Prevalence and Correlates of Eating Disorders in Adolescents

Results From the National Comorbidity Survey Replication Adolescent Supplement

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Context: Eating disorders are severe conditions, but little is known about the prevalence or correlates of these disorders from population-based surveys of adolescents.

Objectives: To examine the prevalence and correlates of eating disorders in a large, representative sample of US adolescents.

Design: Cross-sectional survey of adolescents with face-to-face interviews using a modified version of the Composite International Diagnostic Interview.

Setting: Combined household and school adolescent samples.

Participants: Nationally representative sample of 10 123 adolescents aged 13 to 18 years.

Main Outcome Measures: Prevalence and correlates of eating disorders and subthreshold conditions.

Although the lifetime prevalence estimates of eating disorders from population-based studies of adults are relatively low (0.5%-1.0% for anorexia nervosa [AN] and 0.5%-3.0% for bulimia nervosa [BN]), their severity and dramatic impact have been repeatedly demonstrated through elevated rates of role impairment, medical complications, comorbidity, mortality, and suicide. Regarding children and adolescents, previous population-based studies of eating disorders have focused on youths who meet full DSM-IV criteria without presenting information on youths with eating problems that fall below current diagnostic thresholds. Eating disorder not otherwise specified (EDNOS), a broad category that covers clinically significant eating disorders that do not meet criteria for AN or BN, tends to be more frequently diagnosed in clinical settings than either of the DSM-IV eating disorder subtypes. In fact, adult population-based studies that have expanded measures to include EDNOS subtypes have found a greater prevalence of binge-eating disorder (BED) and related symptoms than that of AN and BN combined.

Community studies that used dimensional measures in youths have also yielded far greater prevalences of disordered eating behaviors (ie, 14%-22%) than those found in studies that applied strict DSM-IV diagnostic criteria. Taken together, these findings indicate that the full spectrum of disordered eating is likely to be considerably higher than previously estimated, a possibility that may have major public health implications depending on their physical, mental, and social consequences. Investigations of eating disorders in community samples of youths are relatively rare and comprehensive de-
scriptions of unspecified or subthreshold eating conditions have not been addressed in any prior representative adolescent samples to our knowledge.

This study examines eating disorders in the National Comorbidity Survey Replication Adolescent Supplement (NCS-A), a nationally representative sample of US adolescents aged 13 to 18 years. The objectives of this investigation are the following: (1) to present the lifetime and 12-month prevalences of AN, BN, BED, and subthreshold eating disorders; (2) to examine their sociodemographic and clinical correlates and patterns of comorbidity with other mental disorders; and (3) to describe the magnitude of role impairment, suicidal behavior, and service use associated with these disorders.

**METHODS**

**SAMPLE**

The NCS-A is a nationally representative face-to-face interview survey of 10,123 adolescents in the continental United States. The background, measures, design, and clinical validity of the NCS-A have been described in detail elsewhere. Briefly, the NCS-A sample was based on a nationally representative household sample (n=879 adolescents) and a school sample (n=9244 adolescents), with a combined response rate of 82.9%. One parent or parental surrogate of each participating adolescent was asked to complete a self-administered questionnaire that contained questions about the adolescent's mental health and service use; the self-administered questionnaire had a conditional response rate of 83.3%. Sociodemographic variables assessed in the NCS-A include age, sex, race/ethnicity, parental education, parental or parental surrogate-reported marital status, household income, and urbanicity. Parental/surrogate marital status was grouped into married or cohabiting, previously married (including divorced, widowed, or separated), never married, and unknown. Household income was used to calculate the poverty income ratio, defined as the ratio of the income to the poverty line. The 2000 census definitions were used to code urbanicity by distinguishing large metropolitan areas from smaller metropolitan areas and rural areas.

**ASSESSMENT OF DSM-IV DISORDERS**

The DSM-IV disorders were assessed using a modification of the fully structured World Health Organization Composite International Diagnostic Interview (CIDI) administered to the adolescents by lay interviewers. In addition to the adolescent interviews, parent report from the self-administered questionnaire had a conditional response rate of 83.3%. Sociodemographic and clinical correlates and patterns of comorbidity with other mental disorders; and (3) to describe the magnitude of role impairment, suicidal behavior, and service use associated with these disorders.

