CLINICAL REPORT Guidance for the Clinician in Rendering Pediatric Care

American Academy of Pediatrics

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Preventing Obesity and Eating Disorders in Adolescents

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abstract

Obesity and eating disorders (EDs) are both prevalent in adolescents. There are concerns that obesity prevention efforts may lead to the development of an ED. Most adolescents who develop an ED did not have obesity previously, but some teenagers, in an attempt to lose weight, may develop an ED. This clinical report addresses the interaction between obesity prevention and EDs in teenagers, provides the pediatrician with evidence-informed tools to identify behaviors that predispose to both obesity and EDs, and provides guidance about obesity and ED prevention messages. The focus should be on a healthy lifestyle rather than on weight. Evidence suggests that obesity prevention and treatment, if conducted correctly, do not predispose to EDs.

INTRODUCTION

The prevalence of childhood obesity has increased dramatically over the past few decades in the United States and other countries, and obesity during adolescence is associated with significant medical morbidity during adulthood.[1] Eating disorders (EDs) are the third most common chronic condition in adolescents, after obesity and asthma.[2] Most adolescents who develop an ED did not have obesity previously, but some adolescents may misinterpret what "healthy eating" is and engage in unhealthy behaviors, such as skipping meals or using fad diets in an attempt to "be healthier," the result of which could be the development of an ED.[3] Messages from pediatricians addressing obesity and reviewing constructive ways to manage weight can be safely and supportively incorporated into health care visits. Avoiding certain weight-based language and using motivational interviewing (MI) techniques may improve communication and promote successful outcomes when providing weight-management counseling.[4]

This clinical report complements existing American Academy of Pediatrics (AAP) reports on EDs[5] and obesity prevention.[6] The aim is to address the interaction between obesity prevention and EDs in teenagers and to stress that obesity prevention does not promote the development

FREE

DOI: 10.1542/peds.2016-1649

PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

FINANCIAL DISCLOSURE: The authors have indicated they do not have a financial relationship relevant to this article to disclose.

FUNDING: No external funding.

POTENTIAL CONFLICT OF INTEREST: The authors have indicated they have no potential conflicts of interest to disclose.

To cite: Golden NH, Schneider M, Wood C, AAP COMMITTEE ON NUTRITION. Preventing Obesity and Eating Disorders in Adolescents. *Pediatrics.* 2016;138(3):e20161649

of EDs in adolescents. This report provides the pediatrician with office-based, evidence-informed tools to identify behaviors that predispose to both obesity and EDs and to provide guidance about obesity and ED prevention messages.

INCREASING PREVALENCE OF ADOLESCENT OBESITY

Data from the NHANES on adolescent obesity prevalence revealed that, in 2011–2012, 20.5% of 12- to 19-year-olds were obese (BMI ≥95th percentile according to the 2000 sex-specific BMI-for-age growth charts of the Centers for Disease Control and Prevention).[7,8] Combining the definitions of overweight (BMI between the 85th and 95th percentiles) and obesity, according to the NHANES 2011–2012 data, 34.5% of 12- to 19-year-olds were overweight or obese.[7,8] Disparities exist in obesity rates among minority youth, with Hispanic, American Indian, and African-American adolescents having the highest prevalence of obesity. Over the past 30 years, the rate of childhood obesity has more than doubled, and the rate of adolescent obesity has quadrupled. However, more recent data over the past 9 years between 2003–2004 and 2011–2012 have revealed no significant changes in obesity prevalence in youth or adults. Although halting the increase in the rate of obesity is a step in the right direction, the prevalence of obesity remains high, and its health care burden and costs remain significant.[9]

RELATIONSHIP BETWEEN CHILDHOOD OBESITY AND ADULT HEALTH STATUS

Most studies have found that children and adolescents who are obese, especially those in the higher range of BMI percentiles, are more likely to be obese as adults.[10–12] The health consequences of obesity can manifest during childhood, but the longer a person is obese, the more at risk he or she is for adult health problems. A high adolescent BMI increases adult diabetes and coronary artery disease risks by nearly threefold and fivefold, respectively.[13] Type 2 diabetes is one of the most serious complications of childhood obesity. Risks of other common comorbid conditions, such as hypertension, abnormal lipid profiles, nonalcoholic fatty liver disease, gallstones, gastroesophageal reflux, polycystic ovary syndrome, obstructive sleep apnea, asthma, and bone and joint problems, are significantly increased in both obese adolescents and adults who were obese as adolescents.[1,14–16] In addition, the psychosocial morbidities associated with childhood obesity, such as depression, poor self-esteem, and poor quality of life, are of significant concern.[17–19]

