

Screening Obese Adolescents for Binge Eating Disorder in Primary Care: The Adolescent Binge Eating Scale

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Objective To investigate the performance of a simple and developmentally appropriate 10-item questionnaire (Adolescent Binge Eating Scale) for the prediction of binge eating disorder (BED) diagnosis in adolescents seen for obesity.

Study design We evaluated the performance of the questionnaire in comparison with a clinical interview, in a population of adolescents being seen for obesity. The χ^2 or Fisher exact tests were used.

Results There were 94 adolescents aged 12-18 years (59.6% girls) who completed the study. The questionnaire demonstrated a good association with the clinical interview and distinguished different levels of risk for having a BED: participants who responded positively to questions 1 or 2 and had more than 6 positive answers to the 8 additional questions had a high risk of subclinical and clinical BED (83.3%); participants with 3 or fewer positive answers had a low risk of clinical BED (4%).

Conclusions The Adolescent Binge Eating Scale questionnaire is a potential screening tool to identify adolescents with obesity at high risk of BED and guide referral to a specialist to clarify the diagnosis and provide adequate care. (*J Pediatr* 2017;■■■■-■■■).

Binge eating disorder (BED) is associated with obesity and high rates of medical and psychopathologic comorbidity, as well as increased health care use.¹⁻³ Research involving children and adolescents has shown that few meet all the criteria for BED, as described by the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders*.⁴ They more commonly experience a loss of control (LOC) eating disorder (LOC-ED), which includes both classic episodes of binge eating (objective overeating) and subjective experience of being unable to control what or how much is being eaten (LOC).⁵ Children and adolescents who engage in LOC-ED seem to share similar characteristics with individuals who meet full BED, including weight gain and emotional distress.⁵⁻¹⁵ To take into account these developmental specificities, Marcus et al¹⁶ and then Tanofsky-Kraff et al¹⁷ have proposed a set of criteria defining LOC-ED (**Table I**).

Screening for binge eating in adolescents with obesity is essential. Because primary care practitioners (PCPs) are in the first line of care, they play a key role in this screening. However, previous studies in primary care suggest a lack of recognition for this disorder with inconsistent screening and diagnosis.¹⁸⁻²⁰ Failure to recognize and treat BED appropriately is related to poor outcomes.^{7,21} Given the limited time PCPs have with their patients, it is important to provide them with a short screening tool.

We developed a simple auto-questionnaire in French based on the criteria for LOC-ED proposed by Tanofsky-Kraff et al¹⁷, namely, the adolescent binge eating disorder (ADO-BED) questionnaire.²² The aims of this study were to investigate the performance of this questionnaire for the prediction of BED diagnosis, and to identify obese adolescents at risk of BED in the consultation.

Methods

The study took place in the Department of Children and Adolescents of Geneva University Hospitals between January 2011 and January 2014. It involved testing the ADO-BED questionnaire against a structured clinical interview.²²

All patients aged between 12 and 18 years attending the Pediatric Obesity Care Center of Geneva University Hospitals were invited to participate in the study at the end of their first appointment with the pediatrician at the center. Eligibility criteria were: obesity (body mass index > 97th percentile), fluent in French, and no mental disability or psychiatric disease affecting their ability to understand the questions or to consent to participation. Written informed consent was obtained

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ADO-BED	Adolescent binge eating disorder
BED	Binge eating disorder
LOC-ED	Loss of control eating disorder
SCIE	Structured Clinical Interview for DSM Disorders

Table I. Criteria for LOC-ED in children 12 years of age and younger

- A. Recurrent episodes of LOC eating. An episode of LOC eating is characterized by both of the following
1. Food seeking in the absence of hunger or after satiation.
 2. A sense of lack of control over eating.
- B. The LOC eating episodes are associated with 3 or more of the following
1. Secrecy regarding the episode.
 2. Feelings of numbness (lack of awareness) while eating.
 3. Eating in response to negative affect.
 4. Eating more or the perception of eating more, than others.
 5. Negative affect after eating (e.g., shame/guilt).
- C. The LOC eating episodes occur, on average, at least twice a month for 3 months.
- D. Eating is not associated with the regular use of inappropriate compensatory behaviors and does not occur exclusively during the course of anorexia nervosa, bulimia nervosa, or BED.

Tanofsky-Kraff et al.¹⁷

from the adolescent and his or her legal representative before the first appointment with a psychologist, a member of the research team. The study was approved by the Research Ethics Committee of Geneva University Hospitals (number 09-248).

