

Bulimia nervosa*

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*Throughout this chapter, the term parent(s) is used to refer to all those who fulfill a parental or caregiver role.

Introduction	811
Classification	812
Epidemiology	812
Etiology	813
Clinical presentation	813
Impact on health	815
Medical complications	815
Psychosocial impact	816
Screening	817
Evaluation	818
History	818
Assessment tools	819
Physical examination	819
Laboratory exams	819
Differential diagnosis	820
Treatment	820
Course and prognosis	822
Conclusion	822
Clinical, prevention, intervention, and/or policy takeaways	823
References	823
Further reading	825

Abstract

Bulimia nervosa (BN) is a distinctive eating disorder (ED) that was first identified in the late 1970s. It is a serious disease that usually begins in adolescence or early adulthood and can be associated with a significant risk of morbidity and mortality secondary to the compensatory behaviors used by sufferers to try to prevent weight gain, as well as from its related comorbid psychiatric conditions. Because of this, it is essential that those whose work is related to the fields of pediatrics and adolescent health are familiar with its various aspects. This chapter provides an updated review of the disease in children and adolescents, addressing its classification, epidemiology, etiology, clinical presentation, impact on health, screening, evaluation, treatment and course and prognosis.

Introduction

Bulimia nervosa (BN) is a distinctive eating disorder (ED) that was first identified in the late 1970s (Russell, 1997). Although during the 70s, clinical case reports in the literature closely resembling those that subsequently earned the diagnostic label of BN appeared (Russell, 1997), Russell was the one who coined the term bulimia nervosa in 1979, in relation to the description of a series of 30 patients with three sets of interdependent criteria: powerful urges to overeat, vomiting and/or laxative abuse to avoid the “fattening” effects of food and morbid fear of becoming fat (Russell, 1979). However, he initially interpreted this presentation as a variant of anorexia nervosa (AN) (Russell, 1979). The disease was then progressively recognized as a related but distinct condition and since the 1987 revision of the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III-R) and the 10th revision of the International Classification of Diseases (WHO, 1992) there has been broad international agreement on its status as a diagnostic entity (Russell, 1997). Likewise, its criteria have been refined over time (American Psychiatric Association, 1994, 2013).

BN is a serious disease that usually begins in adolescence or early adulthood (Rome and Strandjord, 2016; National Institute for Health and Care Excellence, 2017; Wade, 2019) and can be associated with a significant risk of morbidity and mortality secondary to the compensatory behaviors used by sufferers to try to prevent weight gain, as well as from its related comorbid psychiatric conditions (Castillo and Weiselberg, 2017). Because of this, it is essential that those whose work is related to the fields of pediatrics and adolescent health are familiar with its various aspects.

This chapter aims to contribute to their knowledge about BN in children and adolescents through an updated review of the literature on the subject. The classification, epidemiology, etiology, clinical presentation, impact on health, screening, evaluation, treatment and course and prognosis of the disorder are addressed.

Classification

The main international classifications of eating disorders correspond to DSM-5 (American Psychiatric Association, 2013) and ICD-11 (World Health Organization, 2018). The criteria corresponding to each of these classifications are shown in Tables 1 and 2, respectively.

In addition, DSM-5 includes under “Other specified feeding and eating disorders” (OSFED), the diagnosis of “BN of low frequency and/or limited duration” for those patients in whom all of the criteria for BN are met, except that the binge eating and inappropriate compensatory behavior occurs at a lower frequency and/or for a shorter period of time. These subthreshold cases have been found to have similar levels of psychopathology compared to threshold diagnoses in adolescent population (Ackard et al., 2011).

Epidemiology

According to a systematic review of prevalence studies of EDs, during the period 2000–2018, the weighted means (ranges) of lifetime prevalence for BN were 1.9% (0.3–4.6%) for women and 0.6% (0.1–1.3%) for men (Galmiche et al., 2019). There are few

Table 1 DSM-5 criteria for bulimia nervosa (BN).