**IMPAIRMENT**

Among subjects who met criteria for an eating disorder within the past 12 months, impairment was assessed using the Sheehan Disability Scale. The Sheehan Disability Scale captures the severity of role impairment in 4 domains: home, school or work, family, and social life. In each of these domains, the Sheehan Disability Scale measures impairment on a scale from 0 to 10 with anchors provided to the adolescent; non-0 scores indicate any impairment due to the disorder, while scores at or above 7 indicate severe or very severe impairment. In addition to this scale, these respondents were also asked to report the number of days on which they were "totally unable to go to school or work or carry out [their] normal activities because of problems with [their] eating or weight."

**SUICIDALITY**

Adolescents were asked about lifetime suicide ideation, plans, and attempts. Because of the sensitivity of these questions, literate adolescents were not asked these questions directly in the face-to-face interview but rather read the questions and responded to them separately. Adolescents who could not read were instead asked these questions orally (n=232). Adolescents were asked about suicide plans and attempts only if they endorsed suicide ideation.

**SERVICE USE**

Both the parent (or parental surrogate) and adolescent were asked whether the adolescent had ever been treated for emotional or behavioral problems. Reports of service use were classified into the following categories: (1) mental health specialty care: services provided by a psychiatrist in settings such as a mental health clinic, drug or alcohol clinic, emergency department, and admissions to hospitals and other facilities; (2) general medical care: services provided by a general health care practitioner, family phy-
were 0.3%, 0.9%, 1.6%, 0.8%, and 2.5%, respectively.

The majority of respondents with an eating disorder met criteria for at least 1 other lifetime DSM-IV disorder assessed in this study across the lifetime, with 55.2%, 88.0%, 83.5%, 79.8%, and 70.1% of adolescents with AN, BN, BED, SAN, and SBED, respectively, endorsing 1 or more comorbid psychiatric disorders (Table 3). The adjusted odds ratios (95% confidence intervals) for comorbid disorders by eating disorder subtype were 1.5 (0.5-4.4) for AN, 8.6 (2.7-27.3) for BN, 5.9 (2.5-13.8) for BED, and 2.6 (0.4-16.0) for SAN.

Table 1. Sex-Specific Lifetime and 12-Month Prevalences and 12-Month to Lifetime Prevalence Ratios of Eating Disorder Subtypes Among 10 123 Adolescents

<table>
<thead>
<tr>
<th>Prevalence or Ratio</th>
<th>Male</th>
<th>Female</th>
<th>Male</th>
<th>Female</th>
<th>NA</th>
<th>SBED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lifetime prevalence</td>
<td>0.3 (0.06)</td>
<td>0.3 (0.10)</td>
<td>0.3 (0.09)</td>
<td>0.3 (0.10)</td>
<td>0.8 (0.09)</td>
<td>2.5 (0.26)</td>
</tr>
<tr>
<td>12-mo prevalence</td>
<td>0.2 (0.05)</td>
<td>0.1 (0.06)</td>
<td>0.2 (0.08)</td>
<td>0.1 (0.06)</td>
<td>NA</td>
<td>1.1 (0.12)</td>
</tr>
</tbody>
</table>

Abbreviations: AN, anorexia nervosa; BN, bulimia nervosa; NA, not applicable; SAN, subthreshold AN; SBED, subthreshold BED.

The 12-month prevalence of SAN was not assessed.

The 12-month prevalence rates of AN, BN, BED, SAN, and SBED were 0.2%, 0.6%, 0.9%, and 1.1%, respectively, with 12-month to lifetime prevalence ratios of 57.9%, 72.0%, 56.0%, and 44.5%, respectively. Among adolescents with BN, 41.3% reported purging in their lifetime while the rest met criteria through nonpurging compensatory behaviors.