PREVALENCE OF EDS IN CHILDREN AND ADOLESCENTS AND CHANGES IN DSM-5 DIAGNOSTIC CRITERIA

The onset of EDs usually is during adolescence, with the highest prevalence in adolescent girls, but EDs increasingly are being recognized in children as young as 5 to 12 years.[20–22] Increased prevalence rates also have been noted in males and minority youth.[23] The peak age of onset for anorexia nervosa (AN) is early to mid-adolescence, and the peak age of onset for bulimia nervosa (BN) is late adolescence. Although overall incidence rates have been stable, there has been a notable increase in the incidence of AN in 15- to 19-year-old girls.[24] In the United States from 1999 to 2006, hospitalizations for EDs increased 119% for children younger than 12 years.[25] The lifetime prevalences of AN, BN, and binge eating disorder in adolescent females are 0.3%, 0.9%, and 1.6%, respectively.[26] The reported female-to-male ratio is 9:1, but increasing numbers of males with EDs are being recognized, especially among younger age groups.[20–22]

The *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-5) criteria for EDs are listed in Table 1.[27] The diagnostic criteria for both AN and BN in the DSM-5 are less stringent than in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision*, so the numbers of reported cases likely will increase. For AN, the 85% expected body weight threshold and the amenorrhea criterion from the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision*, both have been eliminated in the DSM-5. For BN, DSM-5 modifications from the previous edition include reducing the threshold of the frequency of binge eating and inappropriate compensatory behaviors (self-induced vomiting, periods of starvation, compulsive exercising or the use of laxatives, diuretics, or diet pills) from twice a week for 3 months to once a week for 3 months. Binge eating disorder now is officially recognized in the DSM-5 as a distinct disorder characterized by recurrent episodes of bingeing at least once a week for 3 months, but without compensatory behaviors, and is associated with the development of obesity.[28] "Atypical AN" describes a subset of patients who lost a significant amount of weight and then returned to normal weight but who continue to have preoccupations with body shape and weight, comparable to patients with "classic" AN.

MEDICAL COMPLICATIONS ASSOCIATED WITH EDS

The medical complications of EDs have been well described elsewhere.[5] In general, medical complications are either the result of physiologic adaptations to the effects of malnutrition or a consequence of unhealthy weight-control behaviors. Young people who have lost large amounts of weight or lost weight too rapidly can develop hypothermia, bradycardia, hypotension, and

orthostasis even if their current weight is in the normal range.[29,30] Rapid weight loss can be associated with acute pancreatitis and gallstone formation. Electrolyte disturbances can occur secondary to self-induced vomiting or the use of laxatives or diuretics or can develop when food is reintroduced after prolonged periods of dietary restriction (the so-called refeeding syndrome). Dietary restriction can lead to primary or secondary amenorrhea in adolescent girls of even normal weight as a result of the suppression of the hypothalamic-pituitary-ovarian axis, which is mediated in part by leptin.[31] Prolonged amenorrhea results in a low-estrogen state, which can contribute to osteoporosis.[23]

THE INTERACTION BETWEEN EDS AND OBESITY PREVENTION IN ADOLESCENTS

Most adolescents who develop an ED were not previously overweight. However, it is not unusual for an ED to begin with a teenager "trying to eat healthy."[32] Some adolescents and their parents misinterpret obesity prevention messages and begin eliminating foods they consider to be "bad" or "unhealthy."[32] US Food and Drug Administration–mandated nutrition facts on food labels list percent daily values based on a 2000-kcal diet. Moderately active adolescent girls require approximately 2200 kcal/day, and moderately active adolescent boys require 2800 kcal/day for normal growth and development. Teenagers who are athletes require even higher caloric intakes.[33] Strict adherence to a 2000-kcal/day diet may lead to an energy deficit and weight loss for many growing teenagers.

