

## Eating Disorders in Military and Veteran Men and Women: A Systematic Review

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### ABSTRACT

**Objective:** Eating disorders (EDs) have serious consequences for psychological and physical health. They have high mortality rates and are among the most costly disorders to treat. However, EDs remain understudied in military and veteran populations. The aim of this review was to examine prevalence estimates and associated symptomatology of EDs among military and veteran men and women and to identify factors that may put these individuals at risk for the development of an ED for the purposes of improving detection, intervention, and treatment.

**Method:** A thorough literature review was conducted using the databases PsycINFO and PubMed. All articles with a focus on EDs in military/veteran samples were considered.

**Resumen:** Objetivo: Los Trastornos de la Conducta Alimentaria (TCA) tienen consecuencias serias en la salud física y psicológica. Tienen un alto rango de mortalidad y figuran entre las enfermedades más costosas de tratamiento. Sin embargo, los TCA continúan siendo subestudiados en las poblaciones militares y veteranas. El objetivo de esta revisión fue examinar los estimados de prevalencia y sintomatología asociada de TCAs entre hombres y mujeres militares y veteranos e identificar los factores que ponen a estos individuos en riesgo para el desarrollo de un TCA con la intención de mejorar la detección, intervención y tratamiento. Método: Se hizo una extensa revisión de la literatura utilizando las bases de datos de PsycINFO y PubMed. Se consideraron todos los artículos con un enfoque en muestras de TCAs en militares/veteranos.

**Results:** Studies reveal high prevalence estimates of EDs among military/veteran men and women. Unique features of military life may increase the risk for development of an ED, including: military sexual trauma, strict weight and physical fitness requirements, and combat exposure. A history of trauma was common in individuals diagnosed with an ED in military and veteran samples.

**Discussion:** The high rates of EDs among military and veteran samples underscore the importance of further research, as well as the importance of screening and intervention efforts, in these understudied populations. © 2015 Wiley Periodicals, Inc.

**Keywords:** eating disorders; veterans; military; women; men

**Resultados:** Los estudios revelaron estimados altos de prevalencia de TCAs entre hombres y mujeres militares/veteranos. Algunas características únicas de la vida militar pueden incrementar el riesgo de desarrollar un TCA, incluyendo: trauma sexual militar, requerimientos estrictos de peso y condición física, y exposición al combate. La historia de trauma fue común entre los individuos diagnosticados con TCA en las muestras de militares y veteranos. Discusión: Los altos rangos de TCAs entre las muestras de militares y veteranos nos subrayan la importancia de investigaciones futuras, así como la importancia de los esfuerzos de detección e intervención, en estas poblaciones subestudiadas.

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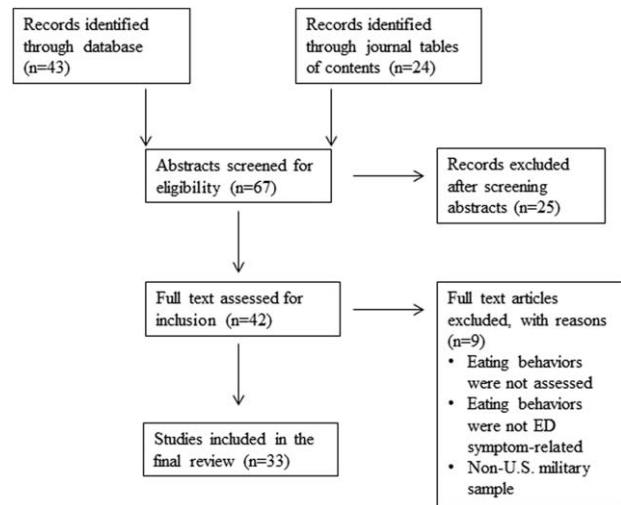
## Introduction

Eating disorders (EDs) are complex in origin, with research implicating cultural, environmental, biological, and genetic etiologic factors.<sup>1-3</sup> EDs have been associated with serious medical morbidities and represent a considerable economic burden to society.<sup>4</sup> A recent review found that annual costs per patient diagnosed with an ED ranged from 1,288 to 8,042 U.S. dollars.<sup>5</sup> Further, anorexia nervosa (AN) is associated with the highest mortality rate of any psychiatric disorder.<sup>6</sup>

Military and veteran populations have long been understudied with respect to EDs, possibly due to the misperception that EDs affect primarily women<sup>7</sup> and therefore are not relevant to these traditionally male groups. Although the majority of ED cases are women, rates are higher in men than previously thought.<sup>8</sup> In a U.S. nationally representative sample, lifetime prevalence estimates for AN, bulimia nervosa (BN), and binge-eating disorder (BED) were .9%, 1.5%, and 3.5% among women and .3%, .5%, and 2.0%, respectively, among men.<sup>8</sup> Moreover, although it has been suggested that military and veteran men and women may be at risk for developing EDs,<sup>9-11</sup> relatively few investigations have been conducted in these populations. To date, there have been two studies of EDs among all current military service members,<sup>12,13</sup> one study of EDs in a nationally representative sample of military service men and women,<sup>14</sup> and none in a nationally representative sample of veterans. Women are a rapidly growing segment of military and veteran populations.<sup>15</sup> The changing demographics in the military as well as the high rates of mental health disorders among military service members and veterans<sup>16,17</sup> underscore the need for investigation of EDs in these samples.

Similar to the general population, military and veteran men and women with EDs have high rates of psychiatric comorbidity, including post-traumatic stress disorder (PTSD), depression, anxiety, and substance abuse.<sup>16,18,19</sup> In addition to high rates of trauma and psychological conditions comorbid with EDs, there are specific features of military life that potentially can increase the risk for the development of an ED among military service members and veterans, including: strict physical fitness requirements; weigh-ins and weight regulations; deployment; the possibility of being exposed to or witnessing violence; death, dying, and harm to oneself or others during combat; killing during combat; and changes in eating behavior while in the service.<sup>9,14,20,21</sup>

**FIGURE 1.** Search strategy used to find and identify relevant articles for review. ED = eating disorder.



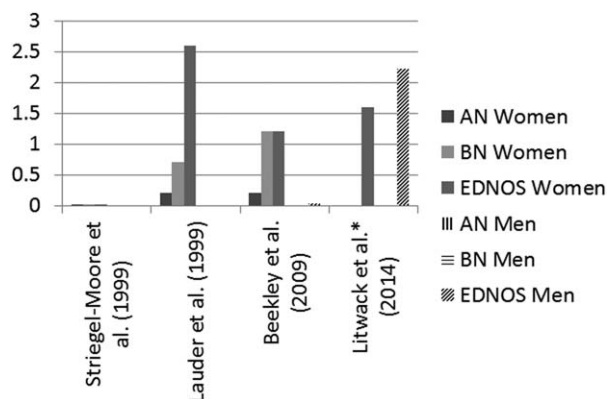
Military sexual trauma (MST) is another possible facet of military life that may have serious consequences for those who experience it. Research shows that MST is associated with poorer emotional and psychological functioning,<sup>22,23</sup> including the development of PTSD and depression.<sup>24</sup> Binging and extreme caloric restriction were positively correlated with mental health symptoms among women veterans who experienced MST, possibly because those who experience MST may try to regulate their psychological distress by engaging in disordered eating behaviors.<sup>25</sup> MST has also been shown to negatively affect women's body image.<sup>22</sup>

This review aimed to examine prevalence estimates of EDs and ED symptoms among military and veteran men and women. We also aimed to identify possible risk factors for the development of EDs in these populations.