Regarding lifetime prevalence estimates, there were no sex differences in the prevalence of AN or SBED, while BN, BED, and SAN were more prevalent in girls (Table 2). Significant ethnic differences emerged for BN, with Hispanic adolescents reporting the highest prevalence; there was a trend toward ethnic minorities reporting more BED, while non-Hispanic white adolescents tended to report more AN. Measures of socioeconomic status, including parental education, household income, and parental/surrogate marital status, were not significantly associated with any eating disorder presentation.

### Age at Onset

Age-at-onset curves for AN, BN, BED, and SBED are shown in the Figure. The median ages at onset of AN, BN, BED, and SBED were 12.3, 12.4, 12.6, and 12.6 years, respectively. Interquartile ranges for AN, BN, BED, and SBED were 11.2 to 13.0, 11.1 to 13.5, 11.2 to 13.5, and 10.0 to 14.3 years, respectively.

### Comorbidity With Other Mental Disorders

The majority of respondents with an eating disorder met criteria for at least 1 other lifetime DSM-IV disorder assessed in this study across the lifetime, with 55.2%, 88.0%, 83.5%, 79.8%, and 70.1% of adolescents with AN, BN, BED, SAN, and SBED, respectively, endorsing 1 or more comorbid psychiatric disorders (Table 3). The adjusted odds ratios (95% confidence intervals) for comorbid disorders by eating disorder subtype were 1.5 (0.5-4.4) for AN, 8.6 (2.7-27.3) for BN, 5.9 (2.5-13.8) for BED, and 2.6 (0.4-16.0) for SAN.
4.3 (2.0-8.8) for SAN, and 2.7 (1.8-4.1) for SBED. Anorexia nervosa was not associated with any other mental disorder except oppositional defiant disorder. In contrast, BN and BED were significantly associated with nearly every disorder assessed. Both subthreshold presentations showed modest amounts of comorbidity across classes of DSM-IV disorders. In particular, BN and BED were strongly associated with mood and anxiety disorders and with multiple disorders, with 27.0% of adolescents with BN and 37.0% of adolescents with BED endorsing 3 or more classes of comorbid disorders.

### IMPAIRMENT

Among adolescents with 12-month AN, BN, BED, and SBED, 97.1%, 78.0%, 62.6%, and 34.6%, respectively, reported impairment in the past 12 months; 24.2%, 10.7%, 8.7%, and 2.8%, respectively, reported severe impairment (Table 4). Eating disorders were most strongly associated with social impairment. Nearly all of those with AN (88.9%) reported social impairment, and 19.6% reported severe social impairment associated with their eating disorder. Adolescents with BN and BED also reported that their eating problems most impaired their social and family relationships. Although impairment in these domains was relatively high, youths with eating disorders rarely reported that their eating problems led to complete loss of role functioning for an entire day. Among adolescents with 12-month AN, BN, BED, and SBED, 11.6%, 14.4%, 9.8%, and 11.9%, respectively, reported at least 1 day in the past year when they were completely unable to carry out normal activities. The reported number of days out of role ranged from 0 to 90 days for AN, 0 to 10 days for BN, 0 to 30 days for BED, and 0 to 41 days for SBED.

### SUICIDALITY

Lifetime suicidality was associated with all subtypes of eating disorders (Table 5). Each eating disorder subtype was associated with significantly elevated levels of suicide ideation, while BN and SAN were further associated with suicide plans and BN and BED were associated with suicide attempts. Of note, adolescents with SAN reported levels of suicide ideation comparable to those of adolescents with AN and considerably more suicide plans and attempts. Suicidality was particularly associated with BN, as more than half of adolescents with BN

