Eating Disorders in a National Sample of Hospitalized Female and Male Veterans: Detection Rates and Psychiatric Comorbidity

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Abstract: **Objective:** *Using a national sample of hospitalized female and male veterans, this study examined the point prevalence of detected cases of eating disorders and explored psychiatric comorbidity in cases with an eating disorder.* **Methods:** *Prevalence rates were determined by reviewing the discharge diagnoses of 24,041 women and 466,590 men hospitalized in Veteran Affairs medical centers during fiscal year 1996. Comorbidity was examined by individually matching eating disorder cases (N = 161) with patients without an eating disorder, using sex, race, and age as matching variables.* **Results:** *On the basis of routine clinical diagnosis, 0.30% of the female veterans and 0.02% of the male veterans were diagnosed with a current ICD-9-CM eating disorder. Women with eating disorders had significantly elevated rates of comorbid substance, mood, anxiety (particularly posttraumatic stress disorder [PTSD]), adjustment, and personality (particularly borderline personality disorder [BPD]) disorders. Men with eating disorders were found to have high rates of comorbid organic mental, schizophrenic/psychotic, substance, and mood disorder.* **Conclusions:** *Our study illustrates the value of administrative data sets for the investigation of uncommon diseases. © 1999 by John Wiley & Sons, Inc.* Int J Eat Disord 25: 405–414, 1999.

Key words: *veterans; eating disorders; psychiatric comorbidity*

INTRODUCTION

As increasing numbers of women have entered the military, more women have been utilizing psychiatric and medical services provided by Veterans Affairs (VA) medical

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centers (Hoff & Rosenheck, 1997). VA clinicians are increasingly likely to encounter psychiatric disorders that occur more frequently in women than in men. As 90% of all eating disorder cases occur in girls and women (Carlat & Camargo, 1991; Hoek, 1993), the rise in the number of female veterans using VA medical services is likely to increase the need for expert management of these disorders. To our knowledge, no effort has been made to date to determine the extent to which eating disorders are being identified among female patients utilizing VA medical centers.

Eating disorders including anorexia nervosa (AN), bulimia nervosa (BN), and eating disorders not otherwise specified (EDNOS) are relatively rare, affecting approximately 1% of adult women (Fairburn & Beglin, 1990; Fombonne, 1995; Hoek, 1993; Striegel-Moore & Marcus, 1995). Because eating disorders are so rare among men, very few researchers even attempt to study these disorders in men. Despite their relatively low prevalence rates, eating disorders merit further study, as they are associated with serious impairments in physical, psychological, and social functioning (for reviews, see Halmi et al., 1991; Kaplan & Garfinkel, 1993; Keller, Herzog, Lavori, Bradburn, & Mahoney, 1992; Vitousek & Manke, 1994). The diagnosis and treatment of eating disorders is further complicated because eating disorders often occur in the context of significant comorbid psychopathology, including mood disorders, anxiety disorders, and substance abuse disorders (for reviews, see Braun, Sunday, & Halmi, 1994; Wonderlich & Mitchell, 1997).

The purpose of this study was to describe eating disorders and their psychiatric comorbidity in a national sample of hospitalized female and male veterans. Specifically, we sought (1) to describe the prevalence of detected cases of AN, BN, and EDNOS; (2) to determine rates of psychiatric comorbidity in individuals with a diagnosed eating disorder; and (3) to explore gender differences in prevalence and comorbidity of eating disorders. It is hoped that this information will assist clinicians in the assessment and management of a clinical disorder that is likely to become increasingly common in VA inpatient settings as more women utilize VA health services. Investigating eating disorders in male veterans also provides the opportunity for considering how a disorder that occurs predominantly in women may present in male patients.

