Eating Disorders During Adolescence and the Risk for Physical and Mental Disorders During Early Adulthood

Jeffrey G. Johnson, PhD; Patricia Cohen, PhD; Stephanie Kasen, PhD; Judith S. Brook, PhD

**Background:** Data from a community-based longitudinal investigation were used to investigate whether adolescents with eating disorders are at an elevated risk for physical and mental disorders during early adulthood.

**Methods:** Psychosocial and psychiatric interviews were administered to a representative community sample of 717 adolescents and their mothers from 2 counties in the state of New York in 1983, 1985 to 1986, and 1991 to 1993. In 1983, the mean age of the youths was 13.8 years.

**Results:** Adolescents with eating disorders were at a substantially elevated risk for anxiety disorders, cardiovascular symptoms, chronic fatigue, chronic pain, depressive disorders, limitations in activities due to poor health, infectious diseases, insomnia, neurological symptoms, and suicide attempts during early adulthood after age, sex, socioeconomic status, co-occurring psychiatric disorders, adolescent health problems, body mass index, and worries about health during adulthood were controlled statistically. Problems with eating or weight during adolescence predicted poor health outcomes during adulthood, regardless of whether an eating disorder had been present. Only 22% of the adolescents with current eating disorders had received psychiatric treatment within the past year.

**Conclusion:** Eating disorders during adolescence may be associated with an elevated risk for a broad range of physical and mental health problems during early adulthood.
eating disorders in the community do not receive treatment. Although some epidemiological studies have examined the course or development of eating disorders, to our knowledge, no population-based prospective longitudinal study has investigated the association between adolescent eating disorders and a broad range of physical and mental health problems during adulthood.

We report such epidemiological findings from the Children in the Community Study. Statistical procedures are used to control for age, sex, and parental income, which are associated with many physical and psychiatric symptoms. Preexisting health problems during adolescence are also controlled, permitting investigation of the hypothesis that adolescent eating disorders contribute to an increased risk for the development of mental and physical health problems.

RESULTS

DESCRIPTIVE STATISTICS

Thirty-six female subjects (10%) and 4 male subjects (1%) had eating disorders during early or middle adolescence. Of the 40 adolescents with current eating disorders, 9 (22%) had received treatment from a mental health professional during the past year. Of these 9 youths, 8 (89%) had co-occurring psychiatric disorders. In comparison, 17 (55%) of the 31 youths who were not treated by a mental health professional had co-occurring psychiatric disorders ($\chi^2=3.45, P=0.06$). Four individuals had eating disorders during adolescence and early adulthood. Youths with eating disorders had a mean of 6 problems with eating or weight during adolescence, regardless of treatment status.

The BMI scores of adolescents with eating disorders were not significantly different from those of adolescents without eating disorders. However, the adolescents who reported strict dieting ($t_{115}=6.38, P<.001$), eating alone to conceal unusual eating behavior ($t_{115}=3.03, P=.004$), frequent exercise to lose weight ($t_{115}=9.27, P<.001$), fasting for at least 24 hours ($t_{115}=3.45, P=.001$), recurrent fluctuations in weight ($t_{115}=4.36, P<.001$), self-induced vomiting ($t_{115}=2.32, P=.02$), and the use of medication to lose weight ($t_{115}=3.48, P=.001$) had significantly higher BMI scores at a mean age of 16.1 years than those who did not have these eating or weight problems. (Table 1). Of the 40 adolescents with current eating disorders, 9 (22%) had received treatment from a mental health professional during the past year. Of these 9 youths, 8 (89%) had co-occurring psychiatric disorders. In comparison, 17 (55%) of the 31 youths who were not treated by a mental health professional had co-occurring psychiatric disorders ($\chi^2=3.45, P=0.06$). Four individuals had eating disorders during adolescence and early adulthood. Youths with eating disorders had a mean of 6 problems with eating or weight during adolescence, regardless of treatment status. The BMI scores of adolescents with eating disorders were not significantly different from those of adolescents without eating disorders. However, the adolescents who reported strict dieting ($t_{115}=6.38, P<.001$), eating alone to conceal unusual eating behavior ($t_{115}=3.03, P=.004$), frequent exercise to lose weight ($t_{115}=9.27, P<.001$), fasting for at least 24 hours ($t_{115}=3.45, P=.001$), recurrent fluctuations in weight ($t_{115}=4.36, P<.001$), self-induced vomiting ($t_{115}=2.32, P=.02$), and the use of medication to lose weight ($t_{115}=3.48, P=.001$) had significantly higher BMI scores at a mean age of 16.1 years than those who did not have these eating or weight problems. (Table 1).
HEALTH PROBLEMS ASSOCIATED WITH EATING DISORDERS DURING ADOLESCENCE