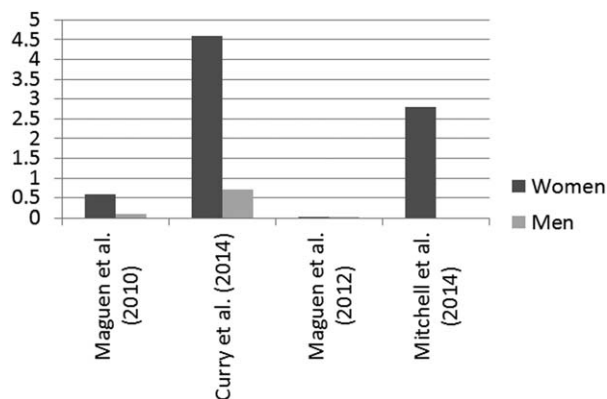
## Method

A systematic review was conducted using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)<sup>26</sup> guidelines (see Fig. 1). Relevant studies were identified using online databases National Center for Biotechnology Information (NCBI) and PubMed for literature up to February 18, 2015. Key search and MESH terms included: "soldier," "deployed," "active duty," "military personnel," "veterans," "service members," "eating disorders," "eating behaviors," "disordered eating," "abnormal eating," "binge eating," "anorexia nervosa," "bulimia nervosa," "eating patterns," and "dietary behaviors." Articles were initially scanned for eligibility via titles, followed by abstract screens, and

**FIGURE 2.** Percentage of women and men diagnosed with AN, BN, and EDNOS. AN = anorexia nervosa, BN = bulimia nervosa, EDNOS = eating disorder not otherwise specified. \*Study included individuals who met criteria for current BED, categorized in the DSM-IV as “eating disorder not otherwise specified.”



**FIGURE 3.** Percentage of eating disorders collapsed across categories for women and men.



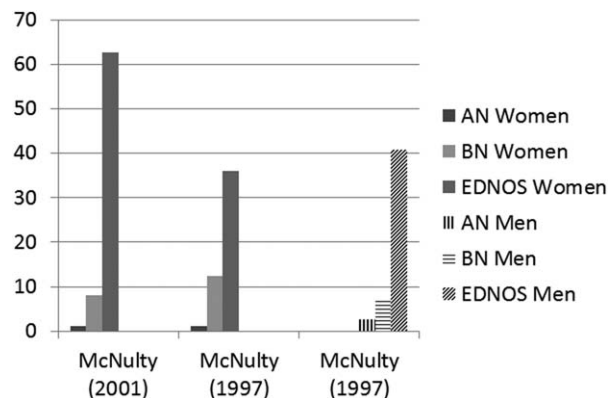
lastly, full-text screens. In addition, all reference lists of relevant articles were searched for potentially eligible studies.

**Inclusion/Exclusion Criteria**

Studies were included if they examined disordered eating in a military or veteran sample. Participants included women and men, and were current active duty service members from all branches of the United States military or veterans (see Table 1). We included studies that examined prevalence estimates of lifetime or current ED diagnoses or behaviors based on hospital records, interviews, or screening measures (e.g., self-report questionnaires). All articles had to be written in English. All relevant published and in-press articles were considered.

Several studies were excluded from the review as a result of ineligibility, including studies that examined eating behaviors unrelated to EDs (e.g., healthy dieting practices, types of foods consumed, etc.). Articles

**FIGURE 4.** Percentage of women and men who met screening cut-offs on self-report measures of eating disorders. AN = anorexia nervosa, BN = bulimia nervosa, EDNOS = eating disorder not otherwise specified.



focused on military personnel serving in any non-U.S. military were not eligible. Articles that were not original studies, including review articles, were excluded.

**Results**

**EDs in the Military**

Unless otherwise noted, the term ED includes any diagnosis or symptomatology of AN, BN, BED, or eating disorder not otherwise specified (EDNOS). To date, studies reporting prevalence estimates of EDs among military samples have used a variety of assessment methods (see Fig. 2–4). Studies that diagnosed EDs with the use of clinical interviews in military samples reported prevalence estimates that are comparable to or higher than the general population, with approximately 5% to 8% of women and .1% of men being diagnosed with an ED.<sup>11,27,28</sup> Specifically, over a 7-year period, the prevalences of AN, BN, EDNOS, and subthreshold disordered eating in military cadets were .2%, 1.2%, 1.2%, and 2.7%, respectively, for women and .0%, .02%, .03%, and .06% for men.<sup>11</sup> In a sample of active duty female personnel, rates were .2% for AN, .7% for BN, 2.6% for EDNOS, 1.2% for BED, and 3.1% for “situational ED” (i.e., abnormal eating behaviors consistent with EDNOS practiced intermittently, typically in anticipation of weigh-ins or fitness testing, that are associated with significant distress or were judged as abnormal or dangerous).<sup>28</sup> However, lower rates of AN, BN, and EDNOS (.25%, .79%, and .72% among women and .01%, .02%, and .03% among men) have been reported based on investigations of hospitalization and outpatient healthcare diagnoses<sup>12</sup> and may be underestimates of the true prevalence of EDs.<sup>29</sup> Further, investigations that utilized