METHODS

Source of Data

The data were based on the discharge abstracts contained in a comprehensive computerized database of all hospital discharges occurring nationally in fiscal year 1996 (October 1, 1995 to September 30, 1996) in the Veterans Health Administration of the Department of Veterans Affairs. For this report, the following data were available: race, gender, age, primary diagnosis (the diagnosis primarily responsible for the length of stay), and up to nine secondary diagnoses. During fiscal year 1996, a total of 837,275 inpatient episodes of care were recorded at 155 VA medical centers, representing a total of 490,631 individual patients.

Participants

The database included treatment files of 24,041 female patients and 466,590 male patients. Of the female patients, 74% were Caucasian; the largest minority group was African American (18.8%). Among the male patients, 72% were Caucasian, with African

Americans again representing the largest non-Caucasian group (21.24%). The mean ages of women and men were 51.38 years (SD = 17.20) and 60.16 years (SD = 14.17), respectively.

Diagnostic Assessment

Diagnoses were based on clinical assessments by VA clinical staff and were recorded in computerized discharge summaries using ICD-9-CM codes (U.S. Department of Health and Human Services, 1991).

Data Analyses

Point prevalence rates of detected eating disorders were established using the entire database. For the comorbidity analyses, eating disorder cases were individually matched with patients without an eating disorder using sex, race, and age as matching variables. These matching variables were selected because sex, race, and age have been found to be risk factors for some psychiatric disorders (Kessler et al., 1994; Robins et al., 1991). For patients who had been admitted more than once, data from all discharge summaries during the 1-year period were reviewed and all psychiatric diagnoses were utilized for calculating comorbidity rates. The comorbidity analyses included the following diagnostic categories (chosen to make our classification comparable to previous comorbidity studies in eating disorders): organic mental disorder (including cognitive impairment and substance-related disorder, but excluding substance abuse or dependence); substance abuse or dependence; schizophrenia or other psychotic disorder (excluding psychoses related to substance use or physical condition); mood disorder; anxiety disorder (including posttraumatic stress disorder [PTSD]); adjustment disorder; and personality disorder. Chi-square tests were used to compare the proportions of cases and controls in each of the diagnostic groupings. The proportions of men and women with an eating disorder in each of the diagnostic groupings also were compared using chi-square tests. Because there were multiple chi-square tests in these two sets of comorbidity comparisons (cases vs. controls and eating disorder men vs. women), Bonferroni adjustments (p = .05/number of comparisons) were made to correct for inflated Type I errors. This resulted in setting the significance level at .007. For chi squares found to be significant, odds ratios and confidence intervals were computed following the methodology described by Fleiss (1981).

RESULTS

Prevalence of Detected Eating Disorders Among Hospitalized Male and Female Veterans

One hundred sixty-one eating disorder cases were identified, including 63 women (0.30%) and 98 men (0.02%). Eleven women received a diagnosis of AN, 20 women were diagnosed with BN, 7 women had a dual diagnosis of AN and BN, and 25 women had a diagnosis of EDNOS. There were 25 men with AN, 17 men with BN, and 56 men with a diagnosis of EDNOS.

Non-Caucasian women represented 15.9% of all eating disorder cases, a rate that is somewhat lower than the proportion of non-Caucasian female veterans in the sample (26.8%, $\chi^2 = 4.21$, $p < .04$; odds ratio = 0.52). Specifically, among the female cases, there were 53 Caucasians, 7 Blacks, 2 Hispanics, and 1 Native American. Of the men with an

eating disorder, 19.4% were non-Caucasian, compared to 27.0% of the male veterans in the total sample ($\chi^2 = 4.14$, $p < .04$; odds ratio = 0.61). Among the men, there were 79 Caucasians, 15 Blacks, 1 Asian, 1 Hispanic, 1 Native American, and 1 of unknown race/ethnicity. More detailed analyses of the association between eating disorders and race/ethnicity were unfortunately not possible, due to the small numbers of cases representing specific minority groups.

