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Depression Mediates the Association of Disordered Eating Behaviors and Sexual Function in Female Service Members and Veterans

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DEPRESSION MEDIATES THE ASSOCIATION OF DISORDERED EATING BEHAVIORS AND SEXUAL FUNCTION IN FEMALE SERVICE MEMBERS AND VETERANS

by

Whitney S. Livingston

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ABSTRACT

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by

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Participants (*N*=511) were partnered females who completed measures of sexual function, disordered eating behavior, depression severity, and demographic and military characteristics.

Nearly 60% reported probable sexual dysfunction, 19.6% reported probable eating disorder, and 44.4% reported probable depressive disorder. Higher depression

symptoms were associated with lower sexual function (r=-.40, p<.001) and higher disordered eating behavior (r=.45, p<.001). Mediation analyses revealed that the association between disordered eating behavior and sexual function was indirect, through depression severity (indirect effect: -1.12, 95% confidence interval [-1.42, -0.85]).

Depression is a potential mechanism through which disordered eating behaviors are related to poor sexual function. Findings are congruent with sexual function theory, and underscore the importance of addressing depression when treating sexual function in those with disordered eating behavior.

(42 pages)

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are related to poor sexual function. Findings are congruent with sexual function theory, and underscore the importance of addressing depression when treating sexual function in those with disordered eating behavior.

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CHAPTER I

INTRODUCTION

Females are among the most rapidly increasing users of Veterans Affairs (VA) services (Washington, Bean-Mayberry, Hamilton, Cordasco, & Yano, 2013) and the fastest growing subpopulation within the veteran community (National Center for Veterans Analysis and Statistics [NCVAS], 2017). Sexual function is an important part of the lives of females in the military (Sadler, Mengeling, Fraley, Torner, & Booth, 2012), as 37% of females fall in the reproductive age range (NCVAS, 2017), and female service members and veterans report a higher number of sexual partners relative to civilians (Lehavot et al., 2014). Poor sexual function is comprised of diminished sexual desire and arousal, presence of sexual pain, inability to orgasm, and low sexual satisfaction (Rosen et al., 2000; Stephenson & Meston, 2015), and is understudied in female service members and veterans. Studies show that the prevalence of sexual dysfunction disorders among female veterans ranges from <1% to 2.4% (Cohen et al., 2012; Turchik et al., 2011). However, research suggests that these rates likely underrepresent the true prevalence of sexual dysfunction disorders due to the focus on diagnoses instead of symptoms, lack of routine screening, and under-reporting (Reissing & Giulio, 2010; Rosebrock & Carroll, 2017). Extant literature demonstrates that poorer sexual function in female service members and veterans is associated with depression (Cohen et al., 2012), posttraumatic stress disorder (PTSD; Schnurr et al., 2009), and risk for suicide (Blais, Monteith, & Kugler, 2018), but little is known about the relationship of eating disorders and poor sexual function. As the prevalence of eating disorders is comparable or higher in female veterans as compared to female civilians (Bartlett & Mitchell, 2015), additional research

examining the association of disordered eating behavior and sexual function could provide novel information that could be used to inform screening and treatment targets.

Barlow's theory of sexual dysfunction (1986) provides a framework to understand potential correlates of sexual function including disordered eating behavior. Barlow theorized that healthy sexual function occurs in those with positive affect who approach sexual activity by attending to erotic stimuli, such as physical sensations during sexual activity, and not attending to or being distracted by non-erotic stimuli, such as body-image concerns. Conversely, poor sexual function occurs in those with negative affect who approach sexual activity by avoiding erotic stimuli and being distracted by non-erotic stimuli, such as thinking about consequences of not performing in a satisfactory manner. A study on 74 female civilians showed that those who self-reported a higher level of distraction secondary to body appearance concerns during sexual activity had lower sexual satisfaction (Dove & Wiederman, 2000). Additionally, research conducted on 48 female civilians demonstrated that increased distraction decreased the participants' ability to attend to erotic cues (Elliott & O'Donohue, 1997. Such findings suggest body dissatisfaction may serve as the non-erotic stimuli that distracts females during sexual activity.