Adolescents who are overweight may adopt disordered eating behaviors while attempting to lose weight. In cross-sectional studies, adolescents who are overweight have been shown to engage in self-induced vomiting or laxative use more frequently than their normal-weight peers.[34,35] Some adolescents who were overweight or obese previously can go on to develop a full ED.[3,30,32] In 1 study in adolescents seeking treatment of an ED, 36.7% had a previous weight greater than the 85th percentile for age and sex.[3] Initial attempts to lose weight by eating in a healthy manner may progress to severe dietary restriction, skipping of meals, prolonged periods of starvation, or the use of self-induced vomiting, diet pills, or laxatives. Initial attempts to increase physical activity may progress to compulsive and excessive exercise, even to the point at which the teenager awakens at night to exercise or continues excess exercise despite injury. EDs that develop in the context of previous obesity can present with challenges that delay treatment of the ED.[32] At first, weight loss is praised and reinforced by family members, friends, and health care providers, but ongoing excessive preoccupation with weight loss can lead to social isolation, irritability,

TABLE 1 Key Features of DSM-5 Diagnostic Criteria for Feeding Disorders and EDs

AN
- Restriction of food eaten leading to lower than expected body weight
- Intense fear of weight gain or being fat
- Body image distortion

Types: restricting or binge eating/purging

BN
- Binge eating in which
  - a larger amount of food is eaten within a 2-hour period compared with peers; and
  - there is a perceived lack of control during the time of the binge
- Repeated use of unhealthy behaviors after a binge to prevent weight gain: (vomiting; abuse of laxatives, diuretics, or other medications; food restriction; or excessive exercise)
- Behaviors occur at least once a week for 3 months
- Self-worth is overly based on body shape and weight
- Behaviors occur distinctly apart from AN

Binge-eating disorder
- Recurrent episodes of binge eating in which
  - a larger amount of food is eaten within a 2-hour period compared with peers; and
  - there is a perceived lack of control during the time of the binge

Bingeing episodes are associated with at least 3 of the following:
- eating faster than normal;
- eating until overly full;
- eating large quantities of food when not hungry;
- eating alone because of embarrassment about the quantity of food eaten; and
- feeling badly emotionally after eating

- Upset about bingeing
- Bingeing behavior occurs at least once a week for 3 months
- Bingeing is not followed by the use of unhealthy behaviors to purge and does not occur during AN or BN

Avoidant/restrictive food intake disorder
- A feeding problem that results in at least one of the following:
  - significant weight loss or failure to meet the expected weight or height gain in children;
  - significant nutritional deficiency;
  - dependence on nonfood nutrition, such as nasogastric feedings or oral nutritional supplements; or
  - marked interference with psychosocial functioning
- The problem is not attributable to food availability or cultural ideas
- The problem is
  - not attributable to AN, and there is no distortion in body image; and
  - not attributable to another condition, medical or mental

Other specified feeding disorder or ED

Atypical AN: all criteria for anorexia, but weight is normal

BN (of low frequency and/or limited duration): all criteria except for frequency

Binge-eating disorder (of low frequency and/or limited duration): all criteria except for frequency

Purging disorder: recurrent purging in an effort to lose weight without bingeing

Source: DSM-5.[27]

difficulty concentrating, profound fear of gaining the lost weight back, and body image distortion. If the pediatrician only focuses on weight loss without identifying the associated concerning symptoms and signs, an underlying ED may be missed.

EVIDENCE-BASED MANAGEMENT STRATEGIES ASSOCIATED WITH BOTH OBESITY AND EDS IN TEENAGERS

Cross-sectional and longitudinal observational studies have identified the following certain behaviors associated with both obesity and EDs in adolescents:

1. *Dieting*. Dieting, defined as caloric restriction with the goal of weight loss, is a risk factor for both obesity and EDs. In a large prospective cohort study in 9- to 14-year-olds (N = 16 882) followed for 2 years, dieting was associated with greater weight gain and increased rates of binge eating in both boys and girls.[36] Similarly, in a prospective observational study in 2516 adolescents enrolled in Project Eating Among Teens (Project EAT) followed for 5 years, dieting behaviors were associated with a twofold increased risk of becoming overweight and a 1.5-fold increased risk of binge eating at 5-year follow-up after adjusting for weight status at baseline.[37] Stice et al[38] showed that girls without obesity who dieted in the ninth grade were 3 times more likely to be overweight in the 12th grade compared with nondieters. These findings and others[36,38,39] suggest that dieting is counterproductive to weight-management efforts. Dieting also can predispose to EDs. In a large prospective cohort study in students 14 to 15 years of age followed for 3 years, dieting was the most important predictor of a developing ED. Students who severely restricted their energy intake and skipped meals were 18 times more likely to develop an ED than those who did not diet; those who dieted at a moderate level had a fivefold increased risk.[40]

2. *Family meals*. Family meals have been associated with improved dietary intake and provide opportunities for modeling behavior by parents, even though family meals have not been shown to prevent obesity across ethnic groups.[41–43] A higher frequency of family meals is associated with improved dietary quality, as evidenced by increased consumption of fruits, vegetables, grains, and calcium-rich foods and fiber and reduced consumption of carbonated beverages.[44] Eating family meals together 7 or more times per week resulted in families consuming 1 serving more of fruits and vegetables per day compared with families who had no meals together. These improvements in dietary intake were sustained 5 years later during young adulthood.[45] Family meals also have been shown to protect girls from disordered eating behaviors.[46–48] Most recently, a prospective study in more than 13 000 preadolescents and adolescents found that eating family dinners most days or every day during the previous year was protective against purging behaviors, binge eating, and frequent dieting. The trend was similar in both females and males, although not statistically significant in males.[48] In girls, family meals perceived to be enjoyable were protective from extreme weight-control behaviors.[46] Postulates for why family meals are protective include the following: families will consume healthier foods than teenagers would choose on their own; parents can model healthy food choices; family meals provide a time for teenagers and parents to interact; and parents can monitor their child's eating and address issues earlier when they are aware of their child's eating behavior.[49]

3. *Weight talk*. Weight talk by family members refers to comments made by family members about their own weight or comments made to the child by parents to encourage weight loss. Even well-intended comments can be perceived as hurtful by the child or adolescent. Several studies have found that parental weight talk, whether it involves encouraging their children to diet or talking about their own dieting, is linked to overweight[37,50] and EDs.[51] Project EAT linked weight talk to higher rates of overweight 5 years later. Loth et al[51] interviewed patients in recovery from EDs and found that weight talk affected them negatively. Parents who had conversations about weight had adolescents who were more likely to engage in dieting, unhealthy weight-control behaviors, and binge eating. However, if the focus of the conversation was only on healthful eating behaviors, overweight adolescents were less likely to diet and to use unhealthy weight-control behaviors.[52]

4. *Weight teasing*. In overweight adolescents, weight teasing by peers or family members is experienced by 40% of early adolescent females (mean age: 12.8 ± 0.7 years), 28.2% of middle adolescent females (mean age: 15.9 ± 0.8 years), 37% of early adolescent males, and 29% of middle adolescent males.[53] Family weight teasing predicts the development of overweight status, binge eating, and extreme weight-control behaviors in girls and overweight status in boys. Adolescent girls who were teased

about their weight at baseline were at approximately twice the risk of being overweight 5 years later.[37] A 10-year longitudinal study found that the prevalence of weight teasing did not decrease as children matured into young adults, despite the fact that the relationship between bullying and obesity had received a great deal of attention in the news.[53] A group of subjects who were studied in their young teenage years were studied again in young adulthood to evaluate the role of hurtful weight-related comments and eating behaviors (n = 1902; mean age: 25 years). For both males and females, hurtful weight-related comments from family members and significant others were associated with the use of unhealthy weight-control behaviors and binge eating in both males and females.[54]

5. *Healthy body image*. Approximately half of teenage girls and one-quarter of teenage boys are dissatisfied with their bodies; these numbers are higher in overweight teenagers.[55] Body dissatisfaction is a known risk factor for both EDs and disordered eating; higher scores of body dissatisfaction are associated with more dieting and unhealthy weight-control behaviors in both boys and girls, reduced physical activity in girls, and more binge eating in boys.[56] Body dissatisfaction and disordered eating occur in minority populations and are not limited to white girls and boys.[57] Adolescents who were more satisfied with their bodies were more likely to report parental and peer attitudes that encouraged healthful eating and exercising to be fit, rather than dieting; they were less likely to report personal weight-related concerns and behaviors.[58]

