HHS Public Access

Author manuscript

J Adolesc Health. Author manuscript; available in PMC 2017 April 01.

Published in final edited form as:

J Adolesc Health. 2016 April ; 58(4): 410–416. doi:10.1016/j.jadohealth.2015.11.005.

Sex differences in the clinical presentation of eating disorders in youth

Kathryn Kinasz, B.A.[a,*], **Erin C. Accurso, Ph.D.**[b], **Andrea E. Kass, Ph.D.**[c], and **Daniel Le Grange, Ph.D.**[b,d]

a

b

c

d

Abstract

Purpose—Eating disorders (EDs) impact both males and females, but little is known about sex differences in ED psychopathology and overall clinical presentation. This study compared demographic and clinical characteristics of child and adolescent males and females who presented for ED treatment.

Methods—Participants included 619 youth (59 males and 560 females) ages 6 to 18 years who presented for treatment between 1999 and 2011.

Results—Males presented for ED treatment at a significantly younger age ($p < .001$), earlier age of onset ($p = .004$), and were more likely to be non-White ($p = .023$). Females showed more severe eating disorder pathology across the Eating Disorder Examination subscales (weight concern: $p < .001$, eating concern: $p < .001$, restraint: $p = .001$, and shape concern: $p = .019$) and global score ($p < .001$). Males were more likely to present with an ED other than anorexia nervosa or bulimia nervosa ($p = .002$). Females presented with significantly higher rates of mood disorders ($p = .027$) and had a lower average percent of expected body weight ($p = .020$). Males and females did not differ in duration of illness, prior hospitalization or treatment, binging and purging episodes, anxiety disorders, behavioral disorders, or self-esteem. All analyses were controlled for age.

Conclusion—Results indicate that further exploration into why the sexes present differently may be warranted. Developing ED psychopathology assessments that better capture nuances particular to males and reevaluating criteria to better categorize male ED diagnoses may allow for more targeted treatment.

[*]Address correspondence to Kate Kinasz, Department of Psychiatry and Behavioral Neuroscience, The University of Chicago, 5841 S. Maryland Avenue, MC 3077, Chicago, IL 60637. kkinasz@uchicago.edu; Phone: 1-847-302-7182; Fax: 1-773-702-4443.

Keywords

Eating Disorders; Anorexia Nervosa; Bulimia Nervosa; Youth; Comorbidity; Sex Distribution

Does sex matter in the clinical presentation of eating disorders in youth?

Eating disorders (EDs) are serious psychiatric illnesses that impact both youth and adults. EDs are more common in females with sex ratio estimates ranging from 3:1 to 18:1 [1]. Studies suggest that the clinical presentation of individuals with EDs also may differ by sex [1]. For example, young males report less severe ED symptom pathology than females [2,3], specifically lower weight and shape concerns [2], and they engage in significantly more over-activity than females [3,4]. Males' perceived "ideal body" also appears to shift across development (i.e., younger males desire a larger body and older males strive for a leaner body), while females consistently endorse a desire to be thinner [5].

Youth with EDs appear to present with high rates of comorbidities [4,6] without any sex differences in rates of anxiety or depression [4,6,7]. However, general population studies typically find that young females have higher rates of depression and anxiety while males show higher instances of behavioral disorders [8]. Studies of adult populations also demonstrate high rates of comorbid diagnoses among males and females with EDs [9,10] but suggest that females with EDs have higher rates of both depression and anxiety [10,11]. Unfortunately, prior youth sex comparisons have been limited to a single ED diagnosis [2,7], a narrow age range [3,4,6,12], or a small subsample of young males [6]. Taken together, it is clear that large-scale comparison of youth across ED diagnoses is needed to recognize any likely sex differences in ED pathology and ultimately inform diagnosis and treatment.

The present study aims to examine differences between male and female youth presenting for ED treatment at a tertiary specialist ED program. Males and females were compared on demographics, ED clinical characteristics (including Diagnostic Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) eating disorder diagnosis), and comorbid symptomatology. We hypothesized that sexes would not differ significantly in terms of demographics, as found in previous studies [2,4,7], males would be less likely than females to present with bulimia nervosa (BN) [13,14], and females would report greater ED psychopathology [2]. Further, we hypothesized that females and males would show similar rates of depression and anxiety as shown in a previous comparison of adolescent ED comorbidities [6], but females would exhibit lower self-esteem scores and rates of behavioral disorders than males, in line with findings of youth in the general population [8,15,16].

Methods

Participants and Procedure

Participants in this study included youth who presented to the outpatient clinic at The University of Chicago Eating Disorders Program between 1999 and 2011 and met the DSM-5 [17] criteria for an ED. Although youth were initially diagnosed with an ED based

on DSM-IV criteria, participants' diagnoses were re-categorized to reflect DSM-5 criteria (i.e., elimination of amenorrhea criterion, relaxation of percent of expect body weight (%EBW) from 85% to 87%, and updated frequency criteria for binge and purge episodes) [17] in order for results to be more clinically relevant for practitioners working with the ED patients. Trained assessors with a master's or doctoral degree administered structured clinical interviews. The sample included 619 youth (59 males, 560 females) ages 6 to 18. The Institutional Review Board at The University of Chicago approved this research study, and informed assent and consent was obtained from all youth and parent participants, respectively.