### Table 2. Lifetime Prevalence by Sociodemographic Correlates Among 10 123 Adolescents

<table>
<thead>
<tr>
<th>Sociodemographic Correlate</th>
<th>AN</th>
<th>BN</th>
<th>BED</th>
<th>SAN</th>
<th>SBED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unweighted No.</td>
<td>34</td>
<td>92</td>
<td>164</td>
<td>98</td>
<td>273</td>
</tr>
<tr>
<td>Overall prevalence</td>
<td>0.3 (0.06)</td>
<td>0.9 (0.16)</td>
<td>1.6 (0.22)</td>
<td>0.8 (0.09)</td>
<td>2.5 (0.26)</td>
</tr>
<tr>
<td>Age, y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13-14</td>
<td>0.3 (0.12)</td>
<td>0.8 (0.25)</td>
<td>1.4 (0.39)</td>
<td>0.6 (0.15)</td>
<td>2.4 (0.45)</td>
</tr>
<tr>
<td>15-16</td>
<td>0.3 (0.12)</td>
<td>0.9 (0.21)</td>
<td>1.6 (0.28)</td>
<td>0.9 (0.19)</td>
<td>2.5 (0.33)</td>
</tr>
<tr>
<td>17-18</td>
<td>0.2 (0.10)</td>
<td>0.9 (0.21)</td>
<td>1.9 (0.38)</td>
<td>1.1 (0.18)</td>
<td>2.5 (0.42)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>0.3 (0.09)</td>
<td>0.5 (0.19)</td>
<td>0.8 (0.19)</td>
<td>0.1 (0.04)</td>
<td>2.6 (0.41)</td>
</tr>
<tr>
<td>Female</td>
<td>0.3 (0.10)</td>
<td>1.3 (0.22)</td>
<td>2.3 (0.40)</td>
<td>1.5 (0.20)</td>
<td>2.3 (0.36)</td>
</tr>
<tr>
<td>Race/ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.2 (0.10)</td>
<td>1.6 (0.83)</td>
<td>2.4 (0.87)</td>
<td>1.0 (0.32)</td>
<td>3.0 (0.43)</td>
</tr>
<tr>
<td>Non-Hispanic black</td>
<td>0.1 (0.09)</td>
<td>1.0 (0.24)</td>
<td>1.5 (0.41)</td>
<td>0.4 (0.16)</td>
<td>3.5 (0.41)</td>
</tr>
<tr>
<td>Other</td>
<td>0.0 (0.03)</td>
<td>1.3 (0.59)</td>
<td>1.4 (0.59)</td>
<td>0.7 (0.28)</td>
<td>3.5 (1.19)</td>
</tr>
<tr>
<td>Non-Hispanic white</td>
<td>0.4 (0.09)</td>
<td>0.7 (0.16)</td>
<td>1.4 (0.28)</td>
<td>0.9 (0.13)</td>
<td>2.0 (0.32)</td>
</tr>
<tr>
<td>Parental/surrogate marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married or cohabiting</td>
<td>0.2 (0.07)</td>
<td>0.8 (0.18)</td>
<td>1.6 (0.33)</td>
<td>0.8 (0.18)</td>
<td>2.3 (0.43)</td>
</tr>
<tr>
<td>Previously married</td>
<td>0.4 (0.24)</td>
<td>1.6 (0.63)</td>
<td>2.8 (1.34)</td>
<td>0.8 (0.27)</td>
<td>1.6 (0.48)</td>
</tr>
<tr>
<td>Never married</td>
<td>0.0 (0.00)</td>
<td>1.1 (0.76)</td>
<td>0.7 (0.34)</td>
<td>0.2 (0.14)</td>
<td>2.5 (1.15)</td>
</tr>
<tr>
<td>Unknown</td>
<td>0.3 (0.14)</td>
<td>0.8 (0.15)</td>
<td>1.3 (0.23)</td>
<td>0.8 (0.16)</td>
<td>2.8 (0.36)</td>
</tr>
<tr>
<td>Poverty index ratio</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1.5</td>
<td>0.1 (0.04)</td>
<td>1.2 (0.27)</td>
<td>1.2 (0.47)</td>
<td>0.8 (0.29)</td>
<td>2.6 (0.40)</td>
</tr>
<tr>
<td>1.5 to &lt;3.0</td>
<td>0.2 (0.12)</td>
<td>0.7 (0.23)</td>
<td>1.6 (0.33)</td>
<td>1.0 (0.20)</td>
<td>1.9 (0.36)</td>
</tr>
<tr>
<td>3.0 to &lt;6.0</td>
<td>0.3 (0.14)</td>
<td>0.9 (0.39)</td>
<td>1.4 (0.23)</td>
<td>1.0 (0.21)</td>
<td>2.5 (0.38)</td>
</tr>
<tr>
<td>&gt;6.0</td>
<td>0.4 (0.12)</td>
<td>0.8 (0.23)</td>
<td>1.9 (0.51)</td>
<td>0.5 (0.14)</td>
<td>2.7 (0.56)</td>
</tr>
<tr>
<td>Urbanicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metropolitan</td>
<td>0.3 (0.07)</td>
<td>0.9 (0.26)</td>
<td>1.5 (0.34)</td>
<td>0.9 (0.17)</td>
<td>2.7 (0.35)</td>
</tr>
<tr>
<td>Other urban</td>
<td>0.2 (0.12)</td>
<td>0.9 (0.24)</td>
<td>1.8 (0.29)</td>
<td>0.7 (0.12)</td>
<td>2.2 (0.50)</td>
</tr>
<tr>
<td>Rural</td>
<td>0.3 (0.23)</td>
<td>0.8 (0.19)</td>
<td>1.3 (0.24)</td>
<td>0.9 (0.22)</td>
<td>2.3 (0.55)</td>
</tr>
</tbody>
</table>