**TABLE 1. Findings from military/veteran samples**

Study	Sample	Study Aim(s)	Eating Disorder Assessment	Findings
Carlton et al. (2005) <sup>9</sup>	Male and female active duty personnel ( <i>N</i> = 489) assigned to the Naval Medical Center Portsmouth in 2002	To examine the prevalence of abnormal eating behaviors	Self-report survey created specifically for the study	10% reported bingeing at least twice weekly within the previous 3 months; 31 to 39% reported binge-type behaviors (e.g., eating until uncomfortably full or eating large amounts when not hungry); 11% reported fear of losing control when eating; 5% reported self-induced vomiting; 18% reported laxative, diuretic, or diet pill use to lose weight; 25% reported fasting; and 15% reported exercising more than one time per day to lose weight.
Garber et al. (2008) <sup>10</sup>	Female U.S. Marine Corps recruits ( <i>N</i> = 1,985)	To examine factors associated with weight dissatisfaction	Self-report questionnaires created specifically for the study	77.3% reported engaging in disordered eating behaviors prior to enlisting, and 37.9% reported weight dissatisfaction upon entering training. Of those who reported weight dissatisfaction, 34.9% reported limiting food intake, and 68.7% reported use of pills, vomiting, and/or bingeing. Body mass index and worry about meeting weight requirements were associated with body dissatisfaction.
Beekley et al. (2009) <sup>11</sup>	Male ( <i>n</i> = 10,859) and female ( <i>n</i> = 1,872) cadets at the United States Military Academy from 1999 to 2005	To examine the incidence, prevalence, and risk of EDs over a 7-year period	EAT-26; participants who exceeded cutoffs on the EAT-26 or who had a BMI <19 received a follow-up clinical interview (unspecified)	Incidence per year for women was 0.02% for AN, 0.17% for BN, 0.17% for EDNOS, and 0.39% for subthreshold disordered eating and for men was 0.0% for AN, 0.003% for BN, 0.02% for EDNOS, and 0.008% for subthreshold disordered eating. The prevalence of diagnosed EDs was 5% for women (0.2% for AN, 1.2% for BN, 1.2% for EDNOS, and 2.7% for subthreshold disordered eating), and 0.1% for men (0.0% for AN, 0.02% for BN, 0.03% for EDNOS, and 0.06% for subthreshold disordered eating).
Antczak and Bringer (2008) <sup>12</sup>	Medical records of male ( <i>n</i> = 1,179,181) and female ( <i>n</i> = 201,607) service members from the Army, Air Force, Navy and Marines from 1998 to 2006 obtained from the Defense Medical Epidemiology Database	To determine the incidence of AN, BN, and EDNOS	ED diagnoses from medical records	The average ED prevalence per year was .30%, including 0.04% for AN, .13% for BN, and .13% for EDNOS. Women had AN, BN, and EDNOS incidence rates of .25%, .79%, and .72%; men had incidence rates of .01%, .02%, and .03%.
Armed Forces Health Surveillance Center (2014) <sup>13</sup>	All male and female active component service members of the Army, Air Force, Marine Corps, Navy, and Coast Guard who served between January 1, 2004 and December 31, 2013	To document rates of AN, BN, and EDNOS in active component service personnel over a 10-year period	Hospital records and records of outpatient care	3,527 service members were diagnosed with an ED, with an overall incidence rate of 2.5 cases per 10,000 p-yrs; women were diagnosed with incidence rates per 10,000 p-yrs of 1.7 for AN, 6.9 for BN, and 4.7 for EDNOS; men were diagnosed with incidence rates per 10,000 p-yrs of 0.1 for AN, 0.3 for BN, and 0.3 for EDNOS; incidence rates were more than 20 times higher among women.
Jacobson et al. (2009) <sup>14</sup>	Population-based U.S. military sample ( <i>n</i> = 42,174)	To investigate the effect of military deployment and combat exposure on weight changes and new-onset disordered eating between baseline and an approximately 3-year follow-up	Patient Health Questionnaire	5.2% of women and 3.9% of men reported disordered eating (full or subthreshold BN or BED) at follow-up. Risk factors for women included deployment with combat exposures, history of a mental disorder, and being on a weight-loss diet: risk factors for men included history of mental disorder and being on a weight-loss diet.
Curry et al. (2014) <sup>16</sup>	Female ( <i>n</i> = 346) and male ( <i>n</i> = 1,354) veterans who were part of the VA Mid-	To investigate gender differences in the frequency of lifetime MDD and comorbid disorders	Structured Clinical Interview for the DSM-IV	4.6% of women and .7% of men were diagnosed with an ED; women but not men diagnosed with MDD were more likely to be diagnosed with an ED

TABLE 1. Continued

Study	Sample	Study Aim(s)	Eating Disorder Assessment	Findings
	Atlantic Mental Illness Research, Education, and Clinical Center multisite registry	as well as their patterns of temporal onset		
Striegel-Moore et al. (1999) <sup>18</sup>	Female ( <i>n</i> = 24,041) and male ( <i>n</i> = 466,590) veterans hospitalized in VA medical centers during fiscal year 1996	To examine the prevalence of detected cases of EDs and to observe psychiatric comorbidities with ED cases	Diagnoses from discharge summaries in a comprehensive electronic VA database	Women with EDs (.30%) had significantly higher rates of comorbid psychiatric diagnoses, including personality disorder (49%), substance use/dependence (33%), anxiety (29%), adjustment (29%), and mood (60%) disorders. Men with EDs (.02%) had higher rates of comorbid substance use/dependence (38%), psychotic disorders (28%), mood (39%), and organic mental (22%) disorders.
Striegel-Moore et al. (1999) <sup>19</sup>	Male veterans ( <i>N</i> = 466,590) hospitalized in VA medical centers during fiscal year 1996	To detail the psychiatric comorbidity for men with AN, BN, and EDNOS	Diagnoses from discharge summaries in a comprehensive electronic VA database	Of the male veterans diagnosed with an ED (0.02%), 92% of AN cases, 100% of BN cases, and 89.3% of EDNOS cases had at least one comorbid psychiatric diagnosis, the most common being mood disorder (39%), substance abuse or dependence disorder (38%), psychotic disorders (28%) and organic mental disorders (22%).
Forman-Hoffman et al. (2012) <sup>21</sup>	Female veterans ( <i>N</i> = 1,004) who enrolled at VA medical centers or outlying clinics	To examine lifetime EDs and associations with PTSD and retrospectively reported sexual trauma throughout different stages of life (childhood, during military service, and lifetime)	Interview items: (1) "Have you ever been diagnosed with an eating disorder?" and (2) "Have you ever suffered from an eating disorder?"	4.7% reported previously receiving an ED diagnosis; 11.5% reported suffering from an ED. Sexual trauma during military service was more strongly associated with lifetime EDs than childhood sexual trauma. Women with PTSD were significantly more likely to have a self-reported ED.
Rowe et al. (2009) <sup>25</sup>	Female veterans ( <i>N</i> = 232) seeking outpatient mental health treatment at a VA medical center	To compare female veterans with and without a history of MST on health behaviors and psychological symptoms; to examine the associations between psychological symptoms and health behaviors among those who reported experiencing MST	Self-report survey of eating behaviors created by the clinic	Rates of bingeing (12.9%), purging (3.9%), laxative use (3.9%), "starving" (8.2%), and excessive exercise (2.6%) were relatively high in the total sample; women with MST histories were significantly more likely to report "starving" behaviors (10.4%) than were women without MST (2.9%).
Lauder et al. (1999) <sup>27</sup>	Female soldiers ( <i>N</i> = 423) from the general active duty population at Fort Lewis, WA	To determine the prevalence of EDs, menstrual irregularities, and the "female athlete triad" (i.e., disordered eating, amenorrhea, and osteoporosis)	EDI: those exceeding the cutoff on the EDI were interviewed using the Structured Clinical Interview for the DSM-IV and questions from the Michigan State University Weight Control Survey	Approximately 8% (0.2% AN, 0.7% BN, 2.6% EDNOS, 1.2% BED, and 3.1% "situational disordered eating") of the total sample was diagnosed with an ED; no participants met criteria for the full female athlete triad.
Lauder et al. (1999) <sup>28</sup>	Female soldiers ( <i>N</i> = 423) from the general active duty population at Fort Lewis, WA	To evaluate the prevalence of abnormal eating behaviors	EDI: those exceeding the cutoff on the EDI were interviewed using the Structured Clinical Interview for the DSM-IV and questions from the Michigan State University Weight Control Survey	33.6% of women exceeded the cutoff on the EDI, and 23.2% of those who exceeded the cutoff (approximately 8% of the total sample) were diagnosed with an ED. Specifically, 0.2% with AN, 0.7% with BN, 2.6% with EDNOS, 1.2% with BED, and 3.1% with "situational disordered eating".
McNulty (1997) <sup>30</sup>	Female Navy nurses ( <i>N</i> = 706) randomly selected from health care facilities	To examine the prevalence of disordered eating	An adapted version of the EDI	1.1% met the cutoff for AN, 12.5% for BN, and 36% for EDNOS.