Measures

In addition to collecting demographic information (e.g. age, weight, height, sex, %EBW, race, and previous hospitalization), baseline assessment for all participants included:

Eating Disorder Examination (EDE)—The EDE is a semi-structured diagnostic interview that assesses the frequency and severity of ED attitudes, behaviors, and cognitions and is used to generate an ED diagnosis [18]. Participants reported on episodes of objective binge eating, subjective binge eating, vomiting, and other compensatory behaviors (i.e, laxative use, diuretic use, and driven exercise) over the past three months. The EDE produces four subscale scores (Restraint, Eating Concern, Weight Concern, and Shape Concern) and a composite global score that averages the four subscales and indicates overall ED psychopathology. Higher scores signify greater severity of symptoms. The EDE has good reliability and validity [18,19] and has been found to be appropriate for use with youth [20,21], though it may be slightly less reliable in adolescent males than females [2].

The Mini International Neuropsychiatric Interview for Children and Adolescents (MINI-KID)—The MINI-KID is a semi-structured clinical interview used to assess current comorbid DSM-IV-TR psychiatric disorders [22,23]. Psychiatric comorbidities were categorized into mood disorders, anxiety disorders, and behavioral disorders. Please refer to **Table 2** for the full list of psychiatric diagnoses included in each diagnostic group.

Rosenberg Self-esteem Scale (RSE)—The RSE is a 10-item self-report measure of global self-esteem [24]. Items are rated from "Strongly Disagree" (0) to "Strongly Agree" (3), which are summed for total scores ranging from 0-30, with higher scores indicating higher self-esteem. This measure has good reliability and validity in children and adolescents [15]. The Cronbach's Alpha test of reliability was 0.916. Removal of any of the questions would have resulted in a lower Alpha.

Statistical analysis

Data were analyzed using IBM SPSS 22 Statistics (IBM Corp., Armonk, NY). The following variables were compared by sex using t- and chi-square tests: age, race/ethnicity, time from ED onset to treatment (i.e. duration of illness,) age of onset, %EBW, prior service use (outpatient or inpatient treatment). ED diagnoses, binge and purge episodes, comorbid diagnoses, ED pathology, and self-esteem comparisons used multiple regression tests for

continuous dependent variables and logistic regression tests for categorical dependent variables and were all controlled for age. A two-tailed significance level of 0.05 was used.

Missing data were observed for the following variables: duration of illness, age of onset, EDE scores, and RSE scores. Missing data for both duration of illness and age of onset (n = 131, 21.1%) was not associated with sex (*p's* > .06). Missing data for RSE (n = 87, 14.0%) was not associated with sex ($p > .10$). Missing data for the EDE scores (n = 60, 9.7%) was associated with sex with a significantly greater number of males missing (20.3% v. 8.5%, $p = .004$).

Results

Demographics

Demographic differences by sex are presented in Table 1. Females (who presented to the ED clinic at the initial assessment) were significantly older than males ($p < .001$.) Duration of illness and prior service use did not differ by sex, but males showed a significantly earlier age of onset ($p = .004$.) Males were more likely to be of a racial minority (i.e., non-White) than females ($p = .007$); further comparisons by race were not possible due to small sample sizes for each non-White race. Detailed demographic data are presented in **Table 1**. When demographic data was compared using regressions with a control for age, significant differences remained the same with the exception of age of onset, which no longer showed a significant sex difference. Age had a significant effect on duration of illness and age of onset (*p's* < .001).

Eating Disorder and Comorbid Diagnoses

Table 2 presents sex differences for ED diagnosis, %EBW, ED compensatory behaviors, and comorbidity diagnoses. As a significant age difference was found, all comparisons were controlled by age. ED diagnoses differed significantly by sex. Specifically, young males were significantly more likely than females to present with an ED other than AN or BN ($p = .027$), but there were no significant sex differences in AN or BN diagnosis. The "Other" category included binge eating disorder (BED)—albeit absent in our sample of males—as well as other specified feeding and eating disorders (OSFED), which comprised of atypical AN, atypical BN, OSFED Purging Disorder, and OSFED Other. Small sample sizes among the diagnoses within the *Other* category precluded between-group analyses to evaluate sex differences. Females had a significantly lower %EBW ($p = .020$). Bingeing and purging behavior did not show a significant sex difference. Females were significantly more likely to present with a comorbid mood disorder than males ($p = .027$), but anxiety and behavioral disorders showed no sex differences. Age was significantly associated with diagnoses with females presenting at an older age [AN ($p = .001$), BN ($p < .001$), and Other ($p = .015$)], BN %EBW ($p = .046$), and Other diagnoses %EBW ($p = .030$). Age had a significant effect on objective binge episodes and vomiting across the full sample (*p's* < .001) as well as with AN objective binge episodes ($p = .041$), AN vomiting ($p = .048$), BN objective binge episodes ($p = .011$), BN vomiting ($p = .006$), and mood disorders ($p = .001$),

