

# Are There Gender Differences in Core Symptoms, Temperament, and Short-Term Prospective Outcome in Anorexia Nervosa?

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## ABSTRACT

**Objective:** The objective of this study was to compare symptoms, premorbid personality phenotypes, and short-term outcome between males and females with anorexia nervosa.

**Method:** Symptom and personality ratings were obtained at the time of hospital admission, and outcome was assessed at discharge and again 1 year later.

**Results:** Gender effects were negligible at admission, with the exception of greater weight concern among females. Lifetime anxiety disorders and personality traits implicated in liability for anorexia nervosa were common among patients of both genders. Females had greater persistence of symptom morbidity over the 1-year follow-up.

**Conclusion:** Although gender has little effect on the clinical features of anorexia nervosa, the illness runs a more protracted early course in females. Possible mechanisms underlying greater persistence of morbidity in females include sexual dimorphisms in brain neurotransmission, gender differences in attitudes regarding ideal body weight, and anxiety-related personality phenotypes associated with anorexia nervosa. © 2006 by Wiley Periodicals, Inc.

**Keywords:** gender; outcome; comorbidity; personality; symptoms

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## Introduction

Anorexia nervosa is an uncommon illness that occurs primarily in females. In most cases, time to recovery is lengthy, and heritable premorbid traits of perfectionism, inhibition, anxiety, and rigidity are contributory factors.<sup>1–5</sup>

The markedly higher prevalence of anorexia nervosa among females has encouraged speculation that causative influences may differ between genders. Lending support to this idea are anecdotal observations suggesting that males with anorexia nervosa have more atypical features such as psychosis, personality disorder, and sexual deviance than females,

but less concern with actual weight.<sup>5</sup> However, not all studies have shown gender differences in core symptoms, and some have shown that males with anorexia nervosa have familial aggregation of eating disorder and long-term outcome profiles similar to those in female samples.<sup>6–11</sup> We are unaware of any study that simultaneously investigates gender differences in symptom phenomenology, personality traits associated with risk of anorexia nervosa, psychiatric comorbidity, and prospectively observed outcome in a consecutively ascertained, well matched sample of male and female cases.

## Method

### Subjects

Written informed consent was obtained from all participants in this study which was approved by The Institutional Review Board of the University of California Los Angeles. The sample consists of 99 consecutive patients, 85 girls and 14 boys, 13–17 years of age (mean age 15.1, *SD* = 1.7), with a consensus diagnosis of anorexia nervosa by Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) criteria admitted to the eating disorders service of the Resnick UCLA Neuropsychiatric Hospital. No patient of either gender had a history of objective

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binge eating up to the time of intake, whereas “any” vomiting was reported by 1 male (7.1%) and 8 females (9.4%) upon intake. The service receives referrals from throughout the United States and provides a range of psychological services, pharmacotherapy, and supervised nutritional rehabilitation for severely ill patients requiring inpatient care. All patients receive an equivalent therapeutic regimen that involves multiple sessions each week of individual and group therapy, weekly family therapy, occupational and recreational therapy, bibliotherapy, and training in relaxation techniques, yoga, and relapse prevention. Upon reaching medical and clinical stabilization, patients transition to daily multidisciplinary care between the hours of 8:00 AM and 6:00 PM in a partial hospital program dedicated specifically to treatment of eating disorders. They remain at this level of care until restored to a prescribed minimum target maintenance weight that is 90% of expected weight based on growth curves for children. During the final weeks of treatment, time spent in the program is steadily decreased to maximize generalization of progress to home and social settings. The average duration of treatment received by patients in this report was 3.9 months ( $SD = 0.9$ ; range, 2.0–6.5 months). All subjects were English speaking, the majority (93.9%) were white, all resided with at least one biological parent, and all came from middle-class to upper-class social backgrounds. The two groups did not differ statistically on any potentially confounding demographic, clinical, or historical variable, including age, body mass index (BMI;  $M = 12.1$ ,  $SD = 1.1$ ; range, 9.0–15.9); duration of illness ( $M = 12.5$  months,  $SD = 6.5$ ; range, 4–24); the proportion with prior outpatient care or other inpatient admissions (70.7%); or the proportion who received adjunctive pharmacotherapy during their UCLA treatment (60.6%). All patients completed the full course of recommended care, which entailed remaining in the program until weight was restored to 90% of average for age and height. The mean BMI in the cohort at discharge was 18.6 ( $SD = 0.42$ ).