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- A. Recurrent episodes of binge eating. An episode of binge eating is characterized by both of the following:
1. Eating, in a discrete period of time (e.g., within any 2-h period), an amount of food that is definitely larger than what most individuals would eat in a similar period of time under similar circumstances
 2. A sense of lack of control over eating during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating)
- B. Recurrent inappropriate compensatory behaviors in order to prevent weight gain, such as self-induced vomiting; misuse of laxatives, diuretics, or other medications; fasting; or excessive exercise
- C. The binge eating and inappropriate compensatory behaviors both occur, on average, at least once a week for 3 months
- D. Self-evaluation is unduly influenced by body shape and weight
- E. The disturbance does not occur exclusively during episodes of anorexia nervosa

Specify if:

- **In partial remission:** After full criteria for BN were previously met, some, but not all, of the criteria have been met for a sustained period of time
- **In full remission:** After full criteria for BN were previously met, none of the criteria have been met for a sustained period of time

Specify current severity:

The minimum level of severity is based on the frequency of inappropriate compensatory behaviors (see below). The level of severity may be increased to reflect other symptoms and the degree of functional disability.

- **Mild:** An average of 1–3 episodes of inappropriate compensatory behaviors per week
 - **Moderate:** An average of 4–7 episodes of inappropriate compensatory behaviors per week
 - **Severe:** An average of 8–13 episodes of inappropriate compensatory behaviors per week
 - **Extreme:** An average of 14 or more episodes of inappropriate compensatory behaviors per week
-

American Psychiatric Association (2013) *Diagnostic and Statistical Manual of Mental Disorders*, 5th edn. Washington, DC: American Psychiatric Association.

Table 2 ICD-11 criteria for bulimia nervosa (BN).

Frequent, recurrent episodes of binge eating (e.g., once a week or more over a period of at least 1 month)

- A binge eating episode is a distinct period of time during which the individual experiences a subjective loss of control over eating, eating notably more or differently than usual, and feels unable to stop eating or limit the type or amount of food eaten

Binge eating is accompanied by repeated inappropriate compensatory behaviors aimed at preventing weight gain (e.g., self-induced vomiting, misuse of laxatives or enemas, strenuous exercise)

The individual is preoccupied with body shape or weight, which strongly influences self-evaluation

There is marked distress about the pattern of binge eating and inappropriate compensatory behavior or significant impairment in personal, family, social, educational, occupational or other important areas of functioning

The individual does not meet the diagnostic requirements of anorexia nervosa

World Health Organization (2018) *International Classification of Diseases for Mortality and Morbidity Statistics (11th Revision)*. Available from: <https://icd.who.int/browse11/l-m/en>.

studies about prevalence of BN in the adolescent population. The estimated lifetime prevalence in this group varies between 0.1% and 2.6% (Merikangas et al., 2010; Swanson et al., 2011; Stice et al., 2013; Smink et al., 2014). The disorder has its peak age of onset in late adolescence and early adulthood (Rome and Strandjord, 2016; National Institute for Health and Care Excellence, 2017; Wade, 2019) although there are studies reporting an earlier age of onset (Swanson et al., 2011). It has female predominance, with variable reported female to male ratios (3:1–10:1) (Lock et al., 2015; Castillo and Weiselberg, 2017; Engel et al., 2020).

Etiology

A clear and complete understanding of the cause of EDs is lacking. Research to date has proposed various biological, psychological, behavioral and socio-environmental factors that would interact in a complex way, contributing to the development and maintenance of EDs (Bakalar et al., 2015; Schaumberg et al., 2017). Treasure et al., in an article recently published in *The Lancet* (Treasure et al., 2020), describe that work in progress suggests that there are differences between the etiology of two broad categories of EDs, AN and binge spectrum disorders, and summarize those factors currently recognized as involved in the etiology of the latter (Fig. 1).

It seems that individuals with EDs would have a biological or genetic predisposition to the development of these diseases, which is activated by environmental factors (Bakalar et al., 2015), but the mechanisms underlying the interaction between these factors have yet to be clarified.

Clinical presentation

BN is characterized by recurrent episodes of binge eating, followed by repeated inappropriate compensatory behaviors to prevent weight gain, and a self-evaluation that is unduly influenced by body shape and weight (American Psychiatric Association, 2013).