Body dissatisfaction is a common concern among those with disordered eating behaviors (Duarte, Pinto-Gouveia, & Ferreira, 2017; Gagne et al., 2012; Horne, Van Vactor, & Emerson, 1991). In a study of 208 obese female veterans, those with binge eating behavior reported that body image/food issues were their top treatment priority relative to those without binge eating behavior (Rosenbaum et al., 2016). Further, individuals with eating disorders have an attention bias toward weight/shape concerns

(Williamson, White, York-Crowe, & Stewart, 2004), suggesting those with eating disorders may be particularly likely to attend to non-erotic stimuli during sexual activity. According to Barlow's theory, poorer sexual function may occur in those who report higher disordered eating behavior.

Of the research on eating disorders in female military service members and veterans, a recent review reported 5-8% of military women are diagnosed with an eating disorder (Bartlett & Mitchell, 2015). Further, factors within the military environment, such as weight requirements and maximum body fat percentages in each branch, confer a unique set of job-related pressures on military service members that may further increase risk for disordered eating behaviors (see review, Bartlett & Mitchell, 2015). For example, an Army pamphlet explained that the image of service members with excessive fat "connotes a lack of personal discipline" and "may indicate a poor state of health, physical fitness, or stamina" (United States Army, 2006, p. 1). This highlights the pressure to fulfill certain standards depicted by the military that may put military service members at heightened risk of developing disordered eating behaviors.

Although there is limited research on the association of disordered eating behaviors and sexual function in military samples, one recent study examined this relationship (Blais, Monson, Livingston, & Maguen, 2019). The study was conducted on a sample of 479 female service members and veterans and observed that worse disordered eating behaviors were associated with poorer sexual function (Blais, Monson, Livingston, & Maguen, 2019). Research on female civilians further supports these findings. For instance, a study conducted on 242 females reported that those with a diagnosed eating disorder were more likely to report lower libido relative to a sample of

nonclinical females (Pinheiro et al., 2010). Further, research from a study of 167 females showed that those with higher disordered eating behavior exhibited more difficulties with sexual stimulation, obsessiveness about sex, and conflicting thoughts about sexual behavior relative to those with lower or no disordered eating behaviors (Kluck, Garos, & Shaw, 2018). Finally, findings from a study on 88 females diagnosed with bulimia or anorexia nervosa showed that those with anorexia nervosa reported worse sexual function relative to healthy females (Castellini et al., 2012). While informative, these studies did not explore possible mediators of this association. As Barlow's theory of sexual function suggests that negative affect, or depressive symptoms, is a key component of the association of sexual function and distress, it may be important to examine the potential contribution of depression to sexual concerns among those experiencing disordered eating behavior.

Depression

Application of Barlow's theory suggests poor sexual function occurs when aspects of disordered eating behavior act as the non-erotic stimuli that are attended to in those with negative affect. Barlow suggests that this negative affect may be in the form of depression (1986). Depression is one of the most prominent disorders among female service members and veterans. Research suggests 11.2% of previously deployed females (Luxton, Skopp, & Maguen, 2010) and 23% of female veterans receiving Veterans Health Administration (VHA) care for their service in Operations Enduring Freedom/Operations Iraqi Freedom were diagnosed with depression (Maguen, Ren, Bosch, Marmar, & Seal, 2010). Moreover, female veterans are at heightened risk for a depression diagnosis relative to male veterans (Curry et al., 2014; Maguen, Ren, Bosch,

Marmar, & Seal, 2010) and female civilians (Lehavot, Hoerster, Nelson, Jakupcak, & Simpson, 2012). Increased risk for depression among female veterans is a critical concern as depression is associated with suicide. Indeed, research conducted on 1,843 VHA-enrolled veterans who died by suicide revealed that 88.6% received a diagnosis of depression within 12 months of their death (Smith et al., 2011). Aside from PTSD, depression rates increased more than all other mental health disorders diagnosed at the VHA between 2002 to 2008 (Seal et al., 2009). Fortunately, there are many evidence-based treatments for depression (Dimidjian et al., 2006; Driessen & Hollon, 2010; Ruiz, 2012). Thus, if depression is the mechanism through which disordered eating behavior is related to worse sexual function, treatment of depression could potentially mitigate the poor sexual function experienced by service members and veterans struggling with disordered eating behavior.

