [reference]), and covariates. The presence of a significant interaction between each sexual trauma variable (lifetime, military, childhood) and PTSD diagnosis was also evaluated in each adjusted model.

Missing categorical data resulted in the listwise exclusion of less than 1.5% of participants in adjusted analyses. Analyses were conducted at the two-tailed $p < 0.05$ level of significance, performed with SAS 9.2 software.

## RESULTS

Female veterans ($n$ = 1,004) enrolled in one of two Iowa VA Medical Centers (Iowa City or Des Moines) ranged in age from 20 to 52 years old at time of interview (Table 1). Most (79.9%) were White, reported completing at least some college or technical training (56.4%), were employed (51.6%) and

**TABLE I.** Characteristics of Female Veteran Sample ($N$ = 1,004)

| Characteristic | Overall ($n$, %) |
|---|---|
| Demographics | |
| Age Group | |
| 20–34 | 334 (33.3) |
| 35–44 | 346 (34.5) |
| 45–52 | 324 (32.3) |
| Race/Ethnicity | |
| White | 802 (79.9) |
| Nonwhite | 99 (9.9) |
| Multi | 103 (10.3) |
| Education | |
| Completed College or Graduate Training | 285 (28.4) |
| Some College/Technical Training | 566 (56.4) |
| High School | 153 (15.2) |
| Employment | |
| Employed | 518 (51.6) |
| Retired | 30 (3.0) |
| Student | 242 (24.1) |
| Unemployed | 214 (21.3) |
| Marital Status | |
| Married | 441 (43.9) |
| Divorced | 333 (33.2) |
| Single | 230 (22.9) |
| Service-Related | |
| Service | |
| AC Only | 598 (59.6) |
| RNG Only | 124 (12.4) |
| Both AC and RNG | 282 (28.1) |
| Served in Military Combat Area/War Zone | |
| Yes | 296 (29.5) |
| No | 708 (70.5) |
| Behavioral | |
| Weight Category | |
| Underweight (BMI < 19) | 22 (2.2) |
| Healthy Weight (19 ≤ BMI < 25) | 332 (33.1) |
| Overweight (25 ≤ BMI < 30) | 313 (31.2) |
| Obese (BMI ≥ 30) | 337 (33.6) |
| Exercise | |
| None | 280 (28.0) |
| 1–90 min/wk | 316 (31.6) |
| More Than 90 min/wk | 403 (40.3) |
| Sexual Trauma | |
| Sexual Trauma-Lifetime | |
| Completed Rape | 511 (50.9) |
| Attempted Sexual Assault | 109 (10.9) |
| None | 384 (38.3) |
| Sexual Trauma During Military Service | |
| Completed Rape | 247 (24.6) |
| Attempted Sexual Assault | 79 (7.9) |
| None | 678 (67.5) |
| Sexual Trauma during Childhood | |
| Completed Rape | 311 (31.0) |
| Attempted Sexual Assault | 100 (10.0) |
| None | 593 (59.1) |
| Mental Health/Substance Use | |
| Lifetime EDO | |
| Diagnosed | 47 (4.7) |
| Self-reported Only | 115 (11.5) |
| None | 842 (83.9) |
| Lifetime Diagnosed PTSD | |
| Yes | 247 (24.6) |
| No | 757 (75.4) |
| Lifetime Diagnosed Depression | |
| Yes | 304 (30.3) |
| No | 700 (69.7) |
| Lifetime Alcohol or Drug Abuse or Dependence | |
| Yes | 346 (34.5) |
| No | 658 (65.5) |

married (43.9%). A majority served in the AC only (59.6%), whereas 28.1% served on both AC and RNG duties. Approximately 30% reported serving in a military combat area or war zone.

Weight category mirrored that of the general U.S. population, with about 64.8% being overweight or obese. Although 28% reported no weekly exercise, over 40% reported exercising 90 or more min/wk. Slightly over 30% reported receiving a lifetime diagnosis of depression, whereas 34.5% reported receiving a lifetime diagnosis of drug or alcohol abuse or dependence.

Overall, nearly 62% of respondents reported at least one attempted or completed sexual trauma during their lifetime, nearly 51% reported at least one completed rape, and an additional 10.9% reported attempted sexual assault solely. Almost one-third (32.5%) of respondents reported sexual trauma during military service (24.6% completed rape and an additional 7.9% attempted sexual assault). About two in five respondents (41.0%) reported sexual trauma during childhood (31% completed rape and an additional 10.0% attempted sexual assault). In addition, about one in five (24.6%) reported lifetime PTSD diagnosis.

Over 16% of respondents reported a lifetime EDO (4.7% diagnosed and an additional 11.5% self-reported). Most women with a reported lifetime EDO (92%) reported receiving all or some of their medical care at a VA Medical Center during the past 5 years. In addition, less than half of respondents reported satisfaction with their eating patterns, two-thirds reported that weight affects how they feel, and over 10% reported eating in secret. (data not shown).