Abbreviations: AN, anorexia nervosa; BED, binge-eating disorder; BN, bulimia nervosa; SAN, subthreshold AN; SBED, subthreshold BED.

* Using a multivariate model taking into account all variables in this table, P < .05.
reported suicide ideation and more than a third reported attempts.

**SERVICE USE**

The majority of adolescents with an eating disorder received some sort of treatment for an emotional or behavioral problem. Among subjects with AN, BN, BED, SAN, and SBED, 77.6%, 88.2%, 72.6%, 70.5%, and 64.2%, respectively, received some form of treatment in their lifetime (Table 6). However, much smaller proportions had sought treatment specifically for their eating or weight problems (27.5%, 21.5%, 11.4%, and 3.4% for AN, BN, BED, and SBED, respectively). The majority of youths who had received services had sought treatment from a mental health specialty (68.8%, 60.9%, 60.4%, 54.3%, and 48.8% for AN, BN, BED, SAN, and SBED, respectively). A sizable minority of youths with AN had sought treatment from human services (40.0%) and school services (40.4%), while many of those with BN also sought treatment from the general medical sector (49.2%) and school services (45.4%). Adolescents with each of the eating disorder subtypes were significantly more likely to seek any treatment and mental health specialty treatment than adolescents without these disorders.

**COMMENT**

To our knowledge, this investigation provides the first report on the prevalence, correlates, impact, and service use patterns of both threshold and subthreshold eating disorders in a nationally representative sample of US adolescents. The observed prevalence estimates were generally similar to those of previous studies, and salient differences in sociodemographic and clinical correlates were observed between eating disorder subtypes. Subthreshold eating conditions that were frequent in this population were characterized by many of the same severity markers as cases meeting diagnostic criteria. While most adolescents with eating disorders received some form of treatment, only a minority of affected individuals received services specifically for eating or weight problems. These findings underscore the important public health implications for a wide spectrum of disordered eating among US youths as well as the necessity to improve treatment access for these conditions.

Prevalence estimates for eating disorders have been difficult to compare across studies owing to differences in research methods as well as cultural and societal differences that affect base prevalence. The observed lifetime prevalence estimates of 0.3% for AN, 0.9% for BN, and 1.6% for BED were only slightly lower than those reported for US adults using parallel methods. However, the ages at onset of each of these disorders were markedly younger in the present sample, thereby underscoring the likelihood that retrospective assessments of adults may overestimate the age at onset of these conditions for a variety of possible reasons.

The sex ratio for most eating spectrum disorders in this study was generally smaller than that in prior treatment-seeking samples and considerably smaller than the 9:1 ratio stated in the DSM-IV. The lack of a female preponderance of eating disorders could be attributable to either the methods of the present study or a true lack of a sex difference in eating disorders in adolescence. One indication that the difference may be genuine is provided by the large female to male ratio for SAN. Future analyses will explore possible explanations for sex differences in eating symptoms and disorders.

