OBJECTIVE — The current study examines the prevalence of binge eating and its association with adiposity and psychosocial functioning in a large, diverse sample of youth with type 2 diabetes.

RESULTS — Youth with clinical (6%) and subclinical (20%) levels of binge eating had significantly higher levels and rates of extreme obesity, global eating disorder and depressive symptoms, and impaired quality of life.

CONCLUSIONS — These findings highlight the importance of evaluating youth with type 2 diabetes for the presence of binge eating. Future research is needed to determine the cumulative effects of disordered eating, obesity, and psychosocial distress on adherence to lifestyle change recommendations and longitudinal response to treatment.

Binge eating and other eating disturbances occur more commonly in girls with type 1 diabetes than girls without diabetes (1–3). However, disturbed eating behaviors, such as binge eating, have not been well studied in youth with type 2 diabetes, despite risk due to age and weight status (4,5). This report summarizes binge eating and related psychosocial disturbances in a large sample of youth with type 2 diabetes in TODAY (Treatment Options for type 2 Diabetes in Adolescents and Youth).

RESEARCH DESIGN AND METHODS — TODAY is a multicenter randomized clinical trial funded by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) of the National Institutes of Health (NIH). The collaborative study includes 13 clinical centers and a data coordinating center (see Supplementary Data). The study design and objectives have been described elsewhere (6). The protocol was approved by an External Evaluation Committee convened by the NIDDK and by Institutional Review Boards at each participating institution. All participants provided informed consent, and minor children confirmed assent according to local guidelines. Enrollment began May 2004 and ended February 2009 with a total of 704 participants. Eligibility requirements included 10–17 years of age, type 2 diabetes <2 years’ duration, BMI ≥85th percentile at diagnosis, and an adult caregiver willing to support study participation. All participants completed a run-in period to discontinue nonstudy diabetes treatments, achieve hemoglobin A1c (HbA1c) <8% on metformin only, and demonstrate adherence to the study protocol.

Demographic variables included age, sex, self-report race/ethnicity, and highest household educational level as a proxy for socioeconomic status. Baseline body composition measures included height, weight, waist circumference, and abdominal height. BMI percentile, BMI z score, and percent overweight were calculated. Other physical health measures included HbA1c, blood lipids, and blood pressure.

Of 704 randomized youth, 678 completed the baseline Youth Eating Disorder Examination Questionnaire (YEDEQ), a self-report measure of eating disorder symptoms (7). Responses to “How many times [over the past 28 days] have you eaten what other people would think was a really big amount of food, given the situation?” (objective overeating episodes) and “On how many of these times did you feel like you had lost control while eating?” were used to derive eating categories. Positive responses to both questions were used to establish binge eating, i.e., reporting episodes of objective overeating with an associated loss of control. Nonovereaters reported zero for objective overeating episodes and loss of control questions; overeaters, ≥1 objective overeating episodes, but zero loss of control episodes; subclinical binge eaters, ≥1–<4 binge eating episodes; and clinical binge eaters, ≥4 binge eating episodes. Responses to each of the four YEDEQ subscales (restriction, eating, weight, and shape concerns) were totaled and averaged to provide a global subscale score, a measure of overall distress related to eating, weight, and shape concerns.

Mood was evaluated by self-report questionnaires, the Beck Depression Inventory (BDI) (8), or the Child Depres- sion Inventory (CDI) (9), depending upon participant age. The presence of clinically significant mood impairment was indicated by a BDI score ≥14 and CDI ≥13. Quality of life (QOL) was measured by total score on the Pediatric Quality of Life Inventory (PedsQL) (10). Clinically significant impairment in QOL was defined as a total score at least 1 SD below the mean score for the sample.
RESULTS—The mean age of the sample was 14.0 years (41.7% Hispanic, 32.0% black non-Hispanic, 20.1% white non-Hispanic, 6.2% American Indian), and 64.9% were girls. Of the households, 16.9% had a primary caregiver with a bachelor’s degree or higher educational level, whereas more than half reported completing high school or less. The mean HbA1c for the sample at baseline was 6.0 (SD = 0.7).

Fifty percent of the participants were classified as nonovereaters, 24% as overeaters, 20% as subclinical binge eaters, and 6% as clinical binge eaters. There were no significant differences among eater categories on sex, age, race/ethnicity, household education, or on physical health indexes such as HbA1c, blood lipids, or blood pressure. However, participants classified as clinical binge eaters differed significantly from nonovereaters and overeaters in terms of levels and rates of obesity, as measured by BMI z scores and percent overweight, and from nonovereaters on waist circumference and abdominal height. Participants categorized as clinical binge eaters had significantly greater global eating and weight and shape concerns than nonovereaters or overeaters. Clinical binge eaters had more depressive symptoms than participants in any of the other eater categories. Subclinical and clinical binge eaters had lower QOL than nonovereaters (see Table 1).

CONCLUSIONS—The current study found that 26% of the youth with type 2 diabetes in this large, diverse sample reported binge eating, with significant relationships between binge eating patterns, higher levels of obesity, psychosocial distress, and poorer QOL. The presence of binge eating in youth with type 2 diabetes is particularly troubling given the association of binge eating with accelerated weight gain in those who are already overweight (11). The significant differences in waist circumference and abdominal height between youth with clinical levels of binge eating compared with those without binge-eating patterns are cause for further concern. Waist circumference has been shown to be an independent risk factor for cardiovascular problems such as high blood pressure, and visceral fat deposits have been linked to heightened insulin resistance (12).

Because binge eating has been identified as a moderator and predictor of reduced treatment outcome in weight loss studies (13), the results of this article have implications for youth with type 2 diabetes whose treatment prescription includes disease management through changes in eating habits and physical activity. Furthermore, evidence from the type 1 diabetes literature suggests that the effects of disordered eating on clinical outcomes are cumulative (14). The results reported here highlight the importance of early assessment for disturbed eating, weight and shape concerns, and mood problems, so that appropriate referral and/or specialized treatment can be initiated (15). Future research is required to assess the impact of binge eating and its associated features upon response to treatment and weight reduction for youth with type 2 diabetes.
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