Women with an eating disorder were significantly younger ($M = 35.33$ years, $SD = 9.82$) than women without an eating disorder [$M = 51.61$ years, $SD = 17.13$, $F_{(1, 7056)} = 71.99$, $p < .0001$]. Similarly, men with an eating disorder ($M = 53.53$ years, $SD = 15.03$) were significantly younger than men without an eating disorder [$M = 60.25$ years, $SD = 14.14$, $F_{(1, 7107)} = 33.02$, $p < .0001$]. Previous prevalence studies have included mostly young adult participants and have found that individuals between the ages of 14 and 40 years are at greatest risk for an eating disorder (Woodside & Garfinkel, 1992). Therefore, in a secondary analysis, we recalculated prevalence rates of eating disorders among veterans age 40 or younger. This resulted in a prevalence rate of 0.60% for women and 0.03% for men.

Psychiatric Comorbidity in Eating Disorders

As described earlier, a control sample of patients without an eating disorder was established from the patient pool by randomly selecting 63 women (mean age = 35.35, $SD = 9.80$) and 98 men (mean age = 53.56, $SD = 15.01$) who were individually matched to the eating disorder cases on sex, race, and age. Cases and controls were then compared on rates of psychiatric comorbidity. Results will be presented separately for the women and the men, followed by a description of gender differences in psychiatric comorbidity.

Female VA Patients with an Eating Disorder

Comorbidity was high in women with an eating disorder. Only 5% of female cases had no comorbid psychiatric diagnosis, compared to 68% of female controls ($\chi^2 = 62.52$, $p < .0001$). Multiple psychiatric comorbidity was also more common among cases ($M = 2.51$, $SD = 1.48$) than among controls [$M = 0.51$, $SD = 0.93$; $F_{(1, 124)} = 82.45$, $p < .0001$]. As shown in Table 1, among women with an eating disorder, the most common comorbid psychiatric disorders were mood disorder and personality disorder. About one third of female cases had diagnoses of substance abuse or dependence disorder, anxiety disorder, or adjustment disorder. Further inspection of ICD-9-CM codes for specific disorders revealed that 25% of the female cases, compared to 8% of female controls, had a diagnosis of PTSD; 38% of the cases, compared to none of the controls, had a diagnosis of borderline personality disorder (BPD). There was very little overlap between BPD and PTSD: only 12.5% of women with a BPD diagnosis also had a PTSD diagnosis. Significant odds ratios for comorbid diagnoses were found for substance abuse or dependence disorder, mood disorder, anxiety disorder, adjustment disorder, and personality disorder.

Male VA Patients with an Eating Disorder

Psychiatric comorbidity was also high among the male veterans with an eating disorder. Only 8% of male cases, compared to 61% of male controls, did not have a comorbid psychiatric condition ($\chi^2 = 66.76$, $p < .0001$). Multiple psychiatric comorbidity was also more common among men with an eating disorder ($M = 1.95$, $SD = 1.22$) than among male controls [$M = 0.71$, $SD = 1.07$; $F_{(1, 194)} = 56.44$, $p < .0001$]. As shown in Table 2, the most common comorbid psychiatric diagnoses among men with an eating disorder were substance abuse or dependence disorder and mood disorder. Almost one third of the male

Table 1. Prevalence and odds ratios for psychiatric disorders for female eating disorder cases and controls in a Veterans Administration medical center inpatient sample

Diagnosis	Eating-Disordered Cases (N = 63)		Matched Controls (N = 63)		χ^2 (df = 1)	Odds Ratio	Confidence Interval
	N	%	N	%			
Organic mental disorder	7	11	1	2	5.37		
Substance abuse or dependence disorder	21	33	6	10	11.11*	4.75	1.66–12.06
Schizophrenia or other psychotic disorder	6	10	6	10	0		
Mood disorder	33	60	9	14	30.15**	9.12	3.64–20.62
Anxiety disorder	18	29	4	6	11.53*	5.90	1.70–16.99
Adjustment disorder	18	29	4	6	11.53*	5.90	1.70–16.99
Personality disorder	31	49	0	0	53.28**	123.09	3.68–1047.00

*$p < .001$.
**$p < .0001$.

cases had a diagnosis of schizophrenia or other psychotic disorder. Among men with an eating disorder, PTSD (8%) was slightly less common than among male controls (12%). BPD was rare among both male cases (3%) and male controls (3%). Odds ratios were significant for organic mental disorder, substance abuse or dependence, schizophrenia or other psychotic disorder, and mood disorder.