Eating Disorder Pathology and Self-Esteem

Sex comparisons by ED psychopathology are presented in **Table 3**, controlling for age. Compared to females, males reported significantly lower overall ED psychopathology as well as lower restraint, eating concern, shape concern, and weight concern subscales. Self-esteem did not differ by sex. Age had a significant effect on weight concern, dietary restraint, eating concern, and global score (*p's* < .001). Normative data from adolescent females [25] and college age males [26] is presented with the table for comparison but is not statistically compared due to age differences in samples.

Discussion

This study identified several sex differences in youth who present for ED assessment. Results indicated that males were more likely than females to present with a diagnoses other than AN or BN. Females reported more severe overall ED pathology than males across domains. Females were also more likely to present with a comorbid mood disorder than males. Finally, females presented for assessment at an older age than males with an older age of onset and were less likely to be non-White. The effect of age was controlled for across all tests, suggesting that sex differences in ED and comorbid pathology exist even after controlling for sex differences in age at presentation. Taken together, these data highlight differences in clinical presentations between males and females with EDs, which may point to sex-specific diagnostic and treatment targets.

Similar to epidemiological findings [27], the majority of males were diagnosed with OSFED. BN is known to be less common in adolescent males [4,6,14,28], and because atypical BN did not contribute much to the high male OSFED percentage, it is more likely that male participants endorsed ED psychopathology and lost a significant amount of weight but not enough to meet the threshold for AN. There may also be fewer social constructions around weight ideals and eating habits for males, leading to a minimization of symptoms [2].

Similar findings have demonstrated that male youth may not meet criteria for AN, but they still present with some degree of malnourishment and accompanying medical compromise [4,29]. Patients with OSFED have not been shown to differ greatly from those with AN in psychopathology [30]. Thus, the higher number of males with OSFED should be recognized as clinically significant, as their failure to meet criteria for AN can still lead to serious psychopathology. It is also possible that the assessment tool was biased to detect ED symptoms with greater sensitivity in females [2], resulting in higher numbers of males presenting with atypical AN. Therefore, future research is needed to better understand whether a sex bias exists in diagnostic and other assessment tools for EDs so they can be detected and treated at their earliest stage.

The non-significant sex difference in individuals with BN is likely due to the low overall prevalence of this disorder in our sample. Males and females also did not differ in binge eating and purging behavior. Epidemiological studies demonstrating low rates purging rates in adolescent males [28,31] but high rates in adult males [11] suggest that BN manifests more prominently in adulthood [9]. Thus, our sample may capture males at a time earlier

than when purging behavior appears. In terms of BED, although not statistically compared, epidemiological data shows slightly lower rates of BED among adolescent males [28,31], but the sex discrepancy is much smaller than in other diagnoses. It is not surprising that so few youth, especially males, presented with BED in our study as it represents those who present for treatment at an ED clinic. As BED has only been considered its own ED in the DSM-5, it is unlikely participants would have presented to an ED clinic for treatment during the years of data collection. However, it is possible that the number of males presenting to ED clinics may grow in the future with the new addition of BED, which males identify with to a greater extent than other ED diagnoses [31,32], lending support to the importance of understanding different clinical profiles in each sex and the need for future research on implications for prognosis.

Consistent with our hypothesis, females and males exhibited similar rates of anxiety. In contrast to our hypothesis, females were more likely to present with a mood disorder than males. This result is consistent with literature showing higher rates of depression among females during adolescence in the general population [8,33] as well as in adults with EDs [10,11]. Females may have had higher rates of mood disorders due to their lower weights as compared to males. Starvation is frequently associated with and may even lead to a depressive state [34], and females' lower %EBW may have impacted mood disorder rates. Sex differences in behavioral disorders were likely insignificant because our sample does not follow the same trends as the general population, such as no patients presenting with conduct disorder, a disorder typically higher in male youth [16].

Results suggest that females showed greater ED pathology in weight concern, shape concern, dietary restraint, eating concern, and global ED pathology. Of note, although not statistically compared, both males and females in our sample seem to show more severe pathology than community samples [25,26]. Because these results are limited by missing EDE data, these findings are more tenuous. Participants with missing data were excluded from this analysis, and results should be confirmed with a more robust study. However, our findings were similar to those found in a previous study of adolescents with AN [2] with the only difference being that the former study did not find sex differences in dietary restraint and eating concern. The overall pathology sex differences may be attributed to the fact that male youth with EDs appear to be more concerned with achieving a muscular physique rather than the female "thin ideal" [2,35]. Because the EDE does not evaluate male-specific behaviors surrounding masculinity (e.g., appearance-enhancing drug use, desire for increased strength, and effort to achieve a certain level of "fitness") [34], it may be that this assessment tool fails to capture the ED pathology that is of higher relevance to males.