Prevalence estimates of eating spectrum disorders also varied by race, with Hispanic adolescents having the highest rates of BN. The greater prevalence of BN in Hispanic adolescents should be interpreted with caution as immigration status, country of birth, and length of residence in the United States may all have an effect on the risk of BN. Nonetheless, this larger prevalence highlights an important discrepancy between treatment-seeking samples and the full US adolescent population.

Although the frequent crossover of eating disorder subtypes in longitudinal studies of adults suggests a lack of diagnostic specificity of eating disorder subtypes, differences in the correlates and clinical profiles be-

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Figure. Age at onset of eating disorders, showing the proportion with disorders (A) and the relative proportion with disorders (B).
between discrete subtypes in our study provide evidence for the validity of these distinctions. There was pervasive lifetime comorbidity among youths with BN, whereas AN was associated with only one other disorder (ie, oppositional defiant disorder). Likewise, suicidality was more common among adolescents with BN compared with those with AN, corroborating findings from previous community surveys and some clinical studies. By contrast, severe role impairment was more common among adults suggests that comorbid disorders may be a consequence of the clinical significance of these subthreshold conditions in the population. Likewise, the significant association between suicide ideation and behavior with subthreshold conditions supports the importance of the spectrum concept of eating disorders.

The majority (72.6%-88.2%) of adolescents with eating disorders reported some contact with the service sector for emotional or behavioral problems, with the most frequently used sectors being mental health specialty care, school services, general medical services, and human services. However, only a minority (3.4%-27.5%) of individuals with eating disorders had actually talked to a professional specifically about their eating or weight problems. This could be attributable to denial of eating problems by adolescents, shame and/or stigma, or a lack of recognition of eating symptoms by professionals treating other disorders among youths in the general population. Subthreshold eating conditions were often characterized by many of the same severity markers as threshold cases. Most striking was the high endorsement of mental health service use for subthreshold conditions, with more than half of these adolescents having sought mental health specialty treatment. Patterns of comorbidity are also suggestive of the clinical significance of these subthreshold conditions in the population. Likewise, the significant association between suicide ideation and behavior with subthreshold conditions supports the importance of the spectrum concept of eating disorders.

The discrepancy between the lack of substantial comorbidity among adolescents in the current study and the high rates of comorbidity associated with AN among adults suggests that comorbid disorders may be a consequence of AN in youths. In fact, some prospective studies provide support for comorbid disorders emerging among youths with primary eating disorders in adolescence. Future analyses will compare the temporal order and progression of comorbid disorders in adults and youths in these parallel studies.

The high prevalence estimates of SAN (0.8%) and SBED (2.5%) provide evidence for a spectrum of eating disorders among youths in the general population. Subthreshold eating conditions were often characterized by many of the same severity markers as threshold cases. Most striking was the high endorsement of mental health service use for subthreshold conditions, with more than half of these adolescents having sought mental health specialty treatment. Patterns of comorbidity are also suggestive of the clinical significance of these subthreshold conditions in the population. Likewise, the significant association between suicide ideation and behavior with subthreshold conditions supports the importance of the spectrum concept of eating disorders.

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non–mental health care professionals to recognize signs of eating disorders). Moreover, the increased risk for certain forms of eating disorders among Hispanic and other minority adolescents warrants particular attention in education of youths, their families, and mental health care professionals.33,36

To our knowledge, this is the first population-based study in the United States to present the prevalence of eating disorders across the full adolescent age range. The large sample size is unparalleled, and the sampling design and weighting allow for generalizations to the general US adolescent population. Inclusion of subthreshold manifestations of eating disorders permitted assessment of a broader range of eating behaviors and their clinical significance. Further strengths are the use of face-to-face structured interviews of the adolescents as well as inclusion of reports from both the parent and adolescent in the assessment of service use and behavioral disorders.

However, the cross-sectional design of this study limits conclusions concerning temporal relationships among comorbid conditions and prevents confirmation of findings from adult samples concerning eating disorder crossovers or transitions from subthreshold to full-threshold conditions.37-39 In addition, the small number of adolescents with combinations of eating disorders (eg, only 6 adolescents met criteria for both AN and BN, and only 2 adolescents met criteria for both BN and BED) precluded our ability to investigate the correlates of combinations of threshold-level eating disorders.