Eating disorders during adolescence were significantly associated with co-occurring chronic fatigue (OR, 3.81; 95% confidence interval [CI], 1.48-9.76), chronic or frequent insomnia (OR, 2.88; 95% CI, 1.44-5.76), chronic or frequent pain (OR, 3.26; 95% CI, 1.71-6.21), or obesity (defined as a BMI of at least 2 SDs above the sample mean) or obesity (defined as a BMI of at least 2 SDs below the sample mean) or obesity (defined as a BMI of at least 2 SDs above the sample mean) or obesity (defined as a BMI of at least 2 SDs above the sample mean). These associations remained significant after age, sex, co-occurring psychiatric disorders, corresponding health problems during adolescence, parental income, BMI, and worries about health during early adulthood were controlled statistically. Eating disorders were not associated with risk for diabetes, which was present in 3 individuals.

ADOLESCENT EATING DISORDERS AND MENTAL HEALTH OUTCOMES DURING EARLY ADULTHOOD

Eating disorders during adolescence were associated with an increased risk of psychiatric disorders during early adulthood (Table 2). These associations remained significant after age, sex, co-occurring psychiatric disorders, corresponding health problems during adolescence, parental income, BMI, and worries about health during early adulthood were controlled statistically. Eating disorders were not associated with risk for diabetes, which was present in 3 individuals.

ADOLESCENT EATING DISORDERS AND PHYSICAL HEALTH OUTCOMES DURING EARLY ADULTHOOD

Eating disorders during adolescence were associated with an increased risk for cardiovascular symptoms, chronic fatigue, chronic or frequent insomnia, chronic or frequent pain, neurological symptoms, frequent sickness, many activities limited due to poor health, fair or poor overall health, and any chronic health problems during early adulthood. Eating disorders were not associated with risk for diabetes, which was present in 3 individuals.

Previous research has indicated that the reliability and validity of the DISC-1 as used in the present study are comparable to those of other structured interviews. 

Personality disorders were assessed with items from the Personality Diagnostic Questionnaire, the DISC-1, and other measures. Items were selected based on correspondence with DSM-III-R diagnostic criteria, combined using algorithms developed by a psychiatrist and 2 clinical psychologists, and subsequently modified to correspond with revisions in the DSM-IV diagnostic criteria. Adolescent personality disorder diagnoses were assigned only if youths met the DSM-IV diagnostic criteria in 1983 and 1985 to 1986 or if they met the DSM-IV diagnostic criteria at one assessment and were within one criterion of the diagnosis at the other assessment. Research has supported the reliability and validity of the items and algorithms used to assess personality disorders.

The version of the DISC-1 administered in the present study was expanded to assess the following physical health problems during adolescence and early adulthood: cardiovascular illness, chronic allergies, chronic fatigue, chronic orthopedic problems, chronic or frequent insomnia, chronic or frequent pain, chronic respiratory illnesses, limitations in activities due to poor health, migraine or other chronic headaches, neurological symptoms (eg, epilepsy), other chronic illnesses (eg, diabetes), worries about health problems, and fair or poor overall health. Susceptibility to infectious diseases (eg, influenza) was assessed during early adulthood with an item assessing whether the participant tended to become "sick more easily than other people." These health problems were considered present if reported by either informant. Parental and youth reports of physical health problems were positively correlated in the entire sample ($r = 0.42$, $P < .01$) and in the subsample of youths with eating disorders ($r = 0.61$, $P < .01$). Additional questions regarding psychiatric treatment were asked during the maternal interviews and during the youth interview in 1991 to 1993. The respondents were asked if the youth had received treatment from a mental health professional and if such treatment had been provided in the past year. Data were not obtained regarding specific treatment for eating disorders.