Table II presents the proportion of respondents with diagnosed and self-reported lifetime EDOs (DX-EDO and EDO) within each sexual trauma and PTSD category. All of the sexual trauma variables were significantly associated with lifetime EDOs using $\chi^2$ analyses. Women with lifetime PTSD or who reported sexual trauma during military service or lifetime were about twice as likely to have a diagnosed or self-reported lifetime EDO than women without PTSD or military or lifetime sexual trauma, respectively. Women who reported completed rape during childhood were about three times as likely to report a lifetime DX-EDO as compared to women with no sexual trauma during childhood (8.7% vs. 2.7%). In addition, of the covariates tested in bivariate analyses, respondents with more education and those who reported being divorced were more likely to have

**TABLE II.** Associations Between Sexual Trauma, PTSD, and EDOs Among Female Veterans ($N$ = 1,004)

| Characteristic | Lifetime Diagnosed With an EDO ($N$ = 47), $n$ (%) | Lifetime Suffered From an EDO Only ($N$ = 115), $n$ (%) |
|---|---|---|
| Sexual Trauma-Lifetime | | |
| Completed Rape ($n$ = 511) | 36 (7.1) | 76 (14.9) |
| Attempted Sexual Assault ($n$ = 109) | 6 (5.5) | 15 (13.8) |
| None ($n$ = 384) | 5 (1.3) | 24 (6.3) |
| Sexual Trauma During Military Service | | |
| Completed Rape ($n$ = 247) | 20 (8.1) | 45 (18.2) |
| Attempted Sexual Assault ($n$ = 79) | 6 (7.6) | 12 (15.2) |
| None ($n$ = 678) | 21 (3.1) | 58 (8.6) |
| Sexual Trauma During Childhood | | |
| Completed Rape ($n$ = 311) | 27 (8.7) | 41 (13.2) |
| Attempted Sexual Assault ($n$ = 100) | 4 (4.0) | 14 (14.0) |
| None ($n$ = 593) | 16 (2.7) | 60 (10.1) |
| Lifetime Diagnosed With PTSD | | |
| Yes ($n$ = 247) | 18 (7.3) | 46 (18.6) |
| No ($n$ = 757) | 29 (3.8) | 69 (9.1) |

All $\chi^2$ associations significant at $p < 0.001$.

had an EDO than respondents with less education and married or single respondents, respectively, as did respondents with lifetime depression diagnoses or alcohol or drug abuse or dependence (data not shown).

Upon examination of the proportion of women with different combinations of lifetime EDO, PTSD, and sexual trauma experiences, 31.6% did not report any of these three experiences, whereas 5.9% reported having all three experiences (Table III). There was substantial overlap between PTSD and sexual trauma (14.7% of the sample) and between EDO and sexual trauma (7.4% of the sample) as well.

Multivariate models adjusted for demographic, service-level, behavioral, and other mental health characteristics of the sample revealed significant associations between PTSD and EDOs as well as sexual trauma and EDOs (Table IV). In each adjusted model examining the association between lifetime PTSD, sexual trauma during various time periods, and lifetime EDOs, those with PTSD were significantly more likely to have lifetime EDO, but not DX-EDO, than those without PTSD. In addition, women with lifetime completed rape or attempted sexual assault were over four times as likely to have lifetime DX-EDO and over twice as likely to have lifetime EDO than women with no lifetime sexual trauma. Similarly, women with completed rape during military service were over twice as likely as women with no sexual trauma to also report lifetime DX-EDO (OR = 2.28, 95% confidence interval [CI] = 1.12–4.64) and nearly twice as likely as women with no sexual trauma to also report a lifetime EDO (OR = 1.84, 95% CI = 1.15–2.95). Although women with an attempted sexual assault during military service (but no completed rape) were over three times as likely as women with no sexual trauma during military service to have lifetime DX-EDO (OR = 3.05, 95% CI = 1.09–8.54); they were not significantly more likely to have lifetime EDO (OR = 1.76, 95% CI = 0.85–3.63). The only significant association between sexual trauma during childhood and lifetime EDOs was women with completed rape during childhood being more likely to have a DX-EDO than women with no sexual trauma during childhood (OR = 3.07, 95% CI = 1.54–6.12). The relationships between attempted sexual assaults during childhood and EDOs and between completed rape during childhood and EDO failed to reach statistical significance. No significant interactions were found between PTSD and sexual trauma variables in any of the models tested.