Our results also showed that males presented to treatment younger than females with an earlier age of ED onset. While age of onset had missing data, it was not significantly related to sex. In a study of adolescents, sex comparisons did not reveal a difference in age for when youth presented for treatment [6]; however, in a study comparing EDs in adolescents versus younger children, younger patients were more likely to be males [27,36]. It is possible that while stigma around identifying as having an ED may delay treatment seeking in adult males [1], young males who present for treatment exhibit disordered eating behaviors and attitudes that differ from their peers to a greater extent than that of young females, making

recognition of the need for treatment more likely. Thus, males appear to have an earlier age of onset specifically in the population who presents for treatment. Given the importance of early intervention in the treatment of EDs [27], future work to evaluate whether males who present earlier for treatment have differential treatment outcomes than females may inform targeted screening and treatment efforts.

Recognizing that age may play an important role in presentation for treatment, it should be noted that puberty may be a risk factor for the development of EDs in females [37] but the role of hormones in ED risk for males is unknown. Puberty may be associated with less assertiveness, a need for affiliation, and even depression in females but not in males [8] demonstrating that puberty impacts emotional and behavioral changes in the sexes differently. Puberty brings males closer to the “muscular ideal” [5], so it may be that early puberty serves as protective rather than risk factor for males, suggesting that puberty also effects age of ED onset differently. Observing Tanner staging may be helpful for clinicians to understand both the current state of development as well as the ED's effect on development after diagnosis to better inform treatment of hormonal and nutritional needs.

Finally, our data showed that significantly more males than females in our sample identified as non-White. This may be due to a greater likelihood of White females being referred for ED treatment [38]. Additionally, data show African American adolescent females are less likely to report weight-related concerns and behaviors than their White counterparts. However, African American, Hispanic, and Asian American males are all more likely to report engaging in weight control behaviors than White males [39]. Accordingly, racial/ethnic differences in endorsement of ED pathology may account for the higher percentage of EDs among non-White males than non-White females. Cultural impact on young males with EDs is an area that warrants further exploration.

The strengths of this study include the relatively large sample of males and use of DSM-5 ED diagnostic criteria. This study adds to the limited research specific to child and adolescent males with EDs. To our knowledge, no study has evaluated sex differences in rates of diagnoses such as behavioral disorders and self-esteem, which is associated with higher levels of psychopathology across ED diagnoses [34]. Despite a relatively large sample of males, the sample was underpowered to examine multinomial models, which precluded an examination of overall eating disorder psychopathology. A major limitation of this study is the missing data across several demographic and clinical domains. However, the EDE pathology differences were highly significant and in line with previous studies [2]. Other limitations include that this study was cross-sectional and only includes patients who presented for treatment, the single institution data collection site led to a narrower spectrum of diagnoses, the adult rather than child EDE was used, and we did not assess for other gender identities such as transgender which represents an important area for future exploration. We also were unable to retroactively diagnose patients with the Avoidant/Restrictive Food Intake Disorder included in DSM-5. Assessments were based on tools currently available, and thus measures assessing constructs common to EDs in males such as muscularity and features of a male's “ideal body” were not recorded. Finally, it is unclear to what extend these trends (e.g., males presenting for treatment at a younger age) may have

changed or may be changing over time. These limitations can be improved upon in future research across multiple institutions or large-scale community surveys.

Further research is needed to establish normative data for the EDE in male youth, as the only known existing normative data are for college males using the EDE-Q [26]. The EDE may not contain questions that are part of the symptom profile for young males [2], and the results of this study may further indicate that the EDE perhaps falls short of capturing true sex differences in ED pathology. Including male symptomatology in the EDE may allow for a greater focus on males with EDs that might otherwise be underdiagnosed or underestimated by current assessments. Further exploration of the DSM-5 OSFED category is needed as it currently seems to serve as a "catch all" for males with EDs and limits the ability to classify differences in young males' diagnoses. Tanner staging and the relationship of puberty to the onset of EDs warrants investigation as this may provide insight into the impact of EDs on development and shed light on malnutrition differences, which may inform whether %EBW thresholds for AN diagnosis should differ by sex. Finally, a more robust study that can compare males and females in stratified age brackets (e.g., comparing children versus adolescents) may be necessary due to the significant effect age showed. Power was insufficient (due to the small number of males and uneven age distribution in this sample) to conduct such an analysis in the present study.