Gender Differences in Psychiatric Comorbidity in Eating Disorders

Eating disorders were significantly more common among women than men (χ^2 = 398.03, $p < .001$). The odds ratio of an eating disorder case being female was 12.51 (confidence interval = 9.14–17.22). It was also significantly more likely for women (25.4%) than for men (10.2%) for the eating disorder diagnosis to be the primary diagnosis (χ^2 = 6.38, $p < .02$; odds ratio = 3.00). Women with an eating disorder were significantly younger than men with an eating disorder [$F_{(1, 159)} = 72.44$, $p < .0001$].

Table 2. Prevalence and odds ratios for psychiatric disorders for male eating disorder cases and controls in a Veterans Administration medical center inpatient sample

Diagnosis	Eating-Disordered Cases (N = 98)		Matched Controls (N = 98)		χ^2 (df = 1)	Odds Ratio	Confidence Interval
	N	%	N	%			
Organic mental disorder	22	22	5	5	13.26**	5.38	1.81–13.83
Substance abuse or dependence disorder	37	38	13	13	14.20**	3.97	1.89–7.87
Schizophrenia or other psychotic disorder	27	28	10	10	9.93*	3.35	1.47–7.14
Mood disorder	38	39	9	9	24.93**	6.26	2.70–13.30
Anxiety disorder	20	20	13	13	1.80		
Adjustment disorder	10	10	13	13	0.44		
Personality disorder	18	18	6	6	7.12		

*$p < .001$.
**$p < .0001$.

Women had a greater mean number (M = 2.51, SD = 1.48) of psychiatric comorbid diagnoses than men [M = 1.95, SD = 1.22, $F_{(1, 159)} = 6.79$, $p < .01$]. As shown in Table 3, comparison of comorbidity rates in women and men with an eating disorder revealed that women were significantly more likely than men to experience a mood, adjustment, or personality (especially BPD) disorder, whereas male cases were significantly more likely than female cases to have comorbid schizophrenia or other psychotic disorder. No gender differences were found in the comorbidity of organic mental disorder, substance abuse or dependence disorder, or anxiety disorder.

DISCUSSION

The point prevalence rates of eating disorders in this national sample of hospitalized veterans were 0.30% for women and 0.02% for men. It is important to keep in mind that these prevalence rates reflect only the number of cases detected by the hospital staff. Two recent reviews describe the formidable methodological challenges involved in obtaining estimates of the prevalence of rare diseases such as eating disorders (Fombonne, 1995; Hoek, 1993). This area of research is characterized by an almost complete lack of methodological consistency across research studies. Differences in diagnostic criteria used to define cases, methods applied to ascertain case status, and demographic characteristics of the populations under investigation all influence the number of cases detected. In the only large-scale epidemiological study in the United States that included a broad age and race spectrum, the Epidemiologic Catchment Area (ECA) study (Robins & Regier, 1991), only 11 cases of AN were identified in a sample of nearly 20,000 men and women (Robins et al., 1984). The ECA study was initiated before BN became a diagnostic category in the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 1980). Consequently, questions about bulimic symptoms were not included in the ECA study. It is estimated that only 1 in 10 cases with an eating disorder is detected by medical staff in routine clinical practice (Turnbull, Ward, Treasure, Jick, & Derby, 1996; Whitehouse, Cooper, Vize, Hill, & Vogel, 1992).