TABLE 1. Continued

Study	Sample	Study Aim(s)	Eating Disorder Assessment	Findings
McNulty (2001) <sup>31</sup>	Service women (N = 1,278) from the total population of three major medical centers (Army, Navy, and Air Force) and the total population of Marine women serving in Okinawa, Japan	To examine the prevalence of AN, BN, and EDNOS	An adapted version of the EDI	Prevalence estimates were 1.1% for AN, 8.1% for BN, and 62.8% for EDNOS. ED rates were significantly higher in the Marines compared with other branches.
McNulty (1997) <sup>32</sup>	Active duty Navy men (N = 1,425) from hospitals, clinics, and ships at sea	To examine the prevalence of AN, BN, and EDNOS	An adapted version of the EDI	Prevalence estimates were 2.5% for AN, 6.8% for BN, and 40.8% for EDNOS. There were no differences in age, work assignment, or military rank among individuals diagnosed with AN or BN compared with those who were not; men with EDNOS were older, more likely to be enlisted men than officers, and more likely to be assigned to ships than to be healthcare workers or medical doctors compared with men who were not diagnosed with EDNOS.
Sweeney (1990) <sup>33</sup>	Soldiers in a medical reserve unit (N = 342)	To assess negative health care practices used to control and maintain weight	A survey created for the study	Soldiers reported that they had tried or would not hesitate to use several unhealthy methods to lose or maintain weight, including self-induced vomiting (4.5%), taking laxatives (12.3%), taking diuretics (19.6%), and taking diet pills (26%).
Peterson and Talcott (1995) <sup>35</sup>	Active duty US Air Force members enrolled in a weight-management program (N = 51), a comparison active duty US Air Force group (N = 51), and civilians enrolled in a weight-management program (N = 53)	To describe eating behaviors of individuals in the Air Force Weight Management Program compared with a civilian weight-management program	A modified version of the Stanford Eating Disorders Questionnaire	The Air Force members enrolled in the weight management program engaged in significantly more bulimic weight-loss behaviors (i.e. self-induced vomiting, diuretics, diets, exercise, fasting, and sauna) than the Air Force or civilian comparison groups.
Haddock et al. (1999) <sup>36</sup>	United States Air Force basic military training recruits (N = 32,144)	To examine the relationship between weight concerns and dieting to lose weight, as well as their association with other factors, such as BMI and ethnicity	A questionnaire developed specifically for the study	Female military recruits were significantly more concerned about weight than male recruits; approximately 25% of female recruits and 10% of male recruits indicated that they either frequently or always worried about their weight; Caucasian and Hispanic American men and women were more likely to report weight concern and dieting than other racial/ethnic groups.
Warner et al. (2007) <sup>37</sup>	Advanced individual training male (n = 955) and female (n = 135) U.S. Army soldiers	To determine the prevalence of disordered eating and assess risk factors for EDs	EAT-26	29.6% of women and 7% of men exceeded the cutoff on the EAT-26; female gender, previous psychiatric treatment, being overweight, and history of verbal abuse were associated with higher EAT-26 scores.
Mitchell et al. (2014) <sup>38</sup>	Female veterans (N = 492) who received services in the VA Boston Healthcare System primary care clinic	To describe rates of EDs and their correlates in a sample of female veteran primary care patients	Diagnoses from the VA electronic medical record system	2.8% of participants had a current ED diagnosis; having a depression diagnosis was associated with having an ED.

TABLE 1. Continued

Study	Sample	Study Aim(s)	Eating Disorder Assessment	Findings
Maguen et al. (2010) <sup>39</sup>	between December 2007-December 2009 Male ( <i>n</i> = 288,348) and female ( <i>n</i> = 40,701) OEF and OIF veterans seeking VA health care services from 2002 to 2008	To examine gender differences in sociodemographic, military service, and mental health characteristics	Diagnoses in the VA National Patient Care Database	0.6% of women and 0.1% of men had been diagnosed with an ED
Maguen et al. (2012) <sup>40</sup>	OEF/OIF veterans ( <i>N</i> = 593,739) who were new users of VA health care from October 7, 2001 to December 31, 2010	To determine prevalence estimates of EDs in OEF/OIF veterans, particularly among those with comorbid health conditions	VA database of OEF/OIF veterans	0.007% of women ( <i>n</i> = 465) and <0.001% of men ( <i>n</i> = 192) had received an ED diagnosis; male and female veterans with other mental health disorders had significantly higher chances of having an ED diagnosis.
Maguen et al. (2012) <sup>41</sup>	Female ( <i>n</i> = 26,527) and male ( <i>n</i> = 187,276) OEF/OIF veterans who had at least one primary care or mental health visit to a VA facility from April 1, 2002, through October 1, 2008	To examine how comorbid conditions varied as a function of MST and to understand how PTSD and comorbid mental health conditions differed by gender and MST status	Diagnoses from the VA electronic medical record system	2% of women and 0.3% of men diagnosed with PTSD were also diagnosed with an ED; 4% of women and 1% of men with a diagnosis of PTSD and a history of MST had an ED diagnosis.
Litwack et al. (2014) <sup>42</sup>	Female ( <i>n</i> = 67) and male ( <i>n</i> = 432) U.S. military veterans who screened positive for trauma histories and/or a probable DSM-IV PTSD diagnosis	To assess rates of EDs and ED symptoms among veterans; and examine the relationships between ED symptoms and comorbid symptoms of psychiatric disorders	Structured Clinical Interview for the DSM-IV	0.49% of men met criteria for lifetime BN, and none met criteria for current BN; no women met criteria for lifetime or current BN; 4.76% of women and 3.69% of men met criteria for lifetime BED; 1.59% of women and 2.22% of men met criteria for current BED.
Mattocks et al. (2012) <sup>47</sup>	OEF/OIF female veterans ( <i>N</i> = 19)	To examine women's military deployment experiences, including combat-related exposure, MST, separation from family, and gender discrimination in the military; to explore women's coping strategies after they return from deployment	Semi-structured interview created for the study	Women identified four major behavioral coping strategies they used to cope with post-deployment stress and MST: binge eating and purging, compulsive spending, over-exercising, and prescription drug abuse.
Kimerling et al. (2007) <sup>48</sup>	Female ( <i>n</i> = 185,880) and male ( <i>n</i> = 4,139,888) veterans who had at least one outpatient visit to a VA health care facility that reported valid MST monitoring data	To examine whether veterans who screen positive for MST had more medical and mental illnesses and if there were gender differences in patterns of illnesses associated with MST	VA administrative data, including psychiatric diagnoses	MST was most strongly associated with PTSD, dissociative disorders, EDs, and personality disorders among women; MST was not associated with EDs among men.
Hoerster et al. (2015) <sup>49</sup>	Iraq/Afghanistan male and female veterans ( <i>N</i> = 332) at the VA Puget Sound Healthcare System, Seattle	To assess associations between symptoms of depression, PTSD and binge eating	Patient Health Questionnaire	8.4% met screening criteria for binge eating; symptoms of PTSD and depression were significantly associated with binge eating.
Rosenberger and Dorflinger (2013) <sup>50</sup>	Overweight/obese male veterans ( <i>N</i> = 111) at a VA Medical center	To compare depression and confidence to engage in healthy eating habits between those who	Questionnaire for Eating and Weight Patterns-Revised (QEWP-R); Perceived Stress	Participants who endorsed binge eating reported higher levels of depression and lower confidence in their ability to adhere to healthier eating habits than those who did not binge eat.