DATA ANALYSIS

Descriptive statistics were computed to determine the prevalence of all of the study variables. Analyses of contingency tables were conducted to investigate whether eating disorders, weight loss behaviors, and behaviors associated with weight gain during adolescence were associated with risk for the development of mental and physical health problems during early adulthood. Logistic regression analyses were conducted to investigate whether these associations were significant after age; sex; anxiety; depressive, disruptive, personality, and substance use disorders; corresponding health problems during adolescence; parental income; co-occurring problems with eating or weight; and worries about health during early adulthood were controlled statistically. To reduce the likelihood of type II errors, these covariates were controlled sequentially in a series of analyses, rather than simultaneously in a single analysis, and bivariate odds ratios (ORs) are reported. To reduce the likelihood of type I errors, $\alpha = .01$ was used to determine whether the ORs were statistically significant.

Analyses of contingency tables and logistic regression analyses were conducted to investigate whether low body weight (defined as a BMI of $\leq 16.60$, identifying individuals whose BMI was at least 2 SDs below the sample mean) or obesity (defined as a BMI of $\geq 28.25$, identifying individuals whose BMI was at least 2 SDs above the sample mean) during adolescence was associated with an elevated risk for health problems during early adulthood.
of the adolescents with eating disorders had 2 or more chronic physical health problems during early adulthood. In comparison, 22% of the adolescents without psychiatric disorders and 32% of the adolescents without eating disorders who had other psychiatric disorders had multiple chronic physical health problems during early adulthood ($\chi^2=34.34, P<.001$).

### ADOLESCENT WEIGHT LOSS BEHAVIORS AND HEALTH PROBLEMS DURING EARLY ADULTHOOD

Fasting, frequently exercising to lose weight, self-induced vomiting, and strict dieting during adolescence were associated with health problems during early adult-

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**Table 1. Eating and Weight Problems During Adolescence and Early Adulthood**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Adolescence</th>
<th>Early Adulthood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight loss behaviors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strict dieting</td>
<td>Females (n = 366)</td>
<td>Males (n = 351)</td>
</tr>
<tr>
<td>Fasting for ≥24 h†</td>
<td>82 (22)</td>
<td>21 (6)</td>
</tr>
<tr>
<td>Frequent exercise to lose weight</td>
<td>208 (57)</td>
<td>97 (28)</td>
</tr>
<tr>
<td>Self-induced vomiting</td>
<td>16 (4)</td>
<td>2 (&lt;1)</td>
</tr>
<tr>
<td>Use of medication to lose weight</td>
<td>40 (11)</td>
<td>9 (3)</td>
</tr>
<tr>
<td>Eating alone to conceal unusual eating behavior</td>
<td>27 (7)</td>
<td>12 (3)</td>
</tr>
<tr>
<td>Recurrent binge eating</td>
<td>27 (7)</td>
<td>23 (7)</td>
</tr>
<tr>
<td>Recurrent fluctuations in weight</td>
<td>52 (14)</td>
<td>44 (13)</td>
</tr>
<tr>
<td>Eating disorders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anorexia nervosa</td>
<td>0</td>
<td>1 (&lt;1)</td>
</tr>
<tr>
<td>Bulimia nervosa</td>
<td>13 (4)</td>
<td>1 (&lt;1)</td>
</tr>
<tr>
<td>Binge-eating disorder</td>
<td>2 (&lt;1)</td>
<td>0</td>
</tr>
<tr>
<td>Eating disorder not otherwise specified‡</td>
<td>21 (6)</td>
<td>2 (&lt;1)</td>
</tr>
</tbody>
</table>