In a study similar to the present investigation, using a large administrative data set

Table 3. Prevalence and odds ratios for psychiatric disorders in an inpatient sample of veterans with an eating disorder

Diagnosis	Women (N = 63)		Men (N = 98)		χ^2 (df = 1)	Odds Ratio	Confidence Interval
	N	%	N	%			
Organic mental disorder	7	11	22	22	3.52		
Substance abuse or dependence disorder	21	33	37	38	0.33		
Schizophrenia or other psychotic disorder	6	10	27	28	8.32*	3.61	1.31–8.80
Mood disorder	38	60	38	39	7.18*	2.40	1.24–4.54
Anxiety disorder	18	29	20	20	1.40		
Adjustment disorder	18	29	10	10	8.80*	3.52	1.46–8.04
Borderline personality disorder	24	38	3	3	35.06**	19.49	4.82–59.47
Personality disorder	31	49	18	18	17.07**	4.31	2.07–8.59

*$p < .007$.
**$p < .0001$.

containing diagnoses of patients registered with a general practitioner in England, Turnbull et al. (1996) found that, among women age 10 to 39 years, incidence rates were 0.0079% for AN and 0.0233% for BN. For men, incidence rates in this age group were 0.0002% for AN and 0.0005% for BN. No prevalence data were provided in this study. Based on data collected among patients registered with a general practitioner in Holland, Hoek (1991) estimated that the incidence of AN was about one third the point prevalence for AN and the incidence of BN about one half the point prevalence for BN. Taken together, all studies of incidence and prevalence show that eating disorders are indeed quite rare (Fombonne, 1995; Hoek, 1993). The low base rates of eating disorders make administrative data sets, which typically contain observations based on very large samples, invaluable for gaining a better understanding of these rare disorders.

Despite some unique characteristics of this VA sample, which limit its generalizability, three key findings were consistent with earlier reports. First, eating disorders were significantly more common among women than men, with the ratio of female to male cases observed in the present study consistent with the typical gender ratio (10:1) reported in the literature (Hoek, 1993). Second, age was associated inversely with eating disorder status: Eating disorder cases were younger than patients who did not have an eating disorder. Third, eating disorder status was associated with high rates of psychiatric comorbidity.

Furthermore, the patterns of psychiatric comorbidity were consistent with previous findings (for review, see Wonderlich & Mitchell, 1997). The present study replicated the association between eating disorders in women and comorbid substance abuse, mood, anxiety, and personality disorders found in both community-based samples (Garfinkel et al., 1995, 1996; Kendler et al., 1991; Rastam, 1992; Walters & Kendler, 1995) and clinic-based studies (e.g., Halmi et al., 1991; Herzog, Keller, Sacks, Yeh, & Lavori, 1992). Consistent with these earlier reports, depression, anxiety, and substance abuse were the three most common comorbid psychiatric disorders. The present study also examined comorbidity for organic mental disorder, schizophrenia/psychotic disorder, adjustment disorder, and PTSD, which were not included in previous studies. These new findings, along with the psychiatric comorbidity for men with eating disorders, are discussed below.

In our sample, men with an eating disorder were as likely as women with an eating disorder to experience comorbid mood disorder, anxiety disorder, and substance abuse or dependence disorder. In the largest case series (N = 135) of male patients seeking treatment for an eating disorder reported to date, comparable rates to ours were found for substance abuse (37%) and anxiety disorders (17%), but higher rates were found for personality disorders (26%) and major depression (54%). The men in this case series were considerably younger (mean age = 19 years) than the male patients in the present study, making it difficult to interpret these differences in comorbidity patterns.

The high rate of comorbid organic mental disorders found for the male eating disorder cases, but not for the female cases, raises important questions about differential diagnosis. Given that organic mental disorders include substance-related disorders, for example, substance-related dementias, the high rate of concomitant organic disorder may reflect the high rates of substance abuse in this sample. It is possible that the male and female cases differed in terms of the nature and severity of their substance abuse problems, with women having milder and therefore nonorganic complications. However, this cannot be determined from the present study. The significantly older age of the male eating disorder cases could also have placed the men at greater risk for age-related organic disturbances. Alternatively, eating problems may have occurred in the context of a nonsubstance abuse-

related organic problem, for example, reduced food intake in the context of a brain tumor. If this was the case, the eating problems were inappropriately diagnosed as an eating disorder.

