



Original article

A Prospective Study of Overeating, Binge Eating, and Depressive Symptoms Among Adolescent and Young Adult Women

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A B S T R A C T

Purpose: To investigate the temporal relationship between depressive symptoms and overeating and binge eating among adolescent and young adult females in the United States.**Methods:** We investigated incident overeating, binge eating, and depressive symptoms among 4,798 females in the Growing Up Today Study, a prospective cohort study of adolescents and young adults throughout the United States. Participants who reported at least monthly episodes of eating a very large amount of food in a short amount of time in the past year, but not experiencing a loss of control, were classified as overeaters. Those who reported a loss of control while overeating were classified as binge eaters. Depressive symptoms were assessed with the McKnight Risk Factor Survey. Participants were followed between 1999 and 2003. Generalized estimating equations were used for lagged analysis with time-varying covariates. Analyses were adjusted for age, age at menarche, body mass index, and follow-up time.**Results:** Females reporting depressive symptoms at baseline were two times more likely than their peers to start overeating (odds ratio [OR] = 1.9; 95% confidence interval [CI] = 1.4, 2.5) and binge eating (OR = 2.3; 95% CI = 1.7, 3.0) during the follow-up. Similarly, females engaging in overeating (OR = 1.9; 95% CI = 1.1, 3.4) or binge eating (OR = 1.9; 95% CI = 1.2, 2.9) at baseline were two times more likely than their peers to develop depressive symptoms during the follow-up.**Conclusions:** These results indicate that it is important to consider depressive symptoms in overeating and binge eating prevention and treatment initiatives targeting adolescent and young adult females.

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Adolescence is a critical period for onset of eating disorders—approximately 90% of cases of anorexia nervosa and bulimia nervosa begin before the age of 20 years [1], although onset of binge eating typically occurs during late adolescence [2]. In addition to those meeting the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) [3] criteria for anorexia nervosa, bulimia nervosa, and binge eating disorder, many more adoles-

cents and young adults engage in disordered eating patterns that may not be severe or frequent enough to meet DSM-IV diagnostic criteria but are themselves associated with increased risk of poor health outcomes [4]. In Project EAT (Eating Among Teens), a population-based investigation involving more than 4,700 adolescents from public schools in Minnesota, 56.9% of females and 32.7% of males reported engaging in unhealthy behaviors, including fasting and skipping meals, in an attempt to control their weight [5]. In this same cohort, 3.1% of girls and 0.9% of boys satisfied criteria for a binge eating disorder, and an additional 7.9% of girls and 2.4% of boys indicated subclinical levels of binge eating defined as objec-

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tive overeating with loss of control, but low frequency or no distress because of overeating [6].

High levels of depressive symptoms are at least as common as eating disorders among adolescent females. In the National Longitudinal Study of Adolescent Health, 9% of adolescents reported moderate to severe depressive symptoms. An additional 16% were classified as at risk for developing depression [7]. Although preadolescent rates of depression are higher among males than among females [8], by age 13, rates of depression among females are higher than that in males. Beginning at age 15 and continuing into adulthood, rates of depression in females are nearly twice that of their male peers [8]. Thus, eating disorders and depression are both much more common among females than among males during adolescence and young adulthood.

Cross-sectional studies have observed that depressive symptoms in adolescence are related to an increased likelihood of participation in adverse health behaviors, including smoking [9] and suicidal ideation, during adulthood [10]. Moreover, cross-sectional studies have reported an association between binge eating, low self-esteem [11], obesity [12], and depressive symptoms [11,13]. A few studies have investigated the latter association prospectively and concluded that there is a “reciprocal relationship” between increases in depressive and bulimic symptoms [14]. However, they have not answered whether the association is because of symptomatic females becoming more symptomatic or whether depressive symptoms predict the development of bulimic symptoms and vice versa. The current investigation aims to further the understanding of this temporal relationship by assessing whether depressive symptoms predict the onset of overeating and binge eating and whether overeating and binge eating predict the onset of depressive symptoms in a large nationwide cohort of adolescent and young adult female participants in the ongoing Growing Up Today Study (GUTS).