Binge eating is defined as eating, in a discrete period of time (e.g., 2 h), an amount of food that is definitely larger than what most individuals would eat during a similar period of time under similar circumstances, and with a feeling of lack of control over the amount and type of food eaten (American Psychiatric Association, 2013). It may occur from once a week to several times a day. The type of foods eaten during a binge varies, but usually are easy to ingest foods that have been avoided because of fear of weight gain, such as desserts, cake, and chocolate (Castillo and Weiselberg, 2017; Engel et al., 2020). Binge episodes may occur in a dissociative state, with patients saying they feel numb or “nothing” during them (Castillo and Weiselberg, 2017; Engel et al., 2020). Adolescents who binge usually do so in secret, often in their bedrooms or at night when there is less risk of being discovered.

The inappropriate compensatory behaviors follow the binges in an effort to getting rid of the calories consumed, prevent weight gain, and relieve the associated guilt and stress (Castillo and Weiselberg, 2017). These behaviors may include one or more of the following: self-induced vomiting; misuse of laxatives, diuretics, diet pills or medications perceived to cause weight loss; food

<p>Biological factors</p> <ul style="list-style-type: none"> • Genetic predisposition (uncertain) • Gender: female–male ratio=3:1 • Metabolic vulnerability • Ethnicity: increased prevalence in Asians • Behavioral susceptibility to appetite dysregulation 		Onset: late puberty
<p>Psychological factors</p> <ul style="list-style-type: none"> • Childhood adversity • Attention-deficit hyperactivity disorder traits (impulsivity and difficulty paying attention) • Inability to delay reward • Social cognition problems with emotional avoidance • Body image disturbance • Alexithymia 		
<p>Psychosocial factors</p> <ul style="list-style-type: none"> • Parental eating problems • Peer pressure (eg, bullying) • Fat talk (ie, conversations including negative and disparaging comments about body shape or eating behavior) from peers, family, authority figures • Trauma (exposure) • Culture (industrialised/western) • Thin idealisation 	<p>Behavioral factors</p> <ul style="list-style-type: none"> • Weight control behaviors • Overconcern with body-mass index • Coping by avoidance or perfectionism • Social isolation • Impaired physical and mental quality of life 	

Fig. 1 Etiology diagram of bulimic spectrum eating disorders. From: Treasure, J., Duarte, T. A. and Schmidt, U. (2020). Eating disorders. *The Lancet* 395(10227): 899-911.

restriction or fasting; excessive exercise; and insulin misuse in patients with diabetes who are prescribed insulin (American Psychiatric Association, 2013; ClinicalKey, 2019). The most common compensatory behavior is self-induced vomiting (Fairburn and Cooper, 1982; Engel et al., 2020), that can be induced with the use of fingers or instrumentation such as a toothbrush or silverware (to stimulate the gag reflex) and facilitated by other means, such as drinking a great deal of water before an episode of purging (Castillo and Weiselberg, 2017). However, some individuals are able to vomit at will after a time (ClinicalKey, 2019). Misuse of diuretics and diet pills or medications to lose weight are not frequent in adolescents in the authors' experience, unless they are available in their homes or provided by parents. It should be noted that the purging compensatory behaviors are also practiced in secret (Herpertz-Dahlmann, 2015). Excessive exercise consists of vigorous or prolonged physical activity associated with a compulsive quality that interferes with important activities, or occurs at inappropriate times, in inappropriate settings, or despite injury (ClinicalKey, 2019; Wade, 2019; Engel et al., 2020).

The prototypic sequence of behavior in BN consists of a recurrent cycle of dietary restriction, binge eating and compensatory behaviors (National Institute for Health and Care Excellence, 2017; Engel et al., 2020). The illness often begins with a period of dieting, however, the extreme nature of it leads to episodes of binge eating driven by hunger. Following a binge and due to an extreme fear of weight gain, those with BN engage in compensatory behaviors. Over time a vicious cycle of dietary restriction, binge eating and compensatory behaviors develops (National Institute for Health and Care Excellence, 2017; ClinicalKey, 2019). In-between binges there are also continuing attempts to restrict eating, which include avoidance of foods that are perceived to be fattening or likely to trigger a binge (National Institute for Health and Care Excellence, 2017; Engel et al., 2020). Binges may also be triggered by dysphoria (characterized by negative feelings related to weight, body shape, or feeling out of control), life stressors, eating a specific food that has been purposefully avoided, or boredom (Castillo and Weiselberg, 2017; Engel et al., 2020). Binges can bring momentary relief but dysphoria along with guilt, shame, remorse, self-loathing and overconcern about body shape and size normally follow (Castillo and Weiselberg, 2017; ClinicalKey, 2019; Engel et al., 2020). Although initially the patients may lose weight, after repeated bingeing and despite compensatory mechanisms, any weight lost tends to be gradually regained and further weight gain is a common outcome (National Institute for Health and Care Excellence, 2017).