Depression and Eating Disorders

Extent research demonstrates that higher disordered eating behaviors are related to more severe depression (Blinder, Cumella, & Sanathara, 2006; Hudson, Hiripi, Pope, & Kessler, 2007; Johnson, Cohen, Kotler, Kasen, & Brook, 2002). For instance, a study of 593,739 female veterans seeking VHA care showed that the odds of having an eating disorder diagnosis were almost 12 times higher in those that were diagnosed with depression, relative to those who did not have a diagnosis of depression (Maguen et al., 2012). Further, a study including 492 female veterans reported odds of an eating disorder diagnosis were more than 4 times higher in those with depression (Mitchell, Rasmusson, Bartlett, & Gerber, 2014). The association of depression and eating disorders may be particularly salient among females. Indeed, a study of 499 male and female veterans who

had previously experienced a traumatic event observed that the relationship between depression severity and disordered eating behaviors was moderated by gender, such that females with depression had worse lifetime bulimia nervosa and binge eating severity, compared to males (Litwack, Mitchell, Sloan, Reardon, & Miller, 2014). Lastly, while PTSD is the most commonly diagnosed mental health disorder at the VHA (NCVAS, 2017; Maguen, Ren, Bosch, Marmar, & Seal, 2010), odds of an eating disorder are higher in those with depression than those with PTSD (Maguen et al., 2012; Mitchell, Rasmusson, Bartlett, & Gerber, 2014).

Depression and Sexual Function

Similar to disordered eating behaviors, extent research suggests depression is associated with worse sexual function. Indeed, higher depression is associated with worse sexual function in females (Beaulieu et al, 2015; Cohen et al., 2012; Fabre & Smith, 2012; Rellini & Meston, 2011; Sadler, Mengeling, Fraley, Torner, & Booth, 2012; Sreelakshmy, Velayudhan, Kuriakose, & Nair, 2017), with one review paper suggesting depression increases an individual's risk for poor sexual function by 50-70% (see review, Atlantis & Sullivan, 2012). A study on 71,504 female veterans seeking VHA care found that odds of experiencing poor sexual function were 7.55 times higher among those with depression (Cohen et al., 2012). In a study that included 101 female veterans with poor sexual function, more than half had symptoms of major depressive disorder (Breyer et al., 2016). Additionally, previous studies reported that PTSD, which is commonly associated with depression, and sexual function are related (Yehuda, Lehrner, & Rosenbaum, 2015); however, research suggests that it could be the comorbid depression or aspects of blunted affect found in those with PTSD that account for this association (Blais, Geiser, & Cruz,

2018; Cosgrove et al., 2002; see review, Tran, Dunckel, & Teng, 2015; Yehuda, Lehrner, & Rosenbaum, 2015).

Purpose of the Current Study

In summary, while studies have examined the association of disordered eating behavior and sexual function in female service members and veterans, current literature has yet to determine whether higher disordered eating behavior and lower sexual function are associated through a potential mechanism, depression. Barlow's theory of sexual dysfunction (1986) suggests that depression more fully explains the association of disordered eating behavior and sexual function. The current study was designed to address gaps in our understanding of the association of disordered eating behavior, worse sexual function, and depression in female service members and veterans. We hypothesized that higher disordered eating behaviors would be associated with worse sexual function and that depression would mediate this association, beyond the effects of covariates. As females are the fastest growing group among veterans (NCVAS, 2017), and poor sexual function is of concern by female service members and veterans (Sadler, Mengeling, Fraley, Torner, & Booth, 2012), the current study on sexual function and related mental health concerns in female service members and veterans is timely.

CHAPTER II

METHODS

Participants

Participants (*n*=511) were extracted from a larger dataset (*N*=833) that was collected to examine the association between relationship satisfaction, sexual function, and military sexual trauma in female service members and veterans (Blais, 2019). Participants were included in the current study if they completed questions on sexual function, disordered eating behavior, depression, and covariates. Of the female service members and veterans who participated in the parent study, 534 (64.1%) completed measures of disordered eating behaviors and sexual function, 528 (63.4%) completed the depression measure, and 511 (61.3%) completed the aforementioned measures and information related to age, race, marital status, military branch, and discharge status (covariates). The current sample was comprised of these 511 female service members and veterans.