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**Table 2. Eating Disorders During Adolescence and Chronic Health Problems During Early Adulthood**

<table>
<thead>
<tr>
<th>Chronic Health Problem During Early Adulthood</th>
<th>Without an Eating Disorder</th>
<th>With an Eating Disorder</th>
<th>Odds Ratio (95% Confidence Interval)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiovascular symptoms (eg, hypertension)</td>
<td>11 (2)</td>
<td>3 (8)</td>
<td>4.91 (1.31-18.36)</td>
</tr>
<tr>
<td>Chronic allergies</td>
<td>159 (23)</td>
<td>11 (28)</td>
<td>1.24 (0.60-2.53)</td>
</tr>
<tr>
<td>Chronic fatigue</td>
<td>10 (1)</td>
<td>3 (8)</td>
<td>5.41 (1.43-20.49)</td>
</tr>
<tr>
<td>Chronic or frequent insomnia</td>
<td>184 (27)</td>
<td>19 (48)</td>
<td>2.42 (1.27-4.61)</td>
</tr>
<tr>
<td>Chronic or frequent pain</td>
<td>119 (18)</td>
<td>18 (45)</td>
<td>3.84 (2.00-7.38)</td>
</tr>
<tr>
<td>Chronic orthopedic condition (eg, arthritis)</td>
<td>88 (13)</td>
<td>9 (22)</td>
<td>1.94 (0.90-4.22)</td>
</tr>
<tr>
<td>Chronic respiratory illness (eg, asthma)</td>
<td>22 (3)</td>
<td>4 (10)</td>
<td>3.31 (1.08-10.11)</td>
</tr>
<tr>
<td>Frequent sickness (eg, influenza)</td>
<td>41 (6)</td>
<td>7 (18)</td>
<td>3.29 (1.37-7.89)</td>
</tr>
<tr>
<td>Many activities limited due to poor health</td>
<td>19 (3)</td>
<td>4 (10)</td>
<td>3.85 (1.24-11.90)</td>
</tr>
<tr>
<td>Migraine or other chronic headache</td>
<td>69 (10)</td>
<td>9 (22)</td>
<td>2.56 (1.17-5.60)</td>
</tr>
<tr>
<td>Neurological symptoms (eg, seizures)</td>
<td>5 (&lt;1)</td>
<td>2 (5)</td>
<td>7.07 (1.33-37.65)</td>
</tr>
<tr>
<td>Overall health rated as “fair” or “poor”</td>
<td>72 (11)</td>
<td>11 (28)</td>
<td>3.18 (1.53-6.65)</td>
</tr>
<tr>
<td>Any chronic health problem</td>
<td>193 (27)</td>
<td>23 (58)</td>
<td>3.65 (1.91-6.99)</td>
</tr>
</tbody>
</table>

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*Data are given as number (percentage) of subjects. The mean age during adolescence was 13.8 years in 1983 and 16.1 years in 1985 to 1986; during early adulthood, 22.0 years in 1991 to 1993.
†Only includes fasting for the purpose of losing weight.
‡Includes anorexia nervosa without amenorrhea and clinically significant eating disorder symptoms (eg, self-induced vomiting).
self-induced vomiting. The use of medications to lose
orders could not be controlled in the analyses involving
disorder not otherwise specified, co-occurring eating dis-
vomiting met the criteria for bulimia nervosa or eating
adolescent eating disorders, co-occurring eating or weight
subsequent health problems remained significant after
veral of the associations between weight loss behaviors and
adolescence was 13.8 years in 1983 and 16.1 years in 1985 to 1986; during early adulthood, 22.0 years in 1991 to 1993.