The psychological processes of people with BN involve them trying to adhere to a range of strict eating and food-related rules that increase the risk of binge eating (National Institute for Health and Care Excellence, 2017). Deep dissatisfaction with the subject's own body shape and weight is very common (several patients with BN also tend to overestimate their body size), there is fear of fatness and a pathologic preoccupation with weight and shape (Herpertz-Dahlmann, 2015). Self-evaluation is predominantly based on the perception of one's own body, and everyday life is unduly influenced by weight-control practices (Herpertz-Dahlmann, 2015).

The medical symptoms that may be present in these cases are described in Table 3. Physical signs (Table 4) are usually absent but there may be some findings that are mainly due to recurrent purging behaviors (Castillo and Weiselberg, 2017). Body mass index (BMI) for age and gender is most frequently normal or overweight (Mairs and Nicholls, 2016; ClinicalKey, 2019).

It should be noted that adolescents with BN typically hide their symptoms due to guilt or shame over the binge or purging behaviors, minimization of the consequences of the disease, and ambivalence about the treatment (Wade, 2019). Thus, the disease often goes undetected by their families and physicians, as their appearance is usually unremarkable, they can often eat normally in public and there is often no associated medical complaint that may bring them to seek help (Castillo and Weiselberg, 2017;

Table 3 Medical symptoms in bulimia nervosa.

- Fatigue
- Headache
- Recurrent epistaxis
- Swollen cheeks
- Dry mouth
- Sensitivity of teeth
- Frequent sore throat
- Hoarse voice, chronic cough
- Heart palpitations
- Hematemesis
- Abdominal pain/bloating
- Constipation/diarrhea
- Amenorrhoea, oligomenorrhoea

Academy for Eating Disorders (AED) (2016) *Eating Disorders. A Guide to Medical Care. Critical Points for Early Recognition and Medical Risk Management in the Care of Individuals With Eating Disorders*, 3rd edn. Academy for Eating Disorders.

ClinicalKey (2019) *Bulimia Nervosa. Clinical Overview*. Available from: https://www-clinicalkey-es.uchile.idm.oclc.org/#!/content/clinical_overview/67-s2.0-4e69ff24-86d3-42e0-a2b6-2965ca779337 (Accessed 25 October 2020).

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Rosten A and Newton T (2017) The impact of bulimia nervosa on oral health: A review of the literature. *British Dental Journal* 223(7): 533–539.

Table 4 Physical examination findings in bulimia nervosa.

- BMI for age and gender most frequently normal or overweight
- Bradycardia, tachycardia, irregular heart rhythm, hypotension, orthostasis
- Calluses over knuckles (Russell's sign)
- Edema
- Subconjunctival hemorrhages
- Parotid gland enlargement
- Oral trauma/lacerations, mucositis, cheilitis
- Dental erosion (perimolysis), most marked on lingual surface of the maxillary anterior teeth
- Dental caries
- Abdominal bloating
- Rectal prolapse

Academy for Eating Disorders (AED) (2016) *Eating Disorders. A Guide to Medical Care. Critical Points for Early Recognition and Medical Risk Management in the Care of Individuals With Eating Disorders*, 3rd edn. Academy for Eating Disorders.

Campbell K and Peebles R (2014) Eating disorders in children and adolescents: State of the art review. *Pediatrics* 134(3): 582–592.

ClinicalKey (2019) *Bulimia Nervosa. Clinical Overview*. Available from: https://www-clinicalkey-es.uchile.idm.oclc.org/#!/content/clinical_overview/67-s2.0-4e69ff24-86d3-42e0-a2b6-2965ca779337 (Accessed 25 October 2020).

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National Institute for Health and Care Excellence, 2017). Sufferers typically are symptomatic for years before seeking treatment (Fairburn and Cooper, 1982; Mairs and Nicholls, 2016), unless their behaviors are extreme or have been disclosed to a parent or caregiver (Mairs and Nicholls, 2016).