The pattern of comorbidity of psychotic disorders and eating disorders in men seems to represent a distinct and, at present, relatively understudied clinical picture, which may be gender linked. With the exception of several case reports of schizophrenic patients with eating disorders (e.g., Andrew & Harris, 1994; Deckelman, Dixon, & Conley, 1997), there is little research that has examined eating disorders in the context of severe mental disturbance. This complex clinical presentation is likely to pose unique treatment problems. For example, tube-feeding an anorectic schizophrenic patient, already suffering from delusional fears of thought insertion and body invasion, will require special tact and planning.

In the present study, which grouped PTSD under anxiety disorders, one fourth of women with an eating disorder also had PTSD. This high rate of comorbid PTSD is consistent with extensive empirical evidence indicating that rates of sexual and physical abuse are very high among women with eating disorders (Everill & Waller, 1995; Welch & Fairburn, 1994; Wonderlich, Wilsnack, Wilsnack, & Harris, 1996). Further research is needed to determine the nature of the traumatic stressors associated with the development of eating disorders in this population of female veterans. Moreover, future studies should investigate why men with eating disorders do not have similarly elevated rates of comorbid anxiety disorders, and PTSD in particular.

Study Limitations

Our prevalence rates based on detected cases are likely to underestimate the true current prevalence rates. It is now generally agreed that standardized, structured research interviews result in higher detection rates than clinical diagnosis (Fairburn & Beglin, 1990; Kutcher, Whitehouse, & Freeman, 1985). Identifying eating disorders during routine clinical practice is quite challenging, given the relatively low base rates of eating disorders, the stigma against self-disclosure, and the propensity for clinicians to overlook eating disorder symptomatology (Kutcher et al., 1985; Whitehouse et al., 1992).

Age is a known risk factor for eating disorders, with persons in the 14 to 40-year-old range at greatest risk (Woodside & Garfinkel, 1992). In our sample, 77% of the women and 91% of the men were over 40 years old, and thus well outside of this at-risk range. Indeed, limiting our prevalence analysis to veterans age 40 years or younger increased the prevalence rate of eating disorders in both women and men. These age effects should be kept in mind when generalizing from this study to other populations.

These limitations notwithstanding, this study now represents the largest epidemiological study of the prevalence of eating disorders and their psychiatric comorbidity in North America. Our results regarding gender, age distribution, and psychiatric comorbidity patterns are consistent with results reported in previous studies. Moreover, the present study extends previous investigations by offering data on men with eating disorders. In addition, we report comorbidity data for several psychiatric disorders that were not assessed in previous studies, such as PTSD, organic mental disorder, and schizophrenia/psychotic disorder. As shown previously by Turnbull and colleagues (1996), our study illustrates the value of large administrative data sets in illuminating risk factors and clinical features of uncommon diseases.

CONCLUSIONS

The present study described the prevalence and psychiatric comorbidity of eating disorders in a large national sample of hospitalized female and male veterans. We found that 0.30% of the female veterans and 0.02% of the male veterans received an ICD-9-CM diagnosis of a current eating disorder. Both female and male eating disorder cases had high rates of psychiatric comorbidity, but there were significant differences in their respective clinical profiles. For women, the eating disorder diagnosis was more likely to be the primary diagnosis, with significantly increased odds of a comorbid substance, mood, anxiety (particularly PTSD), adjustment, or personality (particularly BPD) disorder. For men, in contrast, the eating disorder diagnosis was generally a secondary diagnosis and was associated with organic mental, substance, schizophrenia/psychotic, or mood disorder. These high rates of psychiatric comorbidity, in the context of significant gender differences, underscore the complexity of assessment and treatment for women and men with eating disorders.

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