Procedure

Participants were recruited through social media using advertisements targeting female military service members and veterans in romantic relationships or electronic listservs serving female military groups. Those interested in participating were directed to a Qualtrics survey, where they completed screening items confirming female sex, consenting age (≥18), marital status, and a history military service. Those participants meeting inclusion criteria on the screening items were presented with the Institutional Review Board (IRB) Letter of Information and all study measures. Compensation of $15 was offered for participation. The Utah State University IRB approved this study.

Measures

A demographic inventory was used to collect data on covariates of race (White, other), age, marital status (married, unmarried), discharge status (veteran status, active duty), and military branch of service (Army, other). These variables were included as covariates for the current study given that older age (Hendrickx, Gijs, & Enzlin, 2015), non-Hispanic white race/ethnicity (Hughes, Rostant, & Pelon, 2015), partnered but not married relationship status (Brown, Bulanda, & Lee, 2005), service in the Army (Gadermann, 2012), and active duty military status (Pickett et al., 2015) have established associations with depression severity or poor sexual function.

Sexual function, our outcome variable, was assessed with the *Female Sexual Function Index* (FSFI; Rosen et al., 2000), a 19-item self-report measure that assesses sexual arousal, desire, lubrication, orgasm, satisfaction, and pain/discomfort (Rosen et al., 2000). A sample item includes "Over the past 4 weeks, how would you rate your level (degree) of sexual desire or interest?" Items are evaluated using a Likert scale with varying anchors that range from 0-5 or 1-5. Total scores range from 2-36 and are computed by using an algorithm created by the authors of the FSFI. Lower scores indicate worse sexual function, and scores <26.55 indicate probable sexual dysfunction (Wiegel, Meston, & Rosen, 2005). Previous research indicates that the FSFI is a valid (Stephenson, Toorabally, Lyons, & Meston, 2016) and reliable measure (Rosen et al., 2000) of sexual function. Cronbach's alpha for the FSFI using data from the current sample was adequate, .98.

Disordered eating behaviors, our primary independent variable, was assessed using the self-report *Eating Disorder Examination-Questionnaire* (EDE-Q; Fairburn &

Beglin, 1994), a 28-item questionnaire. A sample item includes "Over the past 28 days, on how many days have you eaten in secret (i.e. furtively)?" Items are scored on a Likert scale from 0 (*no days*) to 7 (*every day*). Subscales of restraint, eating concern, shape concern, and weight concern are used to compute the global score. The global score is calculated by using an algorithm designed by Fairburn, Cooper, and O'Connor (2014), with total scores ranging from 0-6. Higher scores indicate worse disordered eating behavior. Scores >4.02 indicate probable disordered eating behavior (Aardoom, Dingemans, Slof, & Van Furth, 2012). Previous research reports the EDE-Q is a reliable measure for capturing eating-related psychopathology and the related behaviors (Reas, Grilo, & Masheb, 2006). Cronbach's alpha for the EDE-Q using data from the current sample was adequate, .96.

Depression severity, our mediator variable, was assessed with the *Patient Health Questionnaire-9* (PHQ-9; Kroenke, Spitzer, & Williams, 2001), a 9-item self-report measure assessing symptoms of depression. An example item from this measure includes "Over the past 2 weeks, how often have you been bothered by feeling down, depressed, or hopeless." Items are scored on an ordinal scale that ranges from 0 (*not at all*) to 3 (*quite a bit*). Total scores are computed by summing scores on all nine items. Total scores range from 0 to 27, and higher scores indicate worse symptoms of depression. Scores $\geq$10 suggest probable depression (Manea, Gilbody, & McMillan, 2012). Previous research shows that the PHQ-9 is a valid and reliable measure (Kroenke, Spitzer, & Williams, 2001). Cronbach's alpha for the PHQ-9 using data from the current sample was adequate, .92.

Analytic Plan

Demographic characteristics were calculated using descriptive statistics. Pearson's correlations were used to examine the associations of sexual function, depression severity, disordered eating behavior, and age (covariate). Independent-samples *t*-tests were used to determine whether there were significant differences in sexual function, disordered eating behavior, and depression as a function of the following dichotomous covariates: marital status, military branch, and discharge status.