**TABLE III.** Overlap of EDOs,[a], PTSD,[b] and Sexual Trauma[c] Among Female Veterans ($N$ = 1,000)

| Combination of Experiences | $n$ (%) |
|---|---|
| Sexual Trauma Only | 340 (34.0) |
| None | 316 (31.6) |
| Sexual Trauma and PTSD | 147 (14.7) |
| Sexual Trauma and Eating Disorder | 74 (7.4) |
| Sexual Trauma, PTSD, and Eating Disorder | 59 (5.9) |
| PTSD Only | 36 (3.6) |
| Eating Disorder Only | 24 (2.4) |
| PTSD and EDO Only | 4 (0.4) |
| Total | 1,000 (100) |

[a]Lifetime diagnosed or ever suffered from an EDO. [b]Lifetime diagnosed with PTSD. [c]Lifetime completed rape or attempted sexual assault.

## DISCUSSION

In the current study, over 16% of the sample of women veterans reported a lifetime EDO, with nearly 5% reporting a lifetime DX-EDO. These estimates fall within the range of prior self-reported survey estimates of EDOs among female military samples. The current study additionally found significant eating and weight-related impairment among women veterans. For example, one in ten women reported eating in secret, most (2/3) reported that weight affected how they felt, and nearly half were unsatisfied with their eating patterns, which are reflective of other national investigations of weight-related thoughts and behaviors in nationwide samples of women.[37,38]

**TABLE IV.** Bivariate and Multivariate Models Examining the Relationship between Sexual Trauma, PTSD, and EDOs among Female Veterans[a]

| | Lifetime Diagnosed with an EDO OR (95% CI) | Lifetime Suffered From an EDO Only OR (95% CI) |
|---|---|---|
| Unadjusted Models | | |
| Lifetime PTSD Diagnosis | 2.24 (1.21–4.12) | 2.40 (1.60–3.61) |
| Lifetime Completed Rape | 6.41 (2.49–16.5) | 2.82 (1.74–4.56) |
| Lifetime Attempted Sexual Assault | 4.84 (1.49–16.2) | 2.52 (1.27–5.01) |
| No Lifetime Sexual Trauma | REF | REF |
| Completed Rape During Military Service | 3.14 (1.66–5.91) | 2.55 (1.67–3.90) |
| Attempted Sexual Assault During Military Service | 2.81 (1.09–7.22) | 2.03 (1.03–3.99) |
| No Sexual Trauma During Military Service | REF | REF |
| Completed Rape During Childhood | 3.59 (1.90–6.79) | 1.45 (0.95–2.23) |
| Attempted Sexual Assault During Childhood | 1.58 (0.51–4.83) | 1.47 (0.79–2.75) |
| No Sexual Trauma During Childhood | REF | REF |
| Adjusted Models[b] | | |
| Model 1: Sexual Trauma-Lifetime | | |
| Lifetime PTSD Diagnosis | 1.02 (0.49–2.12) | 1.77 (1.09–2.84) |
| Lifetime Completed Rape | 4.82 (1.74–13.3) | 2.05 (1.20–3.50) |
| Lifetime Attempted Sexual Assault | 4.43 (1.27–15.5) | 2.09 (1.02–4.27) |
| Model 2: Sexual Trauma During Military Service | | |
| Lifetime PTSD Diagnosis | 1.09 (0.51–2.31) | 1.73 (1.07–2.81) |
| Completed Rape During Military Service | 2.28 (1.12–4.64) | 1.84 (1.15–2.95) |
| Attempted Sexual Assault During Military Service | 3.05 (1.09–8.54) | 1.76 (0.85–3.63) |
| Model 3: Sexual Trauma During Childhood | | |
| Lifetime PTSD Diagnosis | 1.26 (0.61–2.59) | 2.00 (1.26–3.19) |
| Completed Rate During Childhood | 3.07 (1.54–6.12) | 1.19 (0.75–1.89) |
| Attempted Sexual Assault During Childhood | 1.41 (0.44–4.54) | 1.34 (0.69–2.59) |

[a]Multinomial regression models comparing lifetime diagnosed with an EDO and lifetime ever suffered from an EDO to no lifetime EDO (reference). [b]Models adjusted for age, race/ethnicity, education, employment, marital status, service, served in combat/war zone, weight category, exercise activity, lifetime depression diagnosis, lifetime drug or alcohol abuse or dependence.

Analogous to previous research findings in civilian samples, significant relationships were found between sexual trauma, PTSD, and EDOs in this study of women veterans. Significant associations were found in models adjusting for potential confounders between PTSD and lifetime EDOs as well as sexual trauma throughout the life course (childhood, during military service, lifetime) and lifetime EDOs, with few exceptions. First, PTSD was significantly associated with EDO but not DX-EDO. Second, there was a significant association between both lifetime EDO categories (DX-EDO and EDO) and both types of lifetime sexual trauma (completed rape and attempted sexual assault). Third, completed rape during military service was significantly associated with both lifetime DX-EDO and EDO; yet, attempted sexual assault during military service (with no completed rape during military service) was only significantly associated with DX-EDO and not EDO. Finally, only completed rape, and not attempted sexual assault, during childhood was significantly associated with DX-EDO and not EDO.