Impact on health

Medical complications

BN is associated with many different medical complications ranging from mild to life-threatening and involving multiple body systems. The major ones are due to the compensatory purging behaviors (Mehler and Rylander, 2015; Castillo and Weiselberg, 2017; Gibson et al., 2019) and depend upon the method and frequency of these (Mehler and Rylander, 2015; Castillo and Weiselberg, 2017; Gibson et al., 2019).

The complications of self-induced vomiting—the most prevalent purging behavior (Fairburn and Cooper, 1982; Mazzeo et al., 2003)—will be reviewed here. Because they are diverse, those frequently described in the literature are addressed below.

Skin: the most characteristic cutaneous lesion of self-induced vomiting is Russell's sign (Strumia, 2013). It involves knuckle calluses on the dorsal aspects of the dominant hand that are consequence of the trauma caused by the patient's repeated introduction of the hand into the mouth in order to induce vomiting (Strumia, 2013; Mehler and Rylander, 2015; Forney et al., 2016).

Eyes and nose: self-induced vomiting may result in subconjunctival hemorrhages or recurrent epistaxis due to the increase in pressure that can occur during purging which can cause small blood vessels to burst (Brown and Mehler, 2013; Mehler and Rylander, 2015; Castillo and Weiselberg, 2017). Recurrent epistaxis without nasal pathology in a young female should raise the question of covert BN (Brown and Mehler, 2013; Westmoreland et al., 2016).

Oral and salivary glands: reduced salivary secretion that lead to xerostomia (dry mouth) is common in patients with self-induced vomiting, due to dehydration resulting from the purging behavior (Rosten and Newton, 2017). Perimolysis (dental erosion) is another frequent oral finding among bulimics (Rosten and Newton, 2017) and is related to repeated exposure of the teeth to stomach acid (Brown and Mehler, 2013; Westmoreland et al., 2016). It is typically most severe on the lingual surfaces of the maxillary anterior teeth (Altshuler et al., 1990; Brown and Mehler, 2013) and may be apparent as early as 6 months after onset of regular self-induced vomiting (Altshuler et al., 1990; Mehler and Rylander, 2015; Gibson et al., 2018). Increased prevalence of dental caries has also been reported in BN patients as a consequence of bingeing on high carbohydrate-content foods, higher consumption of carbonated beverages, acid exposure, reduced salivary flow rate and poor oral hygiene (Mehler and Rylander, 2015; Rosten and Newton, 2017). Cheilitis and mucositis of the hard palate and throat may also result from repeated exposure to gastric acid due to self-induced vomiting (Brown and Mehler, 2013; Mehler and Rylander, 2015; Westmoreland et al., 2016). Parotid gland enlargement, also called parotid sialadenosis, is another consequence of this type of purging behavior (Forney et al., 2016). Its pathogenesis is unclear (Mehler and Rylander, 2015; Westmoreland et al., 2016; Gibson et al., 2018). Examination of the parotid tissue reveals a non-inflammatory process; enlarged acini with prominent zymogen granules without other pathology (Westmoreland et al., 2016; Gibson et al., 2018). It is generally bilateral and only minimally tender (Mehler and Rylander, 2015; Gibson et al., 2018), usually develops in the days following the cessation of vomiting (Brown and Mehler, 2013; Mehler and Rylander, 2015; Forney et al., 2016; Westmoreland et al., 2016; Gibson et al., 2018) and can be very distressing to a patient

with BN whose focus on body image is exaggerated. Enlargement of the minor salivary glands (e.g., submandibular) has also been reported (Mehler and Rylander, 2015; Forney et al., 2016).

Throat: acid exposure also causes damage to the larynx with inflammatory changes to the vocal cords and symptoms like a hoarse voice and chronic cough (Westmoreland et al., 2016; Castillo and Weiselberg, 2017).