To assess the total effect of disordered eating behavior and sexual function, sexual function was regressed onto disordered eating behavior, and covariates of age, race, marital status, military branch, and discharge status using a linear regression model. PROCESS macro mediation syntax created by Hayes (2016) was then used to examine whether depression mediated the association of higher disordered eating behavior and lower sexual function after accounting for covariates. The mediation analysis included 5,000 iterations of bootstrapping for bias corrected bootstrap confidence intervals (CI). All statistical tests were conducted using SPSS V24 (IBM Corp., 2016).

CHAPTER III

RESULTS

Sample Characteristics

Sample characteristics and bivariate associations of all study variables are presented in Tables 1 and 2. The majority of the sample identified as White, married, reported service in the Army, and were discharged from the military. Overall, the average score on the FSFI was below the suggested cut-off of 26.55 (Wiegel, Meston, & Rosen, 2005), and slightly more than half of the sample (n = 300, 58.7%) reported scores consistent with probable sexual dysfunction. The average score on the EDE-Q was below the clinical cut-off of 4.02 (Aardoom et al., 2012), and a minority (n = 100, 19.6%) reported scores consistent with a probable eating disorder diagnosis. The average score on the PHQ-9 was slightly below the clinical cut-off of 10 (Manea, Gilbody, & McMillan, 2012), and a minority (n = 227, 44.4%) reported scores consistent with a probable depression diagnosis.

Bivariate Associations

Associations between the continuous variables of sexual function, disordered eating behaviors, depression, and age are reported in Table 1. Worse sexual function and higher disordered eating behavior were associated with a small effect size. Worse sexual function and higher depression were associated with a medium effect size. Higher disordered eating behavior and higher depression were also associated with a medium effect size. Older age, which was included as a covariate in the current study, was associated with lower sexual function with a small effect size. Age was not associated with disordered eating behavior or depression (ps > .05).

Table 1

Correlations, Means, and Standard Deviations of Sexual Function, Disordered Eating Behavior, Depression, and Age in Female Service Members and Veterans (N=511)

	1.	2.	3.	4.
1. Sexual Function[a]	--			
2. Disordered Eating Behavior[b]	-.16***	--		
3. Depression[b]	-.40***	.45***	--	
4. Age	-.14**	.04	.03	--
M	22.14	2.38	9.91	32.25
SD	9.95	1.61	7.40	7.53

Note. [a]Lower scores indicate worse functioning. [b]Higher scores indicate worse functioning.
*p < .05; **p < .01; ***p < .001

Table 2

Bivariate Comparisons of Study Variables with t-Tests (N=511)

	Sexual Function[a]		Disordered Eating Behavior[b]		Depression[b]	
	M(*SD*)	*t*-test	*M*(*SD*)	*t*-test	*M*(*SD*)	*t*-test
Race		$t(509)=-0.85$, $p=.40$		$t(509)=0.63$, $p=.53$		$t(509)=2.76$, $p=.006$
White	22.33 (10.09)		2.36 (1.60)		9.46 (7.31)	
Other Race	21.41 (9.40)		2.47 (1.67)		11.68 (7.50)	
Marital Status		$t(509)=2.86$, $p=.004$		$t(509)=-2.02$, $p=.04$		$t(509)=-0.56$, $p=.58$
Married	21.40 (9.67)		2.47 (1.61)		10.02 (7.44)	
Partnered	24.24 (10.46)		2.14 (1.62)		9.60 (7.28)	
Military Branch		$t(509)=-0.42$, $p=.67$		$t(509)=0.93$, $p=.35$		$t(509)=0.57$, $p=.57$
Army	22.32 (9.90)		2.32 (1.61)		9.74 (7.50)	
Other Branch	21.94 (10.02)		2.46 (1.62)		10.11 (7.28)	
Discharge Status		$t(509)=2.41$, $p=.02$		$t(509)=-0.62$, $p=.53$		$t(236)=-4.78$, $p<.001$
Active Duty	24.00 (10.10)		2.31 (1.71)		7.38 (6.57)	
Veteran	21.54 (9.84)		2.41 (1.58)		10.73 (7.47)	

Note. [a]Lower scores indicate worse functioning. [b]Higher scores indicate worse functioning.