Methods

Sample

The GUTS is an ongoing prospective cohort study of 9,039 female and 7,843 male offspring of women in the Nurses' Health Study II [15]. GUTS cohort members were aged 9–14 years when the cohort was established in 1996. Consent to invite the children to participate was obtained from their mothers. Return of a completed baseline questionnaire was considered assent by the child. GUTS participants have been mailed questionnaires every 12–24 months since 1996. The questionnaires are revised before each subsequent cycle to support the instrument's alignment with the developmental stage of cohort participants and to optimize the information collected in each cycle. Content areas typically covered in the questionnaire include weight and height, health-risk behaviors across a range of domains, and psychosocial experiences. Additional details on the cohort's establishment and characteristics have been previously reported [16].

The current investigation uses data from female respondents to the GUTS surveys conducted in 1999 ($N = 7,121$), 2001 ($N = 6,273$), and 2003 ($N = 6,578$): data before 1999 were not used in this investigation, as depressive symptoms were not assessed in surveys before this time. Given the increased risk of binge eating [17] and depressive symptoms [8] among females in this age-group, female adolescents were the focus of this investigation. Eligible female participants ranged in age from 12 to 18 years in 1999 and from 16 to 23 years in 2003. After excluding partici-

pants missing primary exposure, or covariate data in 1999 or 2001 and missing outcome data in 2001 or 2003, a total of 4,798 females remained for this analysis. The Human Subjects Committees at the Harvard School of Public Health and Brigham and Women's Hospital approved the study.

Measures

Overeating and binge eating. Overeating and binge eating were assessed using a validated two-part question [18]. The first question asked, “Sometimes people will go on an ‘eating binge’ where they eat an amount of food that most people, like their friends, would consider to be very large, in a short period of time. During the past year, how often did you go on an eating binge?” Participants who indicated overeating at least occasionally were asked six additional questions regarding their experiences while on an eating binge, one of which was the following: “Did you feel out of control, like you couldn't stop eating even if you wanted to stop?” Respondents were classified as overeating if they indicated overeating at least once per month without loss of control while overeating. We have previously found that the specificity (.79) and negative predictive value (.98) or self-reported binge eating are high among females in our cohort [18]. Although the proposed DSM-5 criteria for binge eating set a cutoff of once per week, we selected a cutoff of at least once per month, as we have previously found that the association between total depressive symptoms and binge eating was similar when binge eating was defined as occurring monthly or weekly [19]. However, in secondary analyses, we use the cutoff of at least weekly overeating or binge eating. Incident overeating was defined as overeating that was initiated between 1999 and 2001 or 2001 and 2003 among individuals who were not overeaters at baseline (1999 and 2001 for the respective time intervals). Binge eaters were overeaters who reported experiencing a loss of control while overeating. Incident binge eating was defined as binge eating initiated between the 1999 and 2001 or 2001 and 2003 questionnaires among individuals who did not engage in binge eating at least monthly at baseline.

Depressive symptoms. Depressive symptoms were assessed with the following question: “In the past year how often did you feel ‘down in the dumps’ or ‘depressed?’” from the McKnight Risk Factor Survey IV. [20] A response of “always” or “usually” on the question's 5-point Likert response scale was reflective of depressive symptoms. Incident depressive symptoms were defined as reporting “always” or “usually” feeling “down in the dumps” or “depressed” at follow-up (in 2001 or 2003) among females who reported “sometimes,” “rarely,” or “never” at baseline, respectively (in 1999 or 2001).

Covariates. Respondent's age at the time of questionnaire return was estimated based on date of survey return and recorded date of birth. Age at menarche was assessed based on data derived from participants' responses to the 1999, 2001, or 2003 questionnaires. Participants who reported an age of menarche at or before 11 years were classified as having an early age at menarche.

Body mass index (BMI, kg/m^2) was computed from self-reported weight and height. Participants < 18 years of age were classified as overweight or obese according to International Obesity Task Force's age- and gender-specific BMI cutoffs [21]. For participants ≥ 18 years of age, overweight was defined as a BMI

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