### Assessments

Patients and parents were interviewed jointly and independently within the first week of admission to assess core eating disorder symptomatology, premorbid development, and psychiatric comorbidity. Core features of anorexia nervosa were assessed by the Eating Disorders Examination (EDE),<sup>12</sup> conducted by senior clinical staff with more than 15 years of experience in the treatment of eating disorders. EDE subscale scores measuring Eating Concerns, Restraint, Weight Concerns, and Shape Concerns for the month before admission were based on patient and parent interviews, supplemented by outside medical records and clinical observation of the patient during the initial week of treatment, and represent a best estimate judgment based on all available sources of

information. Comorbid lifetime psychiatric disorders were assessed using the Kiddie Schedule for Schizophrenia and Affective Disorders (K-SADS),<sup>13</sup> a semi-structured symptom-based interview covering all diagnoses in DSM-IV, administered separately to patient and parent; ratings were the consensus judgment of two clinicians.

To assess premorbid traits linked to risk of anorexia nervosa, we used a semi-structured interview developed by the authors and administered jointly to parents and patient covering four phenotypic traits: the tendency to worry or brood (Anxious Worry); insistence on regularity or routine and avoidance of change or novelty (Aversion to Change); perfectionism (Perfectionism); and avoidance of rule violation, compliance, and seeking approval from others (Compliance). Respondents were read brief, qualitative descriptors of each trait and were asked to judge on a 0–2-point scale the relative “fit” of the descriptor to the subject’s behavior in the several years leading up to onset of the illness, with a score of 2 signifying unequivocal, longstanding prominence of the trait. The assessment shares features in common with a more recently developed measure of premorbid temperament in anorexia nervosa described by Anderluh et al.<sup>4</sup> Two interviewers independently assigned best-estimate consensus ratings taking into account each of the respondent’s answers.

Outcome was measured prospectively in the following ways. First, a global 7-point Clinical Global Improvement (CGI) score ranging from very much worse to very much improved was assigned to each patient at discharge based on the consensus judgment of two senior clinical staff who considered all aspects of the patient’s expressed and observed behavior in the domains of eating, attitudes regarding weight and shape, and compensatory features. Since patients are no longer in daily attendance in the program in the final weeks of treatment, it is possible to assess persistence of dietary restriction and exercise behaviors across multiple settings via patient and parent report for purpose of the discharge CGI rating. Thus, bearing in mind that all patients have been restored to their prescribed target weight at this point, a rating of “No Change” at discharge would imply mental and eating attitudes and psychological features of anorexia nervosa equal in intensity and frequency to those observed at the time of hospital admission.

Second, the EDE was readministered 1 year after discharge, at which time a follow-up CGI score was also derived that reflected overall clinical status at this time relative to status at the time of the index admission. Finally, the course of weight maintenance from the time of discharge was assessed prospectively from planned telephone contacts with parents and treating clinicians scheduled at 3-month intervals following discharge. All weights obtained through these contacts and reported in the present study were those recorded during outpatient clinic or therapist visits; at no time were self- or parent-reported weights used. Accordingly, the disciplines assuming

responsibility for the monitoring of weights as part of the patient's follow-up therapy varied, including pediatricians, therapists, and nutritionists. Complete initial and follow-up assessments were obtained on all 99 patients.

Kappa ( $\kappa$ ) coefficients of agreement indicated satisfactory reliabilities for the measures of comorbidity and personality phenotype: .77 to .91 for K-SADS anxiety disorders (as noted below, the most frequently present comorbid diagnosis), and .72 to .88 for dichotomized (presence = score of 2 vs absence = score of 0 or 1) ratings of temperament. Intra-class coefficients of reliability of EDE scores ranged from .79 to .91 based on joint ratings of 15 subjects, and for CGI at discharge the coefficient was .84 based on joint ratings of 20 patients.

### Analyses

Gender differences on continuous measures were examined using independent *t* tests, and  $\chi^2$  and Fisher's exact tests were used for assessing categorical variables. The Kaplan–Meier estimation with censored observations was used for calculating time to sustained weight loss, defined, a priori, as a minimum of 4 continuous weeks below the maintenance target weight range. Thus, only weight loss resulting in not less than 28 uninterrupted days below the prescribed target weight was counted in the survival analysis. Censored data included subjects who had not met the criteria for weight loss by end of the 1-year follow-up. Difference between the survival distributions was assessed using the log-rank test. Because all analyses were considered exploratory, correction for multiple comparisons was not employed. A two-tailed significance level of .05 was used for all statistical tests.