Independent-samples *t*-tests were used to compare race, marital status, military branch, and discharge status groups on level of sexual function, disordered eating behavior, and depression (Table 2). Those who identified as White reported lower depression scores relative to those reporting non-White race. Those who identified as married reported lower sexual function and higher disordered eating behaviors relative to those reporting not being married. Those who identified as active duty service members reported higher sexual function and lower depression relative to veterans (*ps* < .05). No significant differences were observed in sexual function scores as a function of race or military branch. There were no significant differences in disordered eating behaviors as a function of race, discharge status, or military branch. No significant differences were observed in depression scores as a function of marital status or military branch (*ps* > .05).

Relationship Between Sexual Function and Disordered Eating Behavior

When sexual function was regressed on disordered eating behavior, age, race, marital status, military branch, and discharge status, the overall regression was significant, $R^2 = .06$, $F(6, 504) = 5.22$, $p < .001$ (see Table 3). Higher disordered eating behaviors were associated with lower sexual function. Older age was also associated with lower sexual function.

Indirect Effect of Depression on the Relationship Between Sexual Function and Disordered Eating Behavior

When sexual function was regressed onto disordered eating behaviors, depression, and covariates including age, race, marital status, military branch, and military status, the overall regression was significant, R2 = .18, F(7, 503) = 16.22, p <.001 (see Table 3). Higher depression was associated with lower sexual function. When depression was

Table 3

Mediation Regression Analysis of Sexual Function on Disordered Eating Behavior, Depression, and Covariates in Female Service Members and Veterans (N=511)

	Indirect Effect: None			Indirect Effect: Depression		
	Unstandardized Estimate	Standard Error	95% Confidence Interval	Unstandardized Estimate	Standard Error	95% Confidence Interval
Depression[a]	--	--	--	**-0.55**	**0.06**	**[-0.67, -0.43]**
Disordered Eating Behavior[a]	**-0.90**	**0.27**	**[-1.42, -0.37]**	0.22	0.28	[-0.33, 0.77]
White Race	1.01	1.07	[-1.09, 3.11]	-0.04	1.00	[-2.01, 1.93]
Married	-1.93	1.00	[-3.90, 0.04]	**-2.24**	**0.93**	**[-4.07, -0.40]**
Age	**-0.14**	**0.06**	**[-0.26, -0.03]**	**-0.15**	**0.06**	**[-0.26, -0.04]**
Army Branch	0.10	0.87	[-1.60, 1.80]	0.21	0.81	[-1.38, 1.80]
Veteran	-1.59	1.03	[-3.61, 0.43]	0.19	0.98	[-1.74, 2.11]

Note. Confidence intervals based on bias-corrected bootstrap of 5,000 iterations. Significant estimates are in bolded font.
[a]Higher scores indicate worse functioning.

included in the model, disordered eating behaviors were no longer significantly associated with sexual function. When examining the indirect effect of depression on disordered eating behavior and sexual function, the effect was significant beyond the effects of covariates (indirect effect: -1.12, 95% CI= -1.42, -0.85).

CHAPTER IV

DISCUSSION

The purpose of the current study was to examine whether sexual function and disordered eating behavior were associated in female military service members/veterans, and whether depression mediated this association. As research on the association of sexual function and related mental health concerns is limited in this population, the current study adds novel information to the existing research on sexual function. Results demonstrated that worse sexual function was associated with higher disordered eating behavior, and the mechanism through which higher disordered eating behavior and lower sexual function related was indirect, through depression.

The current study observed that depression more fully explains the association of disordered eating behavior and sexual function. As such, it is possible that treatment of depression may aid in the improvement of sexual function in female service members/veterans. While interventions for poor sexual function are limited, there are many evidence-based treatments that improve depressive symptoms. Indeed, research suggests depression is effectively treated with Behavioral Activation (Dimidjin et al., 2006; Dobson et al., 2008), Acceptance and Commitment Therapy (see review, Twohig & Levin, 2017), and Cognitive Behavioral Therapy (CBT; see review, Hofmann, Asnaani, Vonk, Sawyer, & Fang, 2012). Though the research on the effectiveness of treating depression in attempt to mitigate the association of disordered eating behaviors and sexual function in service members and veterans is limited, a study of 451 civilians that measured sexual function before and after CBT for depression and anxiety and found that sexual function significantly improved in patients that fully remitted or reported

decreased depression (Hoyer, Uhmann, Rambow, & Jacobi, 2008). It is important to note that treatment for depression may also include medication, which can exacerbate sexual health concerns given the side effect profiles of many medications (see review, Serretti & Chiesa, 2009). As such, psychotherapy may be the best option for those with poor sexual function, depression, and disordered eating behaviors.