The ADO-BED questionnaire is a 10-item questionnaire in French (Appendix; available at www.jpeds.com). The development process has been described previously.²²

The clinical interview was based on the BED portion of the Structured Clinical Interview for DSM Disorders (SCID), which is the only diagnostic interview validated and available in French.²³ First, adolescents were asked to complete the ADO-BED questionnaire confidentially and to place it in a sealed envelope. Then 1 of 2 masters-level research psychologists conducted a clinical interview based on the BED portion of the SCID. The psychologists were blinded to the results of the auto-questionnaire.

Participants were categorized into a diagnostic category according to SCID results: without BED, meeting subclinical criteria for BED, or meeting criteria for clinical BED. The χ^2 and Kruskal-Wallis tests were used to compare sex and age of participants and diagnostic categories. For each question on the ADO-BED questionnaire, the sensitivity, specificity, and positive and negative predictive values for the identification of subclinical and clinical BED were assessed and the association with the diagnosis of BED was tested using χ^2 tests or Fisher exact test. In addition, the sum of positive answers to questions 3-6 (for question 4, positive answer was "2/3 times/week" or "every day") was calculated in participants answering "yes" to question 1 or 2. The association between the number of positive answers and the diagnosis of subclinical and clinical BED was assessed and tested using χ^2 test or Fisher exact test. The risk alpha was 0.05 2-sided. All statistical analyses were conducted with STATA/IC 14.0 (STATA Corp. LP; College Station, Texas).

Results

More than 90% of eligible patients attending the clinic agreed to participate. A few ($n < 10$) declined a second appointment with the clinician and could therefore not participate. The

number of patients who were not approached because they did not meet inclusion criteria (language barrier, mental disability, etc.) was less than 5. Ninety-four adolescents with obesity participated in the study. The median age was 14 years (range 11-18). Fifty-six (59.6%) were female.

According to the SCID, 26 adolescents (27.6%) met the criteria for a subclinical BED and 21 (22.3%) for the full clinical disorder. Clinical BED was more frequent in girls (28.6%) than in boys (13.2%), but the difference was not significant ($P = .08$). The age of participants was not associated with clinical BED ($P = .23$).

All participants had to answer questions 1 and 2 ($n = 94$) of the ADO-BED questionnaire. Table II describes their answers compared with the results of the clinical interview (without BED, with subclinical BED, and clinical BED). A positive answer to each one of the first questions (question 1 or 2) was significantly associated with subclinical or clinical BED status ($P < .0001$). Their negative predictive values in the identification of clinical BED were greater than 90% and their sensitivity greater than 85% (Table III). None of the participants answering both questions negatively ($n = 20$, 21.2%) had clinical BED and only 2 (10.0%) had a diagnosis of subclinical BED (Table II). In contrast, the positive predictive value of these questions for clinical BED was approximately 35% (Table III). Participants who answered positively to at least 1 of the 2 first questions ($n = 74$, 78.7%) were invited to answer the 8 additional questions and 69 (93.2%) completed the full questionnaire. Results by question are shown in Table II. The average number of positive answers among these additional questions was 5.0 in participants with a diagnosis of clinical BED, 3.8 in participants with a diagnosis of subclinical BED, and 3.1 in participants without BED ($P < .0001$, Kruskal-Wallis test). The risk of having a diagnosis of BED was significantly associated with the number of positive answers (Figure).

Three of these additional questions were associated more significantly with a risk of clinical BED (Table III): question 3d ("eating more or the perception of eating more than others"), questions 3e ("negative affect following eating"), and question 4 ("≥2-3 times a week"). Patients who responded positively to these 3 questions were at high risk of having clinical BED ($n = 8/10$, 80%).

Discussion

The diagnosis of BED is challenging in children and adolescents, leading to its probable underdiagnosis in primary and secondary care. The subjective nature of a binge eating episode and the fact that children and adolescents mainly experience LOC eating, make the diagnosis particularly difficult to assess. This preliminary study demonstrates that a simple auto-questionnaire based on Tanofsky-Kraff et al.¹⁷ criteria may be a good screening instrument for the identification of BED in a population of adolescents with obesity.

The ADO-BED auto-questionnaire demonstrated a good association with the clinical interview for BED, particularly for question 1, "food seeking in the absence of hunger or after satiation," which was efficient to exclude adolescents without BED

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