## Results

### Diagnostic Comorbidity

Comorbid psychiatric illness, most cases of which preceded the onset of anorexia nervosa, was common in the sample. There were no statistically significant gender differences in comorbidity with Axis I disorders, the most prominent of which were anxiety. Altogether, 7 (50%) of the 14 male patients and 47 (55.2%) of the 85 female patients had at least one of four syndromes of anxiety disorder, with no evidence of variation in subtype or number of anxiety disorder by gender. Obsessive-compulsive disorder occurred in 35.7% ( $n = 5$ ) of the boys compared with 44.7% ( $n = 38$ ) of the girls; generalized anxiety in 35.7% ( $n = 5$ ) of the boys compared with 60% ( $n = 51$ ) of the girls; social phobia in 28.6% ( $n = 4$ ) of the boys compared with 30.6% ( $n = 26$ ) of the girls; and separation anxiety in 28.6% ( $n = 4$ ) of the boys compared with 44.7%

( $n = 38$ ) of the girls. Oppositional defiant disorder was relatively inconspicuous in the sample, occurring in only 1 of the boys (7.1%) and 3 (3.5%) of the girls. No patient had a psychiatric diagnosis which involved psychosis.

### Premorbid Personality

Phenotypic traits that have been implicated in anorexia nervosa were also prominent, and no gender differences were observed. The rates as a function of subject gender were as follows: "Anxious Worry" was present in 64.3% ( $n = 9$ ) of the males compared with 68.2% ( $n = 58$ ) of the females; "Aversion to Change" was present in 71.4% of the males ( $n = 10$ ) compared with 67.1% of the females ( $n = 57$ ); "Perfectionism" was present in 50% of the males ( $n = 7$ ) compared with 72.9% ( $n = 62$ ) of the females; and "Compliance" was present in 50% ( $n = 7$ ) of the males compared with 61.2% ( $n = 52$ ) of the females.

### EDE Scale Scores

**Table 1** presents means and *p* values for the comparison of EDE scores for subjects at the time of their hospital admission and at the time of follow-up. At admission, the scores indicate that morbidity in eating habits and attitudes regarding weight and shape is high regardless of gender. Independent *t* tests detected a significant gender effect only for Weight Concerns, with females scoring higher than males ( $p < .001$ ).

### Illness Course

Persistence of illness without clinically measurable change up to the point of discharge was uncommon. Altogether, 11 (78.6%) of the 14 male patients and 65 (76.5%) of the 85 female patients were rated as "Very Much" or "Much" improved at the time of discharge. Only seven patients of the total of 99 were rated as "No Change," all female.

By contrast, gender effects for symptom morbidity were detected when illness course was assessed prospectively. As shown in **Table 1**, there were statistically significant differences in mean EDE scale scores at 1-year follow-up, with females scoring higher than males in Weight ( $p < .006$ ), Shape ( $p < .04$ ), and Eating Concerns ( $p < .008$ ). In parallel to these differences, at the 1-year postdischarge assessment, the proportion of females rated as "Very Much" or "Much" Improved relative to admission decreased from 65 out of 85 (76.5%) to 55 of 85 (64.7%), whereas the CGI rating of "Very Much or "Much" in males held steady at 78.6%. Likewise, whereas none of the males relapsed into full anorexia nervosa during the year following discharge,

**TABLE 1. Eating disorder examination scale scores at admission and at follow-up**

Score	Boys ( <i>n</i> = 14)		Girls ( <i>n</i> = 85)		Analysis		
	Mean	<i>SD</i>	Mean	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>
At admission							
Restraint	5.21	.45	5.23	.43	0.13	97	ns
Weight concern	4.96	.27	5.32	.40	3.30	97	.001
Shape concern	5.01	.41	5.13	.38	1.07	97	ns
Eating concern	5.14	.44	5.20	.41	0.50	97	ns
At follow-up							
Restraint	1.43	1.02	1.85	.81	1.72	97	ns
Weight concern	1.64	0.74	2.21	.69	2.82	97	.006
Shape concern	1.79	0.70	2.24	.73	2.14	97	0.04
Eating concern	1.43	.93	2.05	.77	2.70	97	.008

there were 7 (8.2%) relapses among females, all occurring in the cases rated as “No Change” at discharge. None of these contrasts was statistically significant. Mean BMI at follow-up was 18.87 (*SD* = 0.45) in male participants and 18.65 (*SD* = 0.51) in female participants, a nonsignificant difference.

We considered the possibility that differences in the three EDE scores at follow-up might be accounted for by greater residual symptom morbidity among the seven female patients who relapsed, three of whom still met full criteria for anorexia nervosa at the time of the follow-up assessment. Accordingly, we repeated analysis of the EDE scores eliminating these seven patients; the results were unchanged.

Similar to these observations, the postdischarge course of weight maintenance was generally less stable among females compared with males. The Kaplan–Meier survival rate of maintaining target weight stably throughout the prospective 1-year follow-up period was 85.3% in males compared with 65.9% in girls; however, the log-rank test comparing the two survival distributions was not statistically significant and the survival distributions remained virtually identical when the seven relapses were removed from the calculations.

### **Effects of Vomiting**

Although vomiting was relatively uncommon, because it was more frequent among females and is often viewed as a marker of illness severity, we considered its possible effect by repeating all analyses eliminating the nine vomiting patients. The results were not altered in any way.