Although 12-month prevalence is also reported, this article primarily focuses on lifetime prevalence and correlates of eating disorders. Such estimates are critical for a comprehensive life-course understanding of these disorders but may also be subject to unreliability of recall of past symptoms or disorders due to memory, bias, desirability of response, and other factors. Attempts to minimize such biases were built into the methods of the CIDI.28,51 In fact, growing evidence from prospective cohort studies suggests that retrospective recall yields underestimates as opposed to overestimates of the true prevalence of psychiatric disorders.32,33 Therefore, the estimates in this article may be a lower bound of the true prevalence of eating disorders.

Concerning other limitations, our diagnostic instrument had not been previously validated in adolescents, and studies using earlier versions of the CIDI found that...
the instrument tended to underdiagnose eating disorders in adults.\textsuperscript{54} However, the use of this same instrument in 2 large adult population–based investigations permitted direct comparisons across studies.\textsuperscript{1,2} An additional concern is that the structure of the survey may not capture all clinically significant cases that fall under a not-otherwise-specified (EDNOS) diagnosis, which corresponds to a majority of the identified cases of eating disorders. For example, the interview did not cover manifestations such as purging without binging, BN or BED with weekly binge eating (a criterion currently proposed for the DSM-5 for both BN and BED),\textsuperscript{30,55} or the age at onset and impairment of SAN.

Furthermore, analyses of associations may have been underpowered owing to the relatively small numbers of adolescents with eating disorders. In particular, as the unweighted number of adolescents with AN in this sample is only 34, the lack of findings for sociodemographic measures and comorbidity may be due to this methodologic issue rather than representing true null findings.

### Table 4. Role Impairment at 12 Months by 12-Month Eating Disorder Subtype

<table>
<thead>
<tr>
<th>Impairment</th>
<th>AN (SE)</th>
<th>BN (SE)</th>
<th>BED (SE)</th>
<th>SBED (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household chore</td>
<td>41.4 (23.36)</td>
<td>65.3 (10.45)</td>
<td>45.0 (12.76)</td>
<td>23.5 (3.61)</td>
</tr>
<tr>
<td>School or work</td>
<td>41.0 (23.20)</td>
<td>63.3 (10.45)</td>
<td>46.2 (11.25)</td>
<td>20.6 (3.74)</td>
</tr>
<tr>
<td>Family life</td>
<td>80.2 (14.12)</td>
<td>59.8 (9.62)</td>
<td>45.7 (11.09)</td>
<td>21.3 (5.66)</td>
</tr>
<tr>
<td>Social life</td>
<td>88.9 (9.66)</td>
<td>72.1 (8.66)</td>
<td>51.6 (11.55)</td>
<td>20.9 (4.00)</td>
</tr>
<tr>
<td>Any</td>
<td>97.1 (3.18)</td>
<td>78.0 (9.58)</td>
<td>62.6 (12.26)</td>
<td>34.6 (5.63)</td>
</tr>
</tbody>
</table>

### Table 5. Lifetime Suicidality by Eating Disorder Subtype Among 10 123 Adolescents

<table>
<thead>
<tr>
<th>Suicide Ideation and Behavior</th>
<th>AN (SE)</th>
<th>BN (SE)</th>
<th>BED (SE)</th>
<th>SAN (SE)</th>
<th>SBED (SE)</th>
<th>No ED (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suicide ideation</td>
<td>31.4 (11.24)</td>
<td>53.0 (5.93)</td>
<td>34.4 (6.18)</td>
<td>30.0 (6.04)</td>
<td>18.3 (4.32)</td>
<td>11.2 (0.55)</td>
</tr>
<tr>
<td>Suicide plan</td>
<td>2.3 (1.42)</td>
<td>25.9 (6.46)</td>
<td>5.1 (1.91)</td>
<td>14.2 (5.40)</td>
<td>5.1 (1.37)</td>
<td>3.6 (0.37)</td>
</tr>
<tr>
<td>Suicide attempt</td>
<td>8.2 (5.75)</td>
<td>35.1 (6.56)</td>
<td>15.1 (7.17)</td>
<td>12.4 (4.83)</td>
<td>5.3 (1.56)</td>
<td>3.0 (0.24)</td>
</tr>
</tbody>
</table>