In sum, this study demonstrated differences in ED pathology between males and females presenting for ED treatment, showing that males who present for ED treatment report less severe ED pathology than females. Although males may be more likely to receive a diagnosis of OSFED than females, males still present with clinically significant disordered eating. Clinicians' comprehension of ED pathology is critical in ensuring the earliest detection in order to drive proper treatment for both the ED and its comorbidities. Improved assessments of diagnosis and ED pathology need to be developed that ensure minimal sex bias. A more complete picture of the psychopathology that drives male EDs may allow clinicians to develop targeted treatments that improve outcomes in males with EDs and may lead to improved management of males with EDs in the future.

Acknowledgements

This work was supported by NIMH T32 MH082761 and T32 HS000078. Portions of this work were presented at the 2014 American Academy of Child and Adolescent Psychiatry Annual Meeting and the 2015 International Conference on Eating Disorders Meeting.

Abbreviations

ED	Eating Disorder
AN	Anorexia Nervosa
BN	Bulimia Nervosa
OSFED	Other Specified Feeding and Eating Disorder
BED	Binge Eating Disorder
DSM-5	Diagnostic Statistical Manual of Mental Disorders, Fifth Edition

MINI-KID	The Mini International Neuropsychiatric Interview for Children and Adolescents
RSE	Rosenberg Self-Esteem
EDE	Eating Disorder Examination

References

1. Raevuori A, Keski-Rahkonen A, Hoek HW. A review of eating disorders in males. Curr Opin Psychiatry. 2014; 27:426–30. [PubMed: 25226158]
2. Darcy AM, Doyle AC, Lock J, et al. The Eating Disorders Examination in adolescent males with anorexia nervosa: how does it compare to adolescent females? Int J Eat Disord. 2012; 45:110–4. [PubMed: 22170022]
3. Lewinsohn PM, Seeley JR, Moerk KC, et al. Gender differences in eating disorder symptoms in young adults. Int J Eat Disord. 2002; 32:426–40. [PubMed: 12386907]
4. Norris ML, Apsimon M, Harrison M, et al. An Examination of Medical and Psychological Morbidity in Adolescent Males With Eating Disorders. Eat Disord. 2012; 20:405–15. [PubMed: 22985237]
5. Parkinson KN, Tovée MJ, Cohen-Tovée EM. Body shape perceptions of preadolescent and young adolescent children. Eur Eat Disord Rev. 1998; 6:126–35.
6. Geist R, Heinmaa M, Katzman D, et al. A comparison of male and female adolescents referred to an eating disorder program. Can J Psychiatry Rev Can Psychiatr. 1999; 44:374–8.
7. Strober M, Freeman R, Lampert C, et al. Are there gender differences in core symptoms, temperament, and short-term prospective outcome in anorexia nervosa? Int J Eat Disord. 2006; 39:570–5. [PubMed: 16937384]
8. Zahn-Waxler C, Shirtcliff EA, Marceau K. Disorders of childhood and adolescence: gender and psychopathology. Annu Rev Clin Psychol. 2008; 4:275–303. [PubMed: 18370618]
9. Hudson JI, Hiripi E, Pope HG Jr. et al. The Prevalence and Correlates of Eating Disorders in the National Comorbidity Survey Replication. Biol Psychiatry. 2007; 61:348–58. [PubMed: 16815322]
10. Woodside DB, Garfinkel PE, Lin E, et al. Comparisons of men with full or partial eating disorders, men without eating disorders, and women with eating disorders in the community. Am J Psychiatry. 2001; 158:570–4. [PubMed: 11282690]
11. Núñez-Navarro A, Agüera Z, Krug I, et al. Do Men with Eating Disorders Differ from Women in Clinics, Psychopathology and Personality? Eur Eat Disord Rev. 2012; 20:23–31. [PubMed: 21823213]
12. Kjelsås E, Bjørnstrøm C, Götestam KG. Prevalence of eating disorders in female and male adolescents (14-15 years). Eat Behav. 2004; 5:13–25. [PubMed: 15000950]
13. Geist R, Davis R, Heinmaa M. Binge/purge symptoms and comorbidity in adolescents with eating disorders. Can J Psychiatry Rev Can Psychiatr. 1998; 43:507–12.
14. Le Grange D, Crosby RD, Rathouz PJ, et al. A randomized controlled comparison of family-based treatment and supportive psychotherapy for adolescent bulimia nervosa. Arch Gen Psychiatry. 2007; 64:1049–56. [PubMed: 17768270]
15. Hagborg WJ. The Rosenberg Self-Esteem scale and Harter's Self-Perception profile for adolescents: a concurrent validity study. Psychol Sch. 1993; 30:132–6.
16. Lahey BB, Schwab-Stone M, Goodman SH, et al. Age and gender differences in oppositional behavior and conduct problems: A cross-sectional household study of middle childhood and adolescence. J Abnorm Psychol. 2000; 109:488–503. [PubMed: 11016118]
17. American Psychiatric Association. Desk reference to the diagnostic criteria from DSM-5. American Psychiatric Publishing; Washington, DC: 2013.
18. Cooper Z, Cooper PJ, Fairburn CG. The validity of the eating disorder examination and its subscales. Br J Psychiatry J Ment Sci. 1989; 154:807–12.