MI IS USEFUL IN ADDRESSING WEIGHT-RELATED ISSUES

MI was developed by Miller and Rollnick in 1991 to treat patients with addiction. Although MI has been well studied in adults with addictions and obesity, fewer studies have evaluated the effect of MI on patients with EDs and the use of MI in children and adolescents.[59–61] Studies to date on the use of MI for patients with EDs[60,61] and for children and adolescents with obesity have been promising.[62–65] The most recent book on MI by Miller and Rollnick defines MI as "a collaborative, goal-oriented style of communication with particular attention to the language of change. It is designed to strengthen personal motivation for and commitment to a specific goal by eliciting and exploring the person's own reasons for change within an atmosphere of acceptance and compassion."[66] This counseling approach involves 4 broad processes listed in Table 2.[67]

A study conducted through the AAP Pediatric Research in Office Settings (PROS) network assessed the effect of MI delivered by pediatricians and found that pediatricians and dietitians who used MI to counsel families with overweight children were successful in reducing children's BMI percentile by 3.1 more points than a control group in which MI was not used.[68] The AAP Web and mobile app called "Change Talk: Childhood Obesity" (http://ihcw.aap.org/resources) uses an interactive virtual practice environment to train pediatricians about the basics of MI. Pediatricians can successfully facilitate their patients' lifestyle behavior changes. Concerns from pediatricians and parents that obesity counseling can lead to an ED can be addressed by understanding the effectiveness of family-centered MI to promote healthy behaviors.

TABLE 2 The Counseling Processes of MI

• Engaging Establishing a working relationship with the patient
• Focusing Identifying how change is being discussed in the conversation
• Evoking Encouraging the patient to explore and discuss the need to change
• Planning for change Planning for change with the patient once the patient demonstrates the readiness to change

WHAT TO DO IF AN ED IS SUSPECTED

The pediatrician often is the first professional consulted by a parent or the school when there is a concern about a possible ED. Height, weight, and BMI should be plotted on the 2000 growth charts available from the Centers for Disease Control and Prevention (www.cdc.gov/growthcharts), and the current data should be compared with as many previous data points as possible. A BMI below the fifth percentile is underweight and may indicate an ED. Other possible indicators of an ED include missed menstrual periods in girls, an unusually rapid decline in BMI, or engaging in disordered eating behaviors by normal-weight and overweight adolescents who are dissatisfied with their body image. Early diagnosis and intervention are associated with improved outcome.[69] EDs are best evaluated and managed by a multidisciplinary health care team, with the pediatrician as an important member of that team.[70] A thorough physical examination and review of systems can help to identify any underlying medical and psychiatric causes for weight loss. This comprehensive clinical assessment has been described in detail elsewhere.[5] High-risk eating and activity behaviors and clinical findings of concern are outlined in Table 3. The pediatrician may feel comfortable performing this evaluation or may prefer to refer the patient to a specialized ED center, if one is available in the

TABLE 3 High-Risk Eating and Activity Behaviors and Clinical Findings of Concern

High-risk eating and activity behaviors
• Severe dietary restriction (<500 kcal/d)
• Skipping of meals to lose weight
• Prolonged periods of starvation
• Self-induced vomiting
• Use of diet pills, laxatives, or diuretics
• Compulsive and excessive exercise
• Social isolation, irritability, profound fear of gaining weight, body image distortion
Clinical findings of concern
• Rapid weight loss
• Falling off percentiles for weight and BMI
• Amenorrhea in girls
• Presence of vital sign instability
o Bradycardia (heart rate <50 beats/minute during the day)
o Hypotension (<90/45 mm Hg)
o Hypothermia (body temperature <96°F [<35.6°C])
o Orthostasis (increase in pulse >20 beats/min) or decrease in blood pressure (>20 mm Hg systolic or >10 mm Hg diastolic) on standing

TABLE 4 Principles of Family-Based Treatment of EDs and Role of the Pediatrician

Principles of treatment
• Parents are not to blame
• Parents are vital to therapeutic success
• Parents are responsible for weight restoration
• Separate the child from the illness
• Nonauthoritarian approach
Three phases of treatment
• Phase 1: parents restore patient's weight
• Phase 2: control transferred back to the child or adolescent
• Phase 3: focuses on adolescent developmental issues and termination of treatment
Examples of the role the pediatrician can play
• Act as a consultant to the parents and therapist
• Explain the medical seriousness of the ED
• Monitor and manage the medical status of the adolescent
• Empower the parents in decision-making
• Communicate with the patient, family, and therapist

local community. A psychological assessment by a mental health professional can assist with the evaluation for comorbid psychiatric illnesses (eg, affective or anxiety disorders).