Table 3. Eating Disorders During Adolescence and Psychiatric Conditions During Early Adulthooda

<table>
<thead>
<tr>
<th>Psychiatric Condition During Early Adulthood</th>
<th>Without an Eating Disorder During Adolescence (n = 677)</th>
<th>With an Eating Disorder During Adolescence (n = 40)</th>
<th>Odds Ratio (95% Confidence Interval)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety disorder</td>
<td>57 (8)</td>
<td>11 (28)</td>
<td>4.13 (1.96-8.69)</td>
</tr>
<tr>
<td>Depressive disorder</td>
<td>37 (5)</td>
<td>8 (20)</td>
<td>4.32 (1.86-10.04)</td>
</tr>
<tr>
<td>Disruptive disorder</td>
<td>23 (3)</td>
<td>2 (5)</td>
<td>1.50 (0.34-6.58)</td>
</tr>
<tr>
<td>Personality disorder</td>
<td>90 (13)</td>
<td>10 (25)</td>
<td>2.17 (1.02-4.60)</td>
</tr>
<tr>
<td>Substance use disorder</td>
<td>53 (8)</td>
<td>5 (12)</td>
<td>1.68 (0.63-4.47)</td>
</tr>
<tr>
<td>Suicide attempt</td>
<td>19 (3)</td>
<td>5 (12)</td>
<td>4.95 (1.31-18.36)</td>
</tr>
</tbody>
</table>

aEating disorders included anorexia nervosa, bulimia nervosa, binge-eating disorder, and eating disorder not otherwise specified. The mean age during adolescence was 13.8 years in 1993 and 16.1 years in 1985 to 1986; during early adulthood, 22.0 years in 1991 to 1993.

Table 4. Significant Associations Between Weight Loss Behaviors During Adolescence and Health Problems During Early Adulthooda

<table>
<thead>
<tr>
<th>Health Problem During Early Adulthood</th>
<th>Fasting for 24 h</th>
<th>Frequent Exercise to Lose Weight</th>
<th>Self-Induced Vomiting</th>
<th>Strict Dieting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiovascular symptoms (eg, hypertension)</td>
<td>...</td>
<td>12.51 (3.16-49.48)</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Chronic orthopedic condition (eg, arthritis)</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Chronic respiratory illnesses (eg, asthma)</td>
<td>...</td>
<td>...</td>
<td>5.88 (1.59-21.73)</td>
<td>...</td>
</tr>
<tr>
<td>Chronic fatigue</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Chronic or frequent insomnia</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Chronic or frequent pain</td>
<td>3.07 (1.73-5.45)</td>
<td>2.13 (1.46-3.11)</td>
<td>5.63 (2.18-14.55)</td>
<td>2.18 (1.37-3.49)</td>
</tr>
<tr>
<td>Migraine or other chronic headache</td>
<td>2.46 (1.24-4.89)</td>
<td>1.99 (1.23-3.20)</td>
<td>4.35 (1.59-11.95)</td>
<td>...</td>
</tr>
<tr>
<td>Neurological symptoms (eg, seizures)</td>
<td>...</td>
<td>...</td>
<td>17.35 (3.13-96.22)</td>
<td>...</td>
</tr>
<tr>
<td>Frequent sickness (eg, influenza)</td>
<td>3.05 (1.40-6.68)</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Many activities limited due to poor health</td>
<td>...</td>
<td>...</td>
<td>6.79 (1.82-25.34)</td>
<td>...</td>
</tr>
<tr>
<td>Overall health rated as “fair” or “poor”</td>
<td>...</td>
<td>3.02 (1.86-4.89)</td>
<td>4.04 (1.47-11.07)</td>
<td>2.28 (1.32-3.94)</td>
</tr>
<tr>
<td>Any chronic health problem</td>
<td>...</td>
<td>1.81 (1.30-2.50)</td>
<td>4.06 (1.55-10.63)</td>
<td>...</td>
</tr>
<tr>
<td>Anxiety disorder</td>
<td>3.33 (1.69-6.57)</td>
<td>...</td>
<td>3.88 (1.34-11.25)</td>
<td>4.26 (2.46-7.35)</td>
</tr>
<tr>
<td>Depressive disorder</td>
<td>...</td>
<td>...</td>
<td>4.59 (1.44-15.49)</td>
<td>2.63 (1.33-5.20)</td>
</tr>
<tr>
<td>Suicide attempt</td>
<td>4.29 (1.63-11.28)</td>
<td>...</td>
<td>6.46 (1.74-24.01)</td>
<td>...</td>
</tr>
</tbody>
</table>