19. Berg KC, Peterson CB, Frazier P, et al. Psychometric evaluation of the eating disorder examination and eating disorder examination-questionnaire: a systematic review of the literature. Int J Eat Disord. 2012; 45:428–38. [PubMed: 21744375]
20. Bryant-Waugh RJ, Cooper PJ, Taylor CL, et al. The use of the eating disorder examination with children: a pilot study. Int J Eat Disord. 1996; 19:391–7. [PubMed: 8859397]
21. Watkins B, Frampton I, Lask B, et al. Reliability and validity of the child version of the Eating Disorder Examination: a preliminary investigation. Int J Eat Disord. 2005; 38:183–7. [PubMed: 16134106]
22. Kaufman J, Birmaher B, Brent D, et al. Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version (K-SADS-PL): Initial Reliability and Validity Data. J Am Acad Child Adolesc Psychiatry. 1997; 36:980–8. [PubMed: 9204677]
23. Sheehan DV, Sheehan KH, Shytle RD, et al. Reliability and validity of the Mini International Neuropsychiatric Interview for Children and Adolescents (MINI-KID). J Clin Psychiatry. 2010; 71:313–26. [PubMed: 20331933]
24. Rosenberg, M. Society and the adolescent self-image. rev. ed.. Vol. xxxii. Wesleyan University Press; Middletown, CT, England: 1989.
25. Carter JC, Stewart DA, Fairburn CG. Eating disorder examination questionnaire: norms for young adolescent girls. Behav Res Ther. 2001; 39:625–32. [PubMed: 11341255]
26. Lavender JM, De Young KP, Anderson DA. Eating Disorder Examination Questionnaire (EDE-Q): Norms for undergraduate men. Eat Behav. 2010; 11:119–21. [PubMed: 20188296]
27. Campbell K, Peebles R. Eating disorders in children and adolescents: state of the art review. Pediatrics. 2014; 134:582–92. [PubMed: 25157017]
28. Swanson SA, Crow SJ, Le Grange D, et al. Prevalence and correlates of eating disorders in adolescents. Results from the national comorbidity survey replication adolescent supplement. Arch Gen Psychiatry. 2011; 68:714–23. [PubMed: 21383252]
29. Bayes A, Madden S. Early onset eating disorders in male adolescents: a series of 10 inpatients. Australas Psychiatry. 2011; 19:526–30. [PubMed: 22077304]
30. Le Grange D, Crosby RD, Engel SG, et al. DSM-IV-Defined Anorexia Nervosa Versus Subthreshold Anorexia Nervosa (EDNOS-AN). Eur Eat Disord Rev. 2013; 21:1–7. [PubMed: 22847947]
31. Smink FRE, van Hoeken D, Oldehinkel AJ, et al. Prevalence and severity of DSM-5 eating disorders in a community cohort of adolescents. Int J Eat Disord. 2014; 47:610–9. [PubMed: 24903034]
32. Striegel-Moore RH, Franko DL. Epidemiology of binge eating disorder. Int J Eat Disord. 2003; 34(Suppl):S19–29. [PubMed: 12900983]
33. Nolen-Hoeksema S, Girgus JS. The emergence of gender differences in depression during adolescence. Psychol Bull. 1994; 115:424–43. [PubMed: 8016286]
34. Hughes EK, Goldschmidt AB, Labuschagne Z, et al. Eating disorders with and without comorbid depression and anxiety: similarities and differences in a clinical sample of children and adolescents. Eur Eat Disord Rev J Eat Disord Assoc. 2013; 21:386–94.
35. Strother E, Lemberg R, Stanford S, Chariese, et al. Eating Disorders in Men: Underdiagnosed, Undertreated, and Misunderstood. Eat Disord. 2012; 20:346–55. [PubMed: 22985232]
36. Peebles R, Wilson JL, Lock JD. How Do Children with Eating Disorders Differ from Adolescents with Eating Disorders at Initial Evaluation? J Adolesc Health. 2006; 39:800–5. [PubMed: 17116508]
37. Killen JD, Hayward C, Litt I, et al. IS puberty a risk factor for eating disorders? Am J Dis Child. 1992; 146:323–5. [PubMed: 1543180]
38. Becker AE, Franko DL, Speck A, et al. Ethnicity and differential access to care for eating disorder symptoms. Int J Eat Disord. 2003; 33:205–12. [PubMed: 12616587]
39. Neumark-Sztainer D, Croll J, Story M, et al. Ethnic/racial differences in weight-related concerns and behaviors among adolescent girls and boys: Findings from Project EAT. J Psychosom Res. 2002; 53:963–74. [PubMed: 12445586]

Implications and Contributions Statement

This study suggests that female youth with eating disorders are more likely to present for treatment at an older age with an accompanying mood disorder, whereas male youth with eating disorders are more likely to present with an atypical diagnosis. These results can help inform sex specific treatment targets.