## **Conclusion**

To our knowledge, gender differences in symptom phenomenology, comorbidity, susceptibility traits,

and early prospective outcome in anorexia nervosa have not been previously investigated in matched clinical cohorts of severely ill male and female patients. Our results showed that both genders exhibited equivalently severe core features of the illness upon hospital admission, they had comparably high prevalence rates of comorbidity with anxiety disorders, and they were commonly described by parents as expressing an “anxious” personality phenotype characterized by behavioral inhibition, perfectionism, and rigidity before illness onset. Initial EDE scores in these patients are consistent with severe anorexia nervosa and the observed rates of diagnostic comorbidity and pre-morbid phenotypes are equivalent to those reported in the literature.<sup>4,12,14,15</sup> The single gender difference at admission was the EDE score for Weight Concerns, with girls scoring statistically higher than males. In general, these findings concur with the relatively few clinical studies of gender influences in anorexia nervosa that have suggested minimal differences between males and females in symptom phenomenology,<sup>6–8</sup> but a possibly greater intensity of specific weight concerns among females.<sup>5</sup> Combined with our earlier report of strong familial transmission of anorexia nervosa in male patients,<sup>16</sup> the present findings support the descriptive, nosological validity of anorexia nervosa across genders.

In contrast to the lack of a gender difference in clinical features at presentation and equivalent ratings of global improvement, girls exhibited greater course morbidity following discharge. Specifically, they evidenced more intense weight, shape, and eating concerns when reassessed 1 year later, and although not statistically significant, they had more relapses and were more likely to drop below their prescribed maintenance target weight. Clearly, these observations require independent replication in a more adequately powered study with a larger sample of male patients. However, an intriguing question is whether greater weight concern exhibited by

females early during the course of their illness is, in fact, a “clinical marker” of processes that sustain, or strengthen, morbidity over time. Consistent with this possibility, and in accord with the findings of the present study, are reports showing that an absence of fat phobia may be associated with more favorable outcome in anorexia nervosa,<sup>17,18</sup> and that males may be disproportionately represented in a latent class of empirically defined eating disorder phenotypes which is characterized by less extreme eating- and weight-related concerns.<sup>19</sup>

It remains for future studies to determine whether weight concern per se confers heightened risk of a more pernicious long-term illness, is a risk factor for early relapse only, or is simply a correlate of other latent influences contributing to disease persistence that are more salient in females than in males. Hypothetical mechanisms that might contribute to greater persistence of symptom morbidity in females with anorexia nervosa include (1) sexual dimorphisms in brain serotonergic (5-hydroxytryptamine [5-HT]) activity and the effects of ovarian steroids on 5-HT pathways<sup>20,21</sup>; (2) differential vulnerability of females to changes in brain 5-HT function induced by chronic dieting<sup>22</sup>; (3) social and cultural norms that favor adoption of a thin weight ideal more selectively in females that may then lead to more entrenched fears of weight gain in the ill state; (4) stronger heritability of anxiety sensitization in females compared with males<sup>23</sup>; (5) and the generally higher prevalence of behavioral inhibition and neuroticism among females in the general population.<sup>24</sup> Notably, central serotonergic neurotransmission, which modulates response inhibition, anticipatory worry, and postprandial satiety, and which has been implicated as a biological risk factor in eating disorders,<sup>25</sup> is possibly heightened in women clinically recovered from anorexia nervosa,<sup>26,27</sup> supporting the idea that overexpression of these neuronal systems may play a role in sustaining behavioral, cognitive, and neural response patterns associated with this illness. Whether males express heightened serotonergic activity in the long-term recovered state remains unknown.

Several limitations of the study deserve note. Given the small number of male patients studied, the relatively young age of these participants, and the brief duration of the follow-up, future onsets of other anxiety disorders and vomiting/binge eating are possible, if not likely. Moreover, because statistical power may have been inadequate for detecting significant differences between the groups, conclusions at this time regarding gender differences in course morbidity remain premature. Addi-

tional limitations of the study reflect certain unique features of the participants, including their recruitment from a specialty inpatient facility; the relative absence of binge/purge behaviors in the two cohorts along with the exceptional rate of treatment compliance, suggesting expectations of more favorable outcomes overall; the predominantly upper middle-class/upper-class demographic of the samples; and the comparatively lengthy duration of the patients' inpatient/day hospital treatment. Finally, lack of a systematic protocol for direct, on-site monitoring weight during the follow-up evaluation is recognized as a drawback, as is the unknown validity of the measure we used for assessing premorbid traits and possible contamination of the measure by retrospective biases influencing parental recall. It thus remains for future developmental, clinical, and biological research to shed added light on gender effects on the expression, course, and long-term outcome of anorexia nervosa.

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