TABLE 1. *Continued*

Study	Sample	Study Aim(s)	Eating Disorder Assessment	Findings
Higgins et al. (2013) <sup>51</sup>	A national sample of overweight/obese veterans (N = 45,477) seeking weight loss treatment at VA facilities	binge eat and those who do not binge eat To describe the association of demographic variables and medical and psychiatric comorbidities with self-reported binge-eating behavior	Scale (PSS); Eating Habits Confidence Survey A questionnaire created for the study	78.2% of the sample reported clinically meaningful binge eating (i.e., two or more binge eating episodes per week); the prevalence of binge eating was higher in male veterans (79%) than in female veterans (76%).
Smith et al. (2009) <sup>59</sup>	Veterans (N = 64) who served in the military between World War II and the present	To conduct focus groups investigating if eating behavior and food insecurity during military service affected eating behavior post-war, and if this contributed to obesity in veterans	Interview: focus group discussions about the veterans' military experience	Veterans reported that their food environment was impacted by military service; eating behavior and food choices were influenced by food insecurity.
Masheb et al. (2014) <sup>61</sup>	Veterans eligible for MOVE! weight management treatment at two Midwestern VA medical centers	To investigate rates of binge eating among veterans seeking weight management treatment, as well as to determine whether weight outcome differed by binge eating status	Self-report binge eating item from the MOVE!23 Survey that asks "On average, how often have you eaten extremely large amounts of food at one time and felt that your eating was out of control at that time?"	77.6% of veterans reported any binge eating, 47.7% reported binge eating one or more times per week, and 6.1% reported binge eating five or more times per week; binge eating, particularly high frequency binge eating, predicted worse weight outcomes than those who reported no binge eating.
Lauder (2001) <sup>68</sup>	Female ROTC cadets (N = 310) in Fort Lewis, WA	To determine the prevalence of abnormal eating behaviors	EDI	20% reported pathological eating behaviors; of these 20%, 35% reported bingeing, 19.3% reported purging, 15% used laxatives, 55.2% used diet pills, and 14.8% used diuretics.

Note: ED = eating disorder, EAT-26 = Eating Attitudes Test-26, AN = anorexia nervosa, BN = bulimia nervosa, EDNOS = eating disorder not otherwise specified, BED = binge eating disorder, EDI = eating disorder inventory, ROTC = reserve officer training corps, OEF = Operation Enduring Freedom, OIF = Operation Iraqi Freedom, DSM-IV = Diagnostic and Statistical Manual of Mental Disorders, 4th edition, VA = Veterans Affairs, PTSD = posttraumatic stress disorder, MST = military sexual trauma, MDD = major depressive disorder, p-yrs = person-years.



established ED screening measures have described a wide range of probable ED rates in military samples, with prevalence estimates for AN, BN, and EDNOS of 1.1, 8.1 to 12.5%, and 36-62.8%, respectively, among women, and 2.5%, 6.8%, and 40.8% among men.<sup>30-32</sup> Further, in a longitudinal study of a nationally representative sample of male and female service members, Jacobson et al.<sup>14</sup> found that 3.9% of men and 5.2% of women reported disordered eating, defined as BN, subthreshold BN, BED, and subthreshold BED, at follow-up. However, it is important to note that these studies used a variety of sampling methods, and probable diagnoses were based solely on self-report questionnaires.

Antczak and Brininger<sup>12</sup> used the Defense Medical Epidemiology Database, which contains demographic and medical information on all military service personnel for the previous 10 years, to conduct a 9-year review to determine the incidence and prevalence of EDs in military service members. ED diagnoses were extracted from medical records. From 1998 to 2006, the average ED prevalence per year, including AN, BN, and EDNOS diagnoses, for female and male service members was .30%. Women had AN, BN, and EDNOS incidence rates of .25%, .79%, and .72%, and men had had incidence rates of .01%, .02%, and .03%. In addition, the rate of overall ED diagnoses increased significantly during the study time frame, from .23% in 1998 to .41% in 2006. This increase may be the result of a variety of factors, including the increasing number of women in the military<sup>15</sup> as well as a younger generation of current military personnel that may be more susceptible to EDs than in previous conflicts.<sup>16</sup> Also, an increased number of service members are engaging in combat situations; therefore stress may also contribute to the rise of EDs.<sup>12</sup>

More recently, the Armed Forces Health Surveillance Center released incidence rates of EDs, based on diagnoses in medical records, among all active component service members between the years 2004 and 2013.<sup>13</sup> In total, 3,527 service members, ranging from less than 21 years of age to >40 years of age, were diagnosed with an ED over the 10-year surveillance period. The incidence rate for all EDs among male and female service members was 2.5 cases per 10,000 person-years (p-yrs). Specifically, women had incidence rates per 10,000 p-yrs of 1.7 for AN, 6.9 for BN, and 4.7 for EDNOS. Men had incidence rates per 10,000 p-years of 0.1 for AN, 0.3 for BN, and 0.3 for EDNOS. Rates of EDs were highest among female service members in the youngest age group who were White, non-Hispanic, and members of the Marine Corps, similar to results found in other representative samples of military

service members.<sup>12,14</sup> These findings also are consistent with patterns in the U.S. population, with the exception that studies in the general U.S. adult population have found no ethnic/racial differences in rates of EDs.<sup>8</sup>

### **Potential Risk Factors for EDs in the Military**

There are several potential risk factors for development of EDs among military service members. Previous findings suggest that military members may engage in disordered eating behaviors, including self-induced vomiting and taking laxatives, diuretics, and diet pills, in response to the strict fitness and weight standards enforced by the military.<sup>33</sup> Service members must meet these requirements every six months.<sup>28</sup> Although exact fitness standards vary between each branch of the military, all of them consist of a combination of pull-ups, sit-ups, push-ups, and a timed 1.5 to 5 mile run. Each branch also has specific weight standards with a maximum allowable body fat percentage that must not be exceeded at each weigh-in. For example, the maximum allowable body fat percentage in the Marines is 18% for men and 26% for women.<sup>34</sup>

The aforementioned study by Jacobson et al. found that both men and women who reported being on a weight loss diet during their service were significantly more likely to endorse disordered eating (e.g., loss of control over eating, consuming unusually large amounts of food, vomiting, fasting) and weight changes in each category assessed ( $\geq 10\%$  weight loss,  $>3\%$  but  $<10\%$  weight loss,  $\geq 10\%$  weight gain, and  $>3\%$  but  $<10\%$  weight gain).<sup>14</sup> In addition, relative to civilian weight management program participants, male and female Air Force weight management program members reported engaging in bulimic weight-loss behaviors (e.g., vomiting, strenuous exercise, or sauna/steam room use) four times as often,<sup>35</sup> indicating that military members may resort to unhealthy weight control behaviors to meet weight standards.<sup>36,37</sup>

Some military members may have pre-existing disordered eating attitudes and behaviors that may be maintained or exacerbated by military culture. For example, Garber et al.<sup>10</sup> found high rates (37.9%) of body dissatisfaction and previous disordered eating behaviors (77%) in a sample of young, female Marine Corps recruits. Worry about making weight was associated with body dissatisfaction in this sample.

In addition, high rates of trauma exposure may contribute to the development of disordered eating in military service members. Jacobson et al.<sup>14</sup> found that women who were deployed with

combat exposure were 1.78 times more likely to develop new-onset EDs and 2.35 times more likely to lose an extreme amount of weight (i.e.,  $\geq 10\%$  weight loss) compared with those who experienced deployment without combat exposure, suggesting that disordered eating and weight changes observed postdeployment were in part due to the trauma exposure rather than the deployment itself. Combat exposure was not associated with ED onset among men in this study.<sup>14</sup> Taken together, extant findings suggest that military men as well as women experience EDs, and there are unique factors that may contribute to the development of EDs in this population.