Table 1

Sex Differences in Demographics

	Females (*n* = 560)	Males (*n* = 59)			
	Mean (SD)	**Mean (SD)**	***t***	***p***	**Effect size (Cohen's *d*)**
Age, in years	15.40 (2.12)	14.31 (2.54)	3.687	< 0.001*	0.466
Illness Duration (months) *a*	17.39 (17.82)	16.38 (14.50)	0.390	0.697	0.062
Age of Onset ^*a*	13.76 (2.31)	12.77 (2.75)	2.866	0.004*	0.390

	***n* (%)**	***n* (%)**	**χ^2**	***p***	**Effect size ϕ**
% Non-White participants *b*	64 (11.5%)	14 (23.7%)	7.190	0.007*	0.108
Prior Treatment **	382 (70.2%)	44 (77.2%)	1.215	0.270	0.045

Key: All analyses controlled for age; SD: standard deviation, SE: standard error, OR: odds ratio, CI: confidence interval

* indicates significant difference $p < 0.05$

** Hospitalization or psychological treatment

^ indicates that results were not significant when a multiple regression was used with a control for age

a 438 girls and 52 boys were included in the analysis of these variables due to missing data—124 girls (22.1%) and 7 boys (11.9%) had missing data

b Note: 87.9% of girls identified as White, 5.5% Black, 3.4% Asian, 0.7% American Indian/Alaska native, 1.8% mixed race, and 0.7% declined answering, while 76.3% of boys identified as White, 16.9% Black, 3.4% Asian, 1.7% American Indian/Alaska native, and 1.7% mixed race. In terms of ethnicities, 74 girls (13.3%) and 14 boys (23.7%) identified as Hispanic, and within this ethnicity, 5 girls (0.9%) and 1 boy (1.7%) identified as Hispanic non-White while all others identified as Hispanic White.

Table 2

Sex Differences in Eating Disorder Diagnoses, Eating Disorder Behavior, and Comorbidity Diagnoses

	Females (*n* = 560)	Males (*n* = 59)				
Eating Disorder Diagnoses	***n* (%)**	***n* (%)**	**B (SE)**	***p***	**OR**	**CI**
Anorexia Nervosa (AN)^	194 (35%)	15 (25%)	−0.595 (0.32)	0.063	0.552	0.30, 1.03
Bulimia Nervosa (BN)^	151 (27%)	7 (12%)	−0.768 (0.43)	0.071	0.464	0.20, 1.07
Other^	215 (38%)	37 (62%)	0.902 (0.29)	0.002*	2.464	1.41, 4.32
OSFED atypical AN	111 (20%)	21 (36%)	--			
OSFED atypical BN	22 (4%)	1 (2%)	--			
OSFED Purge	13 (2%)	0	--			
OSFED Other	54 (10%)	15 (25%)	--			
BED	15 (3%)	0	--			

	Mean (SD)	Mean (SD)	B (SE)	*p*	CI
% EBW[a]	**101.99 (29.84)**	**111.90 (44.86)**	**10.283 (4.41)**	**0.020***	**1.633, 18.933**
AN	79.91 (5.03)	81.97 (3.60)	0.972 (1.33)	0.466	−1.65, 3.59
BN^	112.25 (22.15)	121.74 (42.32)	7.670 (8.96)	0.393	−10.03, 25.37
Other^[b]	112.57 (36.67)	122.88 (49.12)	7.679 (7.04)	0.276	−6.18, 21.54

Eating Disorder Behaviors[c]	**Mean (SD)**	**Mean (SD)**	**B (SE)**	***p***	**CI**
Objective Binge Episodes[a]^	**15.93 (40.17)**	**3.68 (16.19)**	**−8.936 (5.86)**	**0.128**	**−20.45, 2.57**
AN^	0.70 (3.66)	0.08 (0.28)	−0.456 (1.01)	0.653	−2.45, 1.54
BN^	48.83 (61.98)	27.33 (40.46)	−16.251 (25.18)	0.520	−66.02, 33.52
Other[b]	5.21 (16.73)	0.29 (0.81)	−5.659 (3.19)	0.077	−11.94, 0.63
Subjective Binge Episodes[a]	**10.47 (57.35)**	**15.77 (96.98)**	**6.466 (9.48)**	**0.495**	**−12.16, 25.09**
AN	3.33 (10.26)	1.54 (3.45)	−1.436 (2.86)	0.616	−7.08, 4.21
BN	19.70 (75.74)	6.33 (6.77)	−13.034 (31.23)	0.677	−74.75, 48.87
Other[b]	10.14 (65.80)	24.39 (125.76)	14.767 (15.59)	0.345	−15.96, 45.50
Vomiting Episodes[a]^	**39.58 (83.20)**	**18.00 (54.49)**	**−13.833 (12.35)**	**0.263**	**−38.09, 10.42**
AN^	10.31 (42.09)	2.62 (9.43)	−5.811 (11.67)	0.619	−28.84, 7.21
BN^	93.03 (95.89)	33.50 (46.00)	−50.726 (38.67)	0.192	−127.14, 25.69
Other[b]	26.55 (83.32)	21.96 (67.09)	−2.490 (16.94)	0.883	−35.88, 30.90
Other Compensatory Behaviors[a,d]	**45.76 (196.14)**	**49.40 (138.74)**	**8.185 (29.49)**	**0.781**	**−49.79, 66.11**
AN	32.30 (82.96)	33.46 (41.77)	1.680 (23.39)	0.943	−44.46, 47.82
BN	68.43 (335.36)	59.17 (65.86)	−0.934 (138.11)	0.995	−273.86, 271.99