aData are given as odds ratio (95% confidence interval). The mean age during adolescence was 13.8 years in 1983 and 16.1 years in 1985 to 1986; during early adulthood, 22.0 years in 1991 to 1993. Ellipses indicate nonsignificant associations.

Table 4. Significant Associations Between Weight Loss Behaviors During Adolescence and Health Problems During Early Adulthooda

Weight Loss Behavior During Adolescence

Table 3. Eating Disorders During Adolescence and Psychiatric Conditions During Early Adulthooda

<table>
<thead>
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<td>8 (20)</td>
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<td>2 (5)</td>
<td>1.50 (0.34-6.58)</td>
</tr>
<tr>
<td>Personality disorder</td>
<td>90 (13)</td>
<td>10 (25)</td>
<td>2.17 (1.02-4.60)</td>
</tr>
<tr>
<td>Substance use disorder</td>
<td>53 (8)</td>
<td>5 (12)</td>
<td>1.68 (0.63-4.47)</td>
</tr>
<tr>
<td>Suicide attempt</td>
<td>19 (3)</td>
<td>5 (12)</td>
<td>4.95 (1.31-18.36)</td>
</tr>
</tbody>
</table>

aEating disorders included anorexia nervosa, bulimia nervosa, binge-eating disorder, and eating disorder not otherwise specified. The mean age during adolescence was 13.8 years in 1993 and 16.1 years in 1985 to 1986; during early adulthood, 22.0 years in 1991 to 1993.

Data are given as number (percentage) of subjects.

Significant (P<.01) association after controlling for age, sex, and parental income.

Significant (P<.01) association after controlling for corresponding psychiatric condition during adolescence.

Significant (P<.01) association after controlling for co-occurring psychiatric disorders.

Significant (P<.01) association after controlling for body mass index during adolescence.

Significant (P<.01) association after controlling for worries about health during early adulthood.

hool after age, sex, co-occurring psychiatric disorders, corresponding health problems during adolescence, parental income, and worries about health during early adulthood were controlled statistically (Table 4). Several of the associations between weight loss behaviors and subsequent health problems remained significant after adolescent eating disorders, co-occurring eating or weight problems, and BMI were controlled statistically. Because all of the adolescents who reported self-induced vomiting met the criteria for bulimia nervosa or eating disorder not otherwise specified, co-occurring eating disorders could not be controlled in the analyses involving self-induced vomiting. The use of medications to lose weight was not significantly associated with any subsequent physical or mental health problems. A low body weight during adolescence was associated with an elevated risk for respiratory illnesses during adulthood (OR, 4.44; 95% CI, 2.07-9.62). This association remained significant after age, sex, co-occurring psychiatric disorders, corresponding health problems during adolescence, parental income, adolescent eating disorders, and worries about health during early adulthood were controlled statistically. A low body weight during adolescence was not independently associated with any other adult health problems after these covariates were controlled.

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ADOLESCENT BEHAVIORS ASSOCIATED WITH WEIGHT PROBLEMS AND ADULT HEALTH PROBLEMS

Eating alone to conceal unusual eating behavior, eating a large amount of food, and frequent fluctuations in weight during adolescence were associated with early adulthood health problems after age, sex, co-occurring psychiatric disorders, corresponding health problems during adolescence, parental income, and worries about health during early adulthood were controlled statistically (Table 5). Several of the associations between these behaviors and subsequent health problems remained significant after adolescent eating disorders, co-occurring eating or weight problems, and BMI were controlled. Adolescent obesity was associated with an elevated risk for fair or poor health during adulthood (OR, 4.31; 95% CI, 1.39-13.33). This association remained significant after controlling for co-occurring psychiatric disorders. Because most individuals with eating disorders are not appropriately diagnosed or treated,34,35 it seems that greater effort should be devoted to the recognition and treatment of eating disorders among adolescents in the community. The administration of screening questionnaires to patients with eating or weight problems may help primary care physicians, pediatricians, and other practitioners to increase the recognition of eating disorders.52 Referring adolescents with eating disorders to appropriate treatment specialists may help to prevent the development of potentially serious health problems.