In children and adolescents with AN and BN, family-based therapy (FBT), in which the parents control the refeeding process, has been shown to be an effective first-line method of treatment.[71,72] With FBT, the pediatrician can assist with monitoring the patient for weight gain and vital sign stability and can communicate with the patient, family, and therapist. Becoming familiar with the general principles of FBT can assist the pediatrician in understanding his or her role in this form of treatment (Table 4).[73]

AN INTEGRATED APPROACH TO OBESITY AND ED PREVENTION FOCUSES ON HEALTHY FAMILY-BASED LIFESTYLE MODIFICATION

Obesity prevention and treatment, if conducted correctly, does not predispose to EDs. On the contrary, randomized controlled trials of obesity prevention programs have shown a reduction in the use of self-induced vomiting or diet pill use to control weight[74] and a decrease in concerns about weight in the intervention groups.[75]

Family involvement in the treatment of both adolescent obesity and EDs has been determined to be more effective than an adolescent-only focus.[73,76] An integrated approach to the prevention of obesity and EDs focuses less on weight and more on healthy family-based lifestyle modification that can be sustained. Pediatricians can encourage parents to be healthy role models and supportively manage the food environment by creating easy accessibility to healthy foods (eg, fruits, vegetables, whole grains, beans and other legumes, and water) and by limiting the availability of sweetened beverages, including those containing artificial sweeteners, and other foods containing refined carbohydrates. Discussions between pediatricians and parents about increasing physical activity and limiting the amount of total entertainment screen time to less than 2 hours/day are important and may lead to changes in family behavior.[77] Another area of prevention is avoiding the presence of a television in the teenager's bedroom, because having a television in the room predicts significantly less physical activity as well as poorer dietary intakes compared with not having a television in the room.[78,79] Other evidence-based approaches encourage parents to include more family meals, home-prepared meals, and meals with less distractions as well as fewer discussions about weight and about dieting.[6,80] Understanding that poor body image can lead to an ED, parents should avoid comments about body weight and discourage dieting efforts that may inadvertently result in EDs and body dissatisfaction.

ROLE OF THE PEDIATRICIAN IN THE PREVENTION OF OBESITY AND EDS IN ADOLESCENTS

Observations that can be concluded from current research summarized in this report to help prevent weight-related problems including both obesity and EDs include the following:

1. Discourage dieting, skipping of meals, or the use of diet pills; instead, encourage and support the implementation of healthy

eating and physical activity behaviors that can be maintained on an ongoing basis. The focus should be on healthy living and healthy habits rather than on weight.

2. Promote a positive body image among adolescents. Do not encourage body dissatisfaction or focus on body dissatisfaction as a reason for dieting.
3. Encourage more frequent family meals.
4. Encourage families not to talk about weight but rather to talk about healthy eating and being active to stay healthy. Do more at home to facilitate healthy eating and physical activity.
5. Inquire about a history of mistreatment or bullying in overweight and obese teenagers and address this issue with patients and their families.
6. Carefully monitor weight loss in an adolescent who needs to lose weight to ensure the adolescent does not develop the medical complications of semistarvation.

Time constraints in a busy pediatric practice are significant. Weight issues can be a topic of sensitivity and therefore can be time consuming. The evidence-based suggestions in this report can be implemented in relatively brief encounters and can be an excellent first step for teenagers and families to promote a healthy lifestyle.

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ABBREVIATIONS

AAP: American Academy of Pediatrics
AN: anorexia nervosa
BN: bulimia nervosa
DSM-5: *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*
ED: eating disorder
FBT: family-based therapy
MI: motivational interviewing

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