### ***EDs Among Veterans***

To date, there have been no published investigations of EDs among nationally representative samples of veterans. A wide range of prevalence estimates for EDs in male and female veterans have been reported (see **Fig. 2–4**). Studies of EDs based on hospital records generally have found the lowest rates of participants having any ED, ranging from .0007% to 2.8% among women and <.001% to .3% among men.<sup>18,19,38–41</sup> Specifically, two early studies of EDs in veterans found that AN, BN, and EDNOS prevalence estimates were .0007%, .001%, and .001% in women, and <.0001%, <.0001%, and .0001% in men.<sup>18,19</sup> More recent studies, using telephone or in-person interview assessments of EDs, have reported prevalence estimates of any lifetime ED of 4.6% to 4.76% among women and .7% to 3.69% among men.<sup>16,21,42</sup> These results are consistent with findings from the general population suggesting that rates of EDs based on hospital records may underestimate the true prevalence of these conditions.<sup>29</sup>

### ***Potential Risk Factors for EDs Among Veterans***

Several studies have examined risk factors and correlates of EDs in veteran samples. For example, women who had experienced trauma and were diagnosed with PTSD were more likely to have an ED than those who had experienced trauma but were not diagnosed with PTSD,<sup>21,41</sup> consistent with previous findings in non-veteran samples.<sup>43–46</sup> Female veterans identified bingeing, purging, and overexercising as three of their primary behavioral coping strategies for combat and MST,<sup>47</sup> consistent with research showing that women with histories of MST were significantly more likely to report disordered eating behaviors than women without MST.<sup>25,48</sup> In addition, having comorbid mental health disorders has been associated with an increased likelihood of having an ED diagnosis

among male and female veterans.<sup>40</sup> Two earlier studies found that the most common diagnoses comorbid with EDs were mood disorder and personality disorder among women, and mood disorder and substance abuse or dependence disorder among men.<sup>18,19</sup> Further, veterans who experienced symptoms of PTSD and depression were more likely to meet criteria for binge eating,<sup>49</sup> consistent with research showing that veterans who engaged in binge eating reported higher levels of depression and lower levels of efficacy than non-binge eaters.<sup>50</sup>

In addition to high rates of trauma/PTSD and other mental health disorders, the high rates of overweight and obesity observed in veteran samples may make this population vulnerable to the development of disordered eating, as research has demonstrated a link between obesity and disordered eating among men and women in the general population.<sup>51–53</sup> Notably, previous studies have demonstrated rates of overweight and obesity among veteran samples that exceed those of the general U.S. population.<sup>54–58</sup> In focus groups, veteran participants revealed habits developed during their service that they believed had contributed to their weight gain and development of obesity, including: learning to eat large quantities of food in a short period of time, learning to eat quickly, giving in to food cravings when deprived for long periods of time, and overeating after periods of food deprivation.<sup>59</sup> In addition, substantial declines in physical activity after discharge from the military<sup>60</sup> may contribute to weight gain and subsequently, the use of maladaptive eating behaviors in an effort to manage their weight. However, it also is possible that disordered eating may contribute to elevated rates of overweight and obesity in this population.<sup>59</sup> Approximately three-quarters of a large national sample of overweight/obese male and female veterans reported clinically meaningful binge eating.<sup>51</sup> Similarly, nearly 78% of veterans in a separate study reported any binge eating, with 6% of these veterans reporting high-frequency binge eating (five or more times per week).<sup>61</sup> Results such as these underscore the need for further research on disordered eating among male and female veterans.

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## **Discussion**

The findings from this systematic review suggest that rates of EDs in military and veteran populations likely are comparable to EDs in the general population, and are potentially rising in military

service members.<sup>10,11,16,21</sup> The increasing percentage of women in the military, with approximately 14% of current active duty personnel being female,<sup>15</sup> may be one factor contributing to rising rates of EDs in this population. However, it is important to note that rates of EDs among men in the general population are higher than previously believed,<sup>8</sup> underscoring the need for ED investigations among military and veteran men as well as women.

Our review also highlights risk factors for the development of EDs among military personnel and veterans. Consistent with findings from the general U.S. population,<sup>43,44</sup> trauma and PTSD have been associated with EDs among military personnel and veterans, who may engage in disordered eating behaviors as a way to cope with psychiatric symptoms, including negative affect.<sup>14,21,39,62</sup> However, military populations are exposed to several unique factors that could increase risk for developing an ED. Not only are they susceptible to various types of trauma exposure (including MST and combat), male and female service members are also subjected to regimented lifestyles and strict regulations, including physical fitness and weight requirements.<sup>9</sup> It is also possible that individuals who are more vulnerable to developing an ED, endorsing symptoms such as overexercise and placing a high emphasis on weight and shape, may be drawn to the military due to its emphasis on physicality and strict physical training.<sup>63</sup> Several studies found that enlisted service members in the youngest age group who were White, non-Hispanic, and members of the Marine Corps have elevated rates of EDs.<sup>12-14,31</sup> Further, it is possible that veterans' increased risk for obesity as well as eating habits developed during and after their military service could enhance their vulnerability to disordered eating, potentially in order to regulate weight.<sup>59</sup> Thus, from a clinical perspective, findings from the general population regarding associations between trauma exposure and EDs, as well as use of ED behaviors to cope with negative affectivity, may translate well to military and veteran patients. However, it is important to be aware of unique factors that may contribute to EDs in these samples as well.

Although a knowledgeable clinician paired with the proper form of treatment can prove effective in treating those suffering from EDs, early intervention is ideal. However, individuals with EDs may not report their symptoms due to fears of stigma.<sup>64</sup> For example, service members who fail to meet fitness and weight requirements may be placed in an unfavorable remedial fitness program and could be ostracized by other service members.<sup>12</sup> Evaluations,

opportunities, and chances of advancement or promotion can be adversely affected,<sup>9</sup> and service members with repeated failures face increased monitoring for weight loss by superiors<sup>28</sup> as well as the threat of discharge from the military.<sup>65</sup> Therefore, military personnel may go to great lengths to control their weight and conceal ED symptoms in order to avoid possible negative consequences. For example, a previous study found that mental health disorders prior to service were associated with subsequent medical separation.<sup>66</sup> Although to our knowledge, there are no published findings regarding such consequences of EDs, specifically, in the military, it is possible that service members may fear similar adverse results for disclosing an ED diagnosis. It is also possible that individuals may not voluntarily convey their symptoms due to denial.<sup>67</sup> Lastly, given that the military is predominately male and EDs traditionally have been viewed as a "women's issue," men may be especially unwilling to report or seek help for ED symptoms. Thus, many factors may contribute to possible under-detection of EDs and underestimates in hospital records. Regular screenings for EDs, as well as psychoeducation concerning disordered eating, would aid in detection and treatment. McNulty<sup>31,32</sup> advised supervisors to be concerned or suspicious if any members show signs of rapid weight loss in and around the time of weigh-ins or intense physical fitness, as early recognition may minimize these abnormal behaviors.<sup>68</sup> Other forms of intervention could include the promotion of an attitude based on healthy living, rather than weight, as well as a positive body image.<sup>27</sup> Program-specific treatments primarily for those in the military who are suffering from an ED should also be available to all members, who could seek such treatment without consequences.

To our knowledge, this is the first comprehensive review of EDs among military as well as veteran populations. Although the number of studies of EDs in military and veteran samples have increased in recent years, this remains an understudied area, with important gaps in the literature. The increasing rates of EDs in the military underscore the need for research in these traditionally underserved groups.<sup>12</sup> Strengths of the current study are that it is a thorough systematic review that followed an established set of guidelines.<sup>26</sup> We were able to include a large number of studies with both male and female samples. Although we made every effort to find all eligible articles, this investigation is limited by the possibility that we may have missed a potentially relevant study. Similarly, it is also possible that there are non-significant findings that were not published that we do not

have access to. In addition, there is currently no study with a focus on EDs with a nationally representative sample of veterans, and few based on nationally representative military samples.<sup>12–14</sup> Lastly, as mentioned previously, it is also important to note that prevalence estimates from many of the studies were based on self-report questionnaires.