The present findings also indicate that specific problems with eating or weight during adolescence are associated with an increased risk for physical and mental disorders during early adulthood. Our findings are of particular interest because they indicate that youths with eating or weight problems may be at an elevated risk for health problems during adulthood, even if their problems with eating or weight are not severe enough to warrant an eating disorder diagnosis. Because problems with eating and weight are so common among adolescents in the general population, it would seem important to develop and implement educational and public health in-
terventions that inform parents and youths about the potentially harmful long-term consequences of eating and weight problems during adolescence. 53

The present findings also indicate that problematic behaviors associated with eating and weight tend to be more strongly associated with risk for subsequent health problems than body weight itself. Particularly noteworthy are our findings indicating that self-induced vomiting is strongly associated with various adverse health outcomes. Future research should investigate the biological and psychological processes that may mediate the associations between specific problems with eating and weight and the development of physical and mental disorders. Numerous factors, including disruptions in hormonal, neurotransmitter, cytokine, peptide, immunologic, and metabolic functioning, may underlie these associations. 50,51,54-58 An increased understanding of the mechanisms that govern the association between eating or weight problems and adverse health outcomes may facilitate the development of more effective treatment interventions.

Although effective treatments are available for youths with eating disorders, the present findings from this upstate New York sample are consistent with previous findings indicating that relatively few adolescents with eating disorders receive these kinds of specialized treatment services. Because eating and weight problems are associated with a wide range of adverse health outcomes, the present findings suggest that greater effort should be made to promote increased recognition and treatment of eating and weight problems by pediatricians, primary care physicians, and other health professionals. Our findings also suggest that specialized treatment programs should be made more widely available to adolescents with eating disorders.

Limitations of the present study merit consideration. There were not enough cases to permit analyses regarding associations between specific types of adolescent eating disorders and adult health problems. Therefore, we investigated associations between specific eating or weight problems and health problems during early adulthood. In this respect, the present findings provide a uniquely detailed and systematic contribution to the scientific literature. Health outcomes were assessed by interview and could not be independently verified. However, adolescent problems with eating or weight were associated with poor adult health outcomes after worries about health during early adulthood were controlled statistically. Because sufficiently detailed data regarding treatment were not available, treatment outcomes could not be systematically investigated. Few male subjects had eating disorders; however, many male subjects had eating or weight problems, and it was of interest to investigate the health problems that were associated with these problems. There were relatively few subjects with certain health outcomes, such as cardiovascular symptoms, chronic fatigue, and neurological symptoms. This would have been a concern if adolescent problems with eating or weight did not predict these health outcomes. However, problems with eating or weight during adolescence did predict several of the health outcomes that were low in prevalence.

The present study also has numerous methodological strengths, including the use of a large representative sample, the use of a longitudinal design, the systematic assessment of a wide range of psychiatric disorders and health problems from adolescence through early adulthood based on data that were obtained from the youths and their mothers, and the use of statistical procedures to control for the effects of age, sex, socioeconomic status, co-occurring psychiatric disorders, preexisting health problems, and worries about health during early adulthood. For these reasons, the present findings promise to increase our understanding of the association between eating disorders and health problems during early adulthood.

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Corresponding author: Jeffrey G. Johnson, PhD, New York State Psychiatric Institute, 1051 Riverside Dr, Campus Box 60, New York, NY 10032 (e-mail: jjohnso@pi.cpmc.columbia.edu).

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