Cardiovascular: dehydration due to repeated episodes of self-induced vomiting can lead to volume depletion and result in sinus tachycardia, hypotension, and orthostasis (Brown and Mehler, 2013; Mehler and Rylander, 2015). In addition, the hypokalemic and metabolic alkalosis state generated by self-induced vomiting (addressed later) can be associated with cardiac arrhythmias (Mehler and Walsh, 2016; Brinkman and Sharma, 2020). Hypokalemia can lead to prolonged QT interval putting the patient at risk of malignant cardiac arrhythmias including the often-fatal ventricular fibrillation (Mehler and Walsh, 2016). Cardiac arrhythmias are the likely reason for the elevated mortality rate associated with BN (Westmoreland et al., 2016).

Gastrointestinal: patients who self-induce vomiting will commonly complain of symptoms consistent with gastroesophageal reflux disease (GERD) (Mehler and Rylander, 2015; Gibson et al., 2018) but it is unclear if they are at higher risk of GERD, because the actual endoscopic findings suggest similar prevalence between these patients and the general population (Gibson et al., 2018). Several case reports described Barrett's esophagus (a precancerous condition of the distal esophagus) and carcinoma of the esophagus in patients with a prior history of BN, but disagreement exists around the relationship between self-induced vomiting and esophageal cancer (Forney et al., 2016; Santonicola et al., 2019). Another problem that has been described in association with self-induced vomiting is disordered esophageal motility, including achalasia and esophageal spasm, but it is not certain that vomiting causes these abnormalities (Forney et al., 2016; Santonicola et al., 2019). Hematemesis can also occur as a result of tears in the esophagus (Mallory-Weiss syndrome) due to vomiting (Brown and Mehler, 2013; Santonicola et al., 2019). A relationship has been hypothesized between BN and rectal prolapse at an atypically young age of onset (Malik et al., 1997; Santonicola et al., 2019). The repetitively increased intra-abdominal pressure associated with vomiting in addition to constipation, pelvic floor weakness and over-exercise is considered the rationale for this link (Santonicola et al., 2019).

Electrolytes and acid-base: the most dangerous medical complications of self-induced vomiting are due to the associated electrolyte and acid-base disturbances, being hypokalemia and metabolic alkalosis the most common (Westmoreland et al., 2016). These conditions are secondary to acid and potassium loss in vomiting, as well as a volume depleted state which leads to increased aldosterone secretion to sustain the blood pressure (Westmoreland et al., 2016). Repeated episodes of self-induced vomiting can lead to dehydration and subsequent upregulation of the renin-angiotensin-aldosterone system, with the generation of hyperaldosteronism (Brown and Mehler, 2013; Mehler and Rylander, 2015). This results in increased reabsorption of sodium and bicarbonate along with potassium and hydrogen loss by the kidney and subsequent water retention to mitigate the volume depletion (Brown and Mehler, 2013; Mehler and Rylander, 2015; Gibson et al., 2018). The state of normotensive, hypokalemic metabolic alkalosis generated by these phenomena is referred to as pseudo-Bartter's syndrome (Mehler and Walsh, 2016). Cardiac arrhythmias are among the main complications of this hypokalemic and metabolic alkalosis state (Mehler and Walsh, 2016; Brinkman and Sharma, 2020). It is described that the degree of electrolyte abnormalities is proportional to the frequency and duration of purging (Mehler and Rylander, 2015; Gibson et al., 2018) and that the majority of patients with BN, who vomit only occasionally, will have normal serum electrolytes (Mehler and Rylander, 2015). Nevertheless, Castillo and Weiselberg (2017), based on their EDs Program experience, state that even those who purge multiple times per day do not develop hypokalemia, and that this complication can be seen in others even with minimal amounts of purging, emphasizing that the factors that distinguish those who develop hypokalemia from those who do not are unknown. Aldosterone continues to be upregulated for some time after purging ceases and can result in severe peripheral edema especially in patients in whom intravenous saline repletion is required and infused too quickly (Mehler and Rylander, 2015; Westmoreland et al., 2016; Gibson et al., 2018).