Eating Disorder Behaviors[c]	**Mean (SD)**	**Mean (SD)**	**B (SE)**	***p***	**CI**
Other[b]	41.36 (111.17)	54.71 (176.19)	15.100 (24.81)	0.543	−33.80, 64.00

Comorbid Diagnoses[e]	***n* (%)**	***n* (%)**	**B (SE)**	***p***	**OR**	**CI**
Mood Disorders^	202 (36.1%)	11 (18.6%)	−0.774 (0.35)	0.027*	0.461	0.23, 0.92
Anxiety Disorders	114 (20.4%)	10 (16.9%)	−0.180 (0.37)	0.622	0.835	0.41, 1.71
Behavioral Disorders	26 (4.6%)	6 (10.2%)	0.838 (0.48)	0.083	2.312	0.90, 5.97

Note: All analyses controlled for age; Bolded numbers indicate results for participants across all diagnoses. SD: standard deviation, SE: standard error, OR: odds ratio, CI: confidence interval, OSFED (Other Specified Feeding and Eating Disorder), atypical AN (AN Restrictive and Binge Purge who do not meet full criteria for AN), atypical BN (BN Purge and No Purge who do not meet criteria for BN), BED (Binge Eating Disorder)

*indicates significant difference $p < 0.05$

^indicates that control for age was significant with a $p < 0.05$

[a]Comparison across all participants and all diagnoses

[b]Includes all OSFED subtypes and BED

[c]Behaviors summed over a three month period

[d]Includes laxative use, diuretic use, and driven exercise

[e]Mood disorders includes Major Depressive Disorder, Depressive Disorder not otherwise specified, Dysthymic Disorder, Bipolar Disorder, and Cyclothymia; Anxiety Disorders include General Anxiety Disorder, Anxiety Disorder not otherwise specified, Obsessive-Compulsive Disorder, Obsessive-Compulsive Personality Disorder; Social Phobia, Post Traumatic Stress Disorder, Social Anxiety Disorder, Panic Disorder, Specific Phobia Disorder, and Separation Anxiety; Behavioral Disorders include ADHD and Oppositional Defiant Disorder; Those who did not meet criteria for one of these categories were excluded from analyses assessing these constructs.

Table 3

Sex Differences in EDE Pathology

	Mean (SD)	Mean (SD)	B (SE)	*p*	CI	Community Comparison[a]	
Eating Pathology[b]	**Females (*n* = 515)**	**Males (*n* = 47)**				**Females**	**Males**
EDE Weight Concern^	2.88 (1.80)	1.48 (1.38)	−1.198 (0.264)	<0.001*	−1.72, −0.68	1.8 (1.7)	1.3 (1.3)
EDE Shape Concern	3.26 (4.47)	1.67 (1.52)	−1.551 (0.66)	0.019*	−2.85, −0.25	2.2 (1.7)	1.6 (1.4)
EDE Dietary Restraint^	2.73 (1.80)	1.68 (1.34)	−0.903 (0.27)	0.001*	−1.43, −0.38	1.4 (1.5)	1.0 (1.2)
EDE Eating Concern^	1.95 (1.52)	0.86 (1.12)	−0.903 (0.221)	<0.001*	−1.34, −0.47	1.0 (1.0)	0.4 (0.8)
EDE Global Score^	2.71 (1.80)	1.42 (1.17)	−1.14 (0.27)	<0.001*	−1.67, −0.62	1.6 (1.4)	1.1 (1.0)

Self-Esteem[c]	**Females (*n* = 484)**	**Males (*n* = 50)**					
RSE Total Score	20.74 (8.46)	22.02 (7.22)	1.213 (1.25)	0.333	−1.25, 3.67		

Key: All analyses controlled for age; RSE = Rosenberg Self-Esteem Scale

* indicates significant difference $p < 0.05$

^ indicates that control for age was significant with a $p < 0.05$

[a] These data are taken from two different studies attempting to establish norms for the EDE: Girls' comparison is from a sample of 12-14 year old girls [25] while boys' comparison is from a sample of college age boys due to limited adolescent data available [26]

[b] 48 girls (8.5%) and 12 boys (20.3%) had missing data

[c] 78 girls (13.9%) and 9 boys (15.3%) had missing data