Findings further suggest that screening for sexual function in females that are sexually active and screen positive for depression in mental health clinics will provide a targeted approach to identify those with poor sexual function. For instance, depression may be a useful target to identify sexual dysfunction as it is regularly screened for within the VHA. Primary care settings have also implemented routine depression screening in public health facilities (Kagee, Tsai, Lund, & Tomlinson, 2013; Halverson & Chan, 2004), suggesting that follow-up screening for sexual function could capture female service members and veterans with poor sexual function in more general health care settings as well. Given that odds of poor sexual function are more than seven times higher in female veterans with depression (Cohen et al., 2012) and the prevalence of veterans with depressive diagnoses has increased over time (Seal et al., 2009), this targeted approach may improve and expedite the screening process for females with poor sexual function. Lastly, this targeted approach may provide an improved setting to discuss sexual function as mental health concerns are already being identified and treated.

Findings from adjusted models revealed that female service members and veterans who reported being married, relative to those who were unmarried, had lower sexual function. Such findings suggest that therapies that directly address relationship factors, such as couples therapy, may be useful in treating poor sexual function. While

treatments for poor female sexual function are limited, a commonly used psychological treatment for sexual function is Sensate Focus (Masters & Johnson, 1970). This therapy was created by Masters & Johnson (1966), who suggested the sexual response cycle occurs through a linear path that includes desire, arousal, orgasm, and resolution. Basson (2000) criticized this model for only accounting for the sexual response in newer relationships, and proposed a model that aims to consider female sexual function in long-term relationships. Basson's (2000) model suggests that the start of a sexual response in females in long-term relationships is not spontaneous desire, but rather a logical choice/decision to engage in sexual activity. Further, Basson argues that absence of orgasm is common, and that females in long-term relationships may be more reinforced to engage in sexual activity for other reasons, including an opportunity to experience emotional closeness, bonding, and appreciation for the partner's well-being. Therefore, it is possible that couples therapy for females who are in long-term relationships, such as marriage, may improve sexual function by focusing on this cognitive decision-making aspect, as well as increasing reinforcers of sexual activity related to emotional closeness for couples in long-term relationships. As the current study found marital status was associated with poorer sexual function, and previous research reports poor sexual function is associated with worse individual relationship satisfaction (Blais, Monson, Livingston, & Maguen, 2019), it is possible that Basson's model provides a framework for couples or marital therapy that may better address poor sexual function in married females.

The current study has several limitations. First, the data used in this study are cross-sectional; therefore, the temporal association between disordered eating behavior,

depression, and sexual function cannot be determined. Second, disordered eating behaviors were assessed through use of a continuous scale. The use of continuous scale prohibited the differentiation of the types of eating disorders (i.e., binge eating disorder versus anorexia nervosa), which prevents an analysis of which types of eating disorders were associated with worse sexual function. Understanding this differentiation may improve understanding of whether sexual function is an outcome for certain eating disorders but not others, which could improve treatment selection for those with eating disorders and poor sexual function. Third, this study used a convenience sample, which may prevent the ability to generalize these results to single female service members and veterans or to male service members and veterans. Future research may consider examining the association of sexual function and disordered eating behaviors among a sample of female military service members and veterans who report being single, as well as males in the military who report being single.

Conclusions

Poor sexual function among female service members and veterans remains understudied. The current study found that higher disordered eating behaviors and lower sexual function are associated in female service members and veterans, and that depression is a potential mechanism through which disordered eating behavior relates to poor sexual function. This has potential implications for targeted screening of sexual function, as well as treatment approaches that may improve poor sexual function and comorbid mental health disorders. As the female veteran population continues to grow (NCVAS, 2017), and more than a third of female veterans are of reproductive age (Frayne et al., 2010; NCVAS, 2017), continued research could greatly benefit

identification and treatment of poor sexual function in partnered female service members and veterans.

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