### Table 6. Lifetime Service Use by Eating Disorder Subtype and Service Sector Among 6483 Adolescents

<table>
<thead>
<tr>
<th>Service Sector</th>
<th>AN (SE)</th>
<th>BN (SE)</th>
<th>BED (SE)</th>
<th>SAN (SE)</th>
<th>SBED (SE)</th>
<th>No ED (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental health specialty</td>
<td>68.8 (12.20)</td>
<td>60.9 (8.61)</td>
<td>60.4 (9.82)</td>
<td>54.3 (9.22)</td>
<td>48.8 (7.29)</td>
<td>28.6 (1.17)</td>
</tr>
<tr>
<td>General medicine</td>
<td>26.9 (10.24)</td>
<td>49.2 (8.80)</td>
<td>22.0 (8.72)</td>
<td>17.4 (6.36)</td>
<td>11.0 (3.33)</td>
<td>11.5 (0.57)</td>
</tr>
<tr>
<td>Human service</td>
<td>40.0 (14.56)</td>
<td>30.2 (7.95)</td>
<td>17.7 (7.78)</td>
<td>29.2 (10.61)</td>
<td>7.7 (3.15)</td>
<td>10.0 (0.63)</td>
</tr>
<tr>
<td>CAM</td>
<td>24.2 (10.61)</td>
<td>13.8 (5.15)</td>
<td>3.6 (1.92)</td>
<td>7.7 (3.84)</td>
<td>8.4 (2.69)</td>
<td>7.5 (0.56)</td>
</tr>
<tr>
<td>Juvenile justice</td>
<td>10.7 (8.28)</td>
<td>1.5 (0.90)</td>
<td>1.2 (0.74)</td>
<td>15.5 (10.71)</td>
<td>5.2 (1.92)</td>
<td>5.1 (0.72)</td>
</tr>
<tr>
<td>School service</td>
<td>40.4 (13.99)</td>
<td>45.4 (9.03)</td>
<td>19.5 (6.16)</td>
<td>38.5 (11.12)</td>
<td>43.8 (8.64)</td>
<td>21.1 (0.80)</td>
</tr>
<tr>
<td>Any treatment</td>
<td>77.6 (11.19)</td>
<td>82.8 (4.41)</td>
<td>72.8 (8.03)</td>
<td>70.5 (7.52)</td>
<td>64.2 (7.51)</td>
<td>44.4 (0.97)</td>
</tr>
<tr>
<td>Treatment specifically for eating or weight problems</td>
<td>27.5 (11.58)</td>
<td>21.5 (5.55)</td>
<td>11.4 (2.97)</td>
<td>NA</td>
<td>3.4 (1.21)</td>
<td>NA</td>
</tr>
</tbody>
</table>

Abbreviations: AN, anorexia nervosa; BN, bulimia nervosa; BED, binge-eating disorder; SAN, subthreshold AN; SBED, subthreshold BED.\textsuperscript{a} Significant differences between adolescents with the ED subtype and adolescents without the subtype ($P < 0.05$).
ther, while the prevalence of subthreshold presentations was assessed, the CIDI was originally designed to assess only DSM-IV presentations; therefore, vital questions regarding the age at onset and impairment of SAN in particular were not asked. This is unfortunate in light of the research questions faced in the revision of the DSM, and the designers of future epidemiologic studies should consider the qualitative costs to research of enforcing skip logic along with the monetary costs.

Despite these limitations, this study provides key information concerning the epidemiology of eating disorders in the US adolescent population. The prevalence of these disorders is higher than previously expected in this age range, and the patterns of comorbidity, role impairment, and suicidality indicate that eating disorders represent a major public health concern. Finally, these findings support the nosological distinction between the major subtypes of eating disorders as well as the importance of inclusion of the full spectrum of eating behaviors in estimating the magnitude and correlates of eating disorders in the US population.

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