## Directions for Further Research

There remains a paucity of research on EDs in military and veteran samples. In particular, there have been no investigations of EDs in nationally representative samples of veterans, and few longitudinal studies. Currently, there are no national ED treatment programs in the VA system. Potential avenues for assessment and treatment of EDs within the military and VA include developing programs to reduce stigma, implementing standardized formal screenings in order to improve accuracy in diagnosing as well as providing an earlier chance for intervention, providing education to providers, and incorporating evidence-based psychotherapies for EDs. Male and female military service members and veterans likely experience EDs at rates that are at least equal to the general population, underscoring the need for prevention and treatment efforts in these underserved groups.

## References

- Feinson MC. Revisiting the relationship between eating disturbances and cultural origin: A focus on adult women in 14 community studies. *Eat Disord J Treat Prev* 2011;19:335–345.
- Jacobi C, Hayward C, de Zwaan M, Kraemer HC, Agras WS. Coming to terms with risk factors for eating disorders: Application of risk terminology and suggestions for a general taxonomy. *Psychol Bull* 2004;130:19–65.
- Trace SE, Baker JH, Peñas-Lledó E, Bulik CM. The genetics of eating disorders. *Annu Rev Clin Psychol* 2013;9:589–620.
- Simon J, Schmidt U, Pilling S. The health service use and cost of eating disorders. *Psychol Med* 2005;35:1543–1551.
- Stuhldreher N, Konnopka A, Wild B, Herzog W, Zipfel S, Löwe B, et al. Cost-of-illness studies and cost-effectiveness analyses in eating disorders: A systematic review. *Int J Eat Disord* 2012;45:476–491.
- Sullivan P. Mortality in anorexia nervosa. *Am J Psychiatry* 1995;152:1073–1074.
- American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders (Revised 4th ed.)*. Washington, DC: American Psychiatric Association, 2000.
- Hudson JI, Hiripi E, Pope HG Jr, Kessler RC. The prevalence and correlates of eating disorders in the National Comorbidity Survey Replication. *Biol Psychiatry* 2007;61:348–358.
- Carlton JR, Manos GH, Van Slyke JA. Anxiety and abnormal eating behaviors associated with cyclical readiness testing in a naval hospital active duty population. *Mil Med* 2005;170:663–667.
- Garber AK, Boyer CB, Pollack LM, Chang J, Shafer M-A. Body mass index and disordered eating behaviors are associated with weight dissatisfaction in adolescent and young adult female military recruits. *Mil Med* 2008;173:138–145.
- Beekley MD, Byrne R, Yavorek T, Kidd K, Wolff J, Johnson M. Incidence, prevalence, and risk of eating disorder behaviors in military academy cadets. *Mil Med* 2009;174:637–641.
- Antczak AJ, Brininger TL. Diagnosed eating disorders in the U.S. military: A nine year review. *Eat Disord* 2008;16:363–377.
- Armed Forces Health Surveillance Center. Diagnoses of eating disorders among active component service members, U.S. Armed Forces, 2004–2013. *Med Surveill Mon Rep* 21:8–12.
- Jacobson IG, Smith TC, Smith B, Keel PK, Amoroso PJ, Wells TS, et al. Disordered eating and weight changes after deployment: Longitudinal assessment of a large US military cohort. *Am J Epidemiol* 2009;169:415–27.
- National Center for Veterans Analysis and Statistics. *America's Women Veterans: Military Service History and VA Benefit Utilization Statistics*. Available at: [http://www.va.gov/vetdata/docs/SpecialReports/Final\\_Womens\\_Report\\_3\\_2\\_12\\_v\\_7.pdf](http://www.va.gov/vetdata/docs/SpecialReports/Final_Womens_Report_3_2_12_v_7.pdf) accessed on September 4, 2014.
- Curry JF, Aubuchon-Endsley N, Brancu M, Runnals JJ, VA Mid-Atlantic Mirecc Women Veterans Research Workgroup, VA Mid-Atlantic Mirecc Registry Workgroup, et al. Lifetime major depression and comorbid disorders among current-era women veterans. *J Affect Disord* 2014;152154:434–440.
- Herrell R, Henter ID, Mojtabai R, Bartko JJ, Venable D, Susser E, et al. First psychiatric hospitalizations in the US military: The National Collaborative Study of Early Psychosis and Suicide (NCSEPS). *Psychol Med* 2006;36:1405–1415.
- Striegel-Moore RH, Garvin V, Dohm FA, Rosenheck RA. Eating disorders in a national sample of hospitalized female and male veterans: Detection rates and psychiatric comorbidity. *Int J Eat Disord* 1999;25:405–414.
- Striegel-Moore RH, Garvin V, Dohm F-A, Rosenheck RA. Psychiatric comorbidity of eating disorders in men: A national study of hospitalized veterans. *Int J Eat Disord* 1999;25:399–404.
- Maguen S, Vogt DS, King LA, King DW, Litz BT, Knight SJ, et al. The impact of killing on mental health symptoms in Gulf War veterans. *Psychol Trauma Theory Res Pract Policy* 2011;3:21–26.
- Forman-Hoffman VL, Mengeling M, Booth BM, Torner J, Sadler AG. Eating disorders, post-traumatic stress, and sexual trauma in women veterans. *Mil Med* 2012;177:1161–1168.
- Skinner KM, Kressin N, Frayne S, Tripp TJ, Hankin CS, Miller DR, et al. The prevalence of military sexual assault among female veterans' administration outpatients. *J Interpers Violence* 2000;15:291–310.
- Suri A, Lind L, Kashner TM, Borman PD. Mental health, quality of life, and health functioning in women veterans: Differential outcomes associated with military and civilian sexual assault. *J Interpers Violence* 2007;22:179–197.
- Martin L, Rosen LN, Durand DB, Knudson KH, Stretch RH. Psychological and physical health effects of sexual assaults and nonsexual traumas among male and female United States Army soldiers. *Behav Med Wash DC* 2000;26:23–33.
- Rowe EL, Gradus JL, Pineles SL, Batten SV, Davison EH. Military sexual trauma in treatment-seeking women veterans. *Mil Psychol* 2009;21:387–395.
- Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *Int J Surg* 2010;8:336–341.
- Lauder TD, Williams MV, Campbell CS, Davis G, Sherman R, Pulos E. The female athlete triad: Prevalence in military women. *Mil Med* 1999;164:630–635.
- Lauder TD, Williams MV, Campbell CS, Davis GD, Sherman RA. Abnormal eating behaviors in military women. *Med Sci Sports Exerc* 1999;31:1265–1271.
- Whitehouse AM, Cooper PJ, Vize CV, Hill C, Vogel L. Prevalence of eating disorders in three Cambridge general practices: Hidden and conspicuous morbidity. *Br J Gen Pract* 1992;42:57–60.
- McNulty PA. Prevalence and contributing factors of eating disorder behaviors in a population of female navy nurses. *Mil Med* 1997;162:703–706.
- McNulty PA. Prevalence and contributing factors of eating disorder behaviors in active duty service women in the Army, Navy, Air Force, and Marines. *Mil Med* 2001;166:53–58.