Several of the associations may have failed to reach statistical significance given that few reported DX-EDO ($n = 47$) in this sample, coupled with relatively low sample sizes of those reporting attempted sexual assault without also reporting a completed rape. Our findings, however, fail to support previous findings showing strong links between childhood sexual trauma and EDOs. Most prior studies have focused on more global measures of child sexual trauma rather than separating completed rape from attempted sexual assaults during childhood (e.g., Smolak and Murnen[19]). It will be important to replicate our finding of only completed childhood rape (and not attempted sexual assault) being significantly associated with diagnosed EDOs in future studies to determine its validity. The current study found a more consistent association between sexual trauma during military service and lifetime EDOs as compared to the relationship between childhood sexual trauma and lifetime EDOs.

Various studies have hypothesized the explanatory mechanism for the relationship between trauma and EDOs. One potential explanation involves the association having a biological basis as evidenced by dexamethasone suppression test results of trauma and EDOs mirroring that found in posttraumatic stress syndromes.[39] In fact, weight loss experienced in some individuals with EDOs appears to lead to physiological changes that increase susceptibility to PTSD.[40] In addition, hypothalamic pituitary axis dysregulation has been associated with both EDO behaviors like binge eating and traumatic events.[41] More psychopathological explanations for the link between traumatic events and EDOs include EDO development as a way to gain a sense of control, "purify" the "damaged self," and regulate the overwhelming affective state that results from the experience of the trauma,[42] possibly as a result of dissociation following the sexual trauma.[12]

The current study is not without limitations. First, only women veterans who were enrolled at two Midwestern U.S. VA Medical Center or outlying clinics and who agreed to participate (response rate = 63%) comprised the sample, thus reducing the generalizability of findings. Given that the sample was not racially or ethnically diverse, the proportion of women reporting lifetime EDOs and significant associations found in the current study may not apply to all veterans, particularly those who are not VA-enrolled. Second, lifetime EDOs were not assessed with standardized diagnostic instruments, decreasing the reliability of the psychiatric assessment. Comparisons of self-reported chronic diseases to administrative database diagnoses in veterans receiving care in VA health care system have revealed that self-reports have high specificity (88%–100%) but low to moderate sensitivity (24%–78%).[43] Third, the survey assessed age of first diagnosis but not age at onset of EDOs and PTSD, which could be very disparate ages given the length of time in between onset and diagnosis for these disorders. Thus, the assessment of temporal associations and the direction of causality between EDOs and trauma could not be made, preventing conclusions about whether trauma precedes EDOs or whether EDO development places individuals at higher risk of later onset of trauma. Finally, since the only type of trauma investigated in this article was sexual trauma, which our prior research conducted on this sample of women veterans has identified as the worst type of trauma,[44] the current investigation is unable to make conclusions about the associations between EDOs and other types of trauma.

The current study, however, was conducted on a large group of women veterans, increasing the power to detect significant associations and ability to look at a number of different associations while adjusting the analyses for potential confounders. Examining various degrees of sexual trauma (completed rape and attempted sexual assault) over the life course and EDOs (diagnosed and self-reported only) lends validity to the findings. The survey's assessment of a number of different health conditions, demographic variables, and military exposures made the investigation of these important investigations possible. Future studies can capitalize on these findings by investigating these relationships in more generalizable samples such as women veterans from other VA Medical Centers, women veterans who do not seek care from the VA, and men veterans. Also, future studies can build on the results of the current study by using standardized diagnostic tools to assess Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition (DSM-IV)[45] diagnoses of EDOs (including details related to onset and course of illness) as well as query study participants about single vs. multiple sexual and other types of trauma exposures.

Given the recurrent nature of EDOs,[46,47] high rate of comorbidity with other psychiatric disorders[48,49] and other health concerns,[50,51] and high likelihood of transmitting eating disordered behaviors to female children,[52] women veterans should be screened and monitored for EDOs accordingly. This is particularly true for women veterans who have or have had PTSD or who have a history of sexual trauma exposure. The high proportion of women veterans who reported sexual trauma in this sample indicates that many women veterans are likely at high risk for having or developing EDOs. Many of these women currently receive all or some of their medical care at a VA Medical Center as indicated by the 92% of the women with a reported lifetime EDO in the current study sample also reporting that they have received all or some of their medical care at a VA Medical Center during the past 5 years. Additional education in the early identification and treatment of EDOs using a multidisciplinary team approach for VA providers may be warranted. Improvements in screening and referral to appropriate providers with the capability to treat EDOs may limit lost productivity and morbidity associated with EDOs and comorbid conditions, ultimately resulting in significant cost savings to the VA health care system.

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