Despite not being complications of self-induced vomiting, the obstetric and gynecologic problems associated with BN that are relevant to adolescents should be noted in this section, due to their high frequency or potential impact. Amenorrhea has been reported in 7–40% of adolescents and adult women with BN and oligomenorrhea in 19.2–64%. (Poyastro Pinheiro et al., 2007; Kimmel et al., 2016). The subgroup of women with BN who had a history of AN show a higher frequency of amenorrhea (77.1%) (Poyastro Pinheiro et al., 2007). The mechanism for amenorrhea and oligomenorrhea in these patients is unclear (Kimmel et al., 2016), but part of the menstrual disturbances can be explained by the presence of polycystic ovary syndrome (PCOS), which is associated with BN (Kimmel et al., 2016; Paganini et al., 2017; Krug et al., 2019). Women with BN also present a markedly elevated risk of unplanned pregnancy. A study done in young adult women showed those with active BN were more likely to report unplanned pregnancies and to have conceived with oligomenorrheic menstrual status, than those with remitted BN (Morgan et al., 2006; Kimmel et al., 2016). This may reflect misinterpretation of oligomenorrhea (Morgan et al., 2006).

Psychosocial impact

BN widely impacts the life of adolescents by its associations with psychosocial impairment, psychiatric comorbidities, suicidal risk and high-risk behaviors (Fischer and Le Grange, 2007; Swanson et al., 2011; Crow et al., 2014; Mairs and Nicholls, 2016).

This disorder interrupts normal adolescent development producing remarkable levels of impairment. For instance, of those adolescents who met criteria for BN within the past 12 months, 78% reported some level of deterioration in the prior year and more than 10% of them considered their impairment severe (i.e., unable to go to school or carry out with normal activities because their eating problems) (Swanson et al., 2011). The areas most affected by BN were social and family relationships. Also, adolescents with this disorder often experience low self-esteem related to feelings of guilt and shame because of their symptoms (Mairs and Nicholls,

2016). Likewise, their parents may develop symptoms associated with their caring role (mental health problems and distress) (Winn et al., 2007).

Comorbidity with other psychiatric disorders is the norm rather than the exception in adolescents with BN (Fischer and Le Grange, 2007; Swanson et al., 2011; Crow et al., 2014). For instance, Swanson et al. (2011) reported that 88% of them have had at least one DSM-IV disorder in their life. Moreover, 27% have presented multiple psychiatric comorbidities (Swanson et al., 2011). The most prevalent are mood, anxiety and personality disorders (borderline and histrionic) (Fischer and Le Grange, 2007; Swanson et al., 2011; Crow et al., 2014; Magallón-Neri et al., 2014; Lock et al., 2015; Mairs and Nicholls, 2016). Suicidal behavior and high-risk behaviors, such as self-harm, substance abuse and sexual risk behaviors, are also commonly associated with BN (Fischer and Le Grange, 2007; Crow et al., 2014; Mairs and Nicholls, 2016; Castellini et al., 2020).

It is relevant to highlight the high risk of suicidal behavior in youth with BN. For instance, a representative study of adolescents living in the United States found that over half (53%) of those with BN reported lifetime suicidal ideation. The prevalence of other suicidal behaviors among that group, such as suicidal plans (25.9%), attempts (35.1%) and multiple attempts (17.1%) was also concerning and higher than in other groups of adolescents with and without other psychopathology including other EDs (Crow et al., 2014).

Screening

BN often goes undetected for the aforementioned causes and due to failure on the part of the health professionals to ask about its symptoms or their unfamiliarity with them (Wade, 2019). Because late diagnosis negatively impacts the chances of recovery for patients with EDs (Forman et al., 2011), it is recommended that mental health clinicians screen all preteen and adolescent patients for these conditions (Lock et al., 2015). Also, pediatricians should regularly screen adolescents for EDs during their health supervision visits (American Academy of Pediatrics, 2017) and the clinical care of those at-risk (Campbell and Peebles, 2014). Table 5 shows several risk factors for EDs that can be identified during adolescent health care.

The screening should include questions about body satisfaction, eating patterns and weight control practices. Weight, height and BMI should also be obtained and plotted on growth curves (Lock et al., 2015; American Academy of Pediatrics, 2017).

There are several instruments that can be used for ED screening in adolescents (e.g., the Eating Disorder Examination Questionnaire (EDE-Q), Eating Disorder Inventory (EDI), and Eating Attitudes Test (EAT)) (Lock et al., 2015; Rome

Table 5 Risk factors for eating disorders.

-
- Female
 - Family history of EDs
 - Early pubertal maturation
 - Body dissatisfaction and/or high weight concerns
 - Internalization of the “thin ideal”
 - Obesity
 - Dieting