32. McNulty PA. Prevalence and contributing factors of eating disorder behaviors in active duty Navy men. *Mil Med* 1997;162:753–758.
33. Sweeney S. Positive and negative health behaviors used to ensure compliance with the U.S. Army's weight control standards by a reserve component unit. *Mil Med* 1990;155:255–260.
34. Ace Any Military PFT/Military.com [Internet]. Available at: <http://www.military.com/military-fitness/fitness-test-prep/physical-fitness-test-standards> accessed on January 22, 2015.
35. Peterson A, Talcott W. Bulimic weight-loss behaviors in military versus civilian weight-management programs. *Mil Med* 1995;160:616–620.
36. Haddock CK, Stein RJ, Poston WSC, Klesges RC, Talcott GW, Lando H. Prevalence and risk factors for frequent dieting and weight concerns among U.S. Air Force personnel. *Eat Disord J Treat Prev* 1999;7:83–97.
37. Warner C, Warner C, Matuszak T, Rachal J, Flynn J, Grieger TA. Disordered eating in entry-level military personnel. *Mil Med* 2007;172:147–151.
38. Mitchell KS, Rasmusson A, Bartlett B, Gerber MR. Eating disorders and associated mental health comorbidities in female veterans. *Psychiatry Res* 2014; 219:589–591.
39. Maguen S, Ren L, Bosch JO, Marmar CR, Seal KH. Gender differences in mental health diagnoses among Iraq and Afghanistan veterans enrolled in veterans affairs health care. *Am J Public Health* 2010;100:2450–2456.
40. Maguen S, Cohen B, Cohen G, Madden E, Bertenthal D, Seal K. Eating disorders and psychiatric comorbidity among Iraq and Afghanistan veterans. *Womens Health Issues off Publ Jacobs Inst Womens Health* 2012;22:e403–e406.
41. Maguen S, Cohen B, Ren L, Bosch J, Kimerling R, Seal K. Gender differences in military sexual trauma and mental health diagnoses among Iraq and Afghanistan veterans with posttraumatic stress disorder. *Womens Health Issues off Publ Jacobs Inst Womens Health* 2012;22:e61–e66.
42. Litwack SD, Mitchell KS, Sloan DM, Reardon AF, Miller MW. Eating disorder symptoms and comorbid psychopathology among male and female veterans. *Gen Hosp Psychiatry* 2014;36:406–410.
43. Mitchell KS, Mazzeo SE, Schlesinger M, Brewerton T, Smith BN. Comorbidity of partial and subthreshold PTSD among men and women with eating disorders in the National Comorbidity Survey-Replication study. *Int J Eat Disord* 2012;45:307–315.
44. Brewerton TD. Eating disorders, trauma, and comorbidity: Focus on PTSD. *Eat Disord J Treat Prev* 2007;15:285–304.
45. Dansky BS, Brewerton TD, Kilpatrick DG, O'Neil PM. The National Women's Study: Relationship of victimization and posttraumatic stress disorder to bulimia nervosa. *Int J Eat Disord* 1997;21:213–228.
46. Tagay S. Traumatic events, posttraumatic stress symptomatology and somatoform symptoms in eating disorder patients. *Eur Eat Disord Rev* 2009;18: 124–132.
47. Mattocks KM, Haskell SG, Krebs EE, Justice AC, Yano EM, Brandt C. Women at war: Understanding how women veterans cope with combat and military sexual trauma. *Soc Sci Med* 2012;74:537–545.
48. Kimerling R, Gima K, Smith MW, Street A, Frayne S. The Veterans Health Administration and military sexual trauma. *Am J Public Health* 2007;97: 2160–2166.
49. Hoerster KD, Jakupcak M, Hanson R, McFall M, Reiber G, Hall KS, et al. PTSD and depression symptoms are associated with binge eating among US Iraq and Afghanistan veterans. *Eat Behav* 2015;17:115–118.
50. Rosenberger PH, Dorflinger L. Psychosocial factors associated with binge eating among overweight and obese male veterans. *Eat Behav* 2013;14:401–404.
51. Higgins DM, Dorflinger L, MacGregor KL, Heapy AA, Goulet JL, Ruser C. Binge eating behavior among a national sample of overweight and obese veterans. *Obesity* 2013;21:900–903.
52. Striegel RH, Bedrosian R, Wang C, Schwartz S. Why men should be included in research on binge eating: Results from a comparison of psychosocial impairment in men and women. *Int J Eat Disord* 2012;45:233–240.
53. Spitzer RL, Devlin MJ, Walsh BT, Hasin D. Binge eating disorder: A multisite field trial of the diagnostic criteria. *Int J Eat Disord* 1992;11:191.
54. Almond N, Kahwati L, Kinsinger L, Porterfield D. The prevalence of overweight and obesity among U.S. military veterans. *Mil Med* 2008;173:544–549.
55. Koepsell TD, Littman AJ, Forsberg CW. Obesity, overweight, and their life course trajectories in veterans and non-veterans. *Obes Silver Spring Md* 2012;20:434–439.
56. Koepsell TD, Forsberg CW, Littman AJ. Obesity, overweight, and weight control practices in U.S. veterans. *Prev Med* 2009;48:267–271.
57. Nelson KM. The burden of obesity among a national probability sample of veterans. *J Gen Intern Med* 2006;21:915–919.
58. Vieweg WV, Julius DA, Bates J, Quinn JF, Fernandez A, Hasnain M, et al. Post-traumatic stress disorder as a risk factor for obesity among male military veterans. *Acta Psychiatr Scand* 2007;116:483–487.
59. Smith C, Klosterbuer A, Levine AS. Military experience strongly influences post-service eating behavior and BMI status in American veterans. *Appetite* 2009;52:280–289.
60. Littman A, Jacobson IG, Boyko EJ, Smith TC. Changes in Meeting Vigorous Physical Activity Guidelines After Discharge From the Military. *J Phys Act Health* 2014;37:244–253.
61. Masheb RM, Lutes LD, Kim HM, Holleman RG, Goodrich DE, Janney CA, et al. High-frequency binge eating predicts weight gain among veterans receiving behavioral weight loss treatments. *Obes Silver Spring Md* 2015;23:54–61.
62. Heatherton TF, Baumeister RF. Binge eating as escape from self-awareness. *Psychol Bull* 1991;110:86–108.
63. Bodell L, Forney KJ, Keel P, Gutierrez P, Joiner TE. Consequences of Making Weight: A Review of Eating Disorder Symptoms and Diagnoses in the United States Military. *Clin Psychol-Sci Pr* 2014;21:398–409.
64. Roehrig JP, McLean CP. A comparison of stigma toward eating disorders versus depression. *Int J Eat Disord* 2010;43:671–674.
65. Williamson DA, Bathalon GP, Sigrist LD, Allen HR, Friedl KE, Young AJ, et al. Military Services Fitness Database: Development of a computerized physical fitness and weight management database for the U.S. Army. *Mil Med* 2009;174: 1–8.
66. Hoge CW, Toboni HE, Messer SC, Bell N, Amoroso P, Orman DT. The occupational burden of mental disorders in the U.S. Military: Psychiatric hospitalizations, involuntary separations, and disability. *Am J Psychiatry* 2005;162:585–591.
67. King MB. Eating disorders in a general practice population. Prevalence, characteristics and follow-up at 12 to 18 months. *Psychol Med Monogr Suppl* 1989;14:1–34.
68. Lauder TD. Abnormal eating behaviors in female reserve officer training corps cadets. *Mil Med* 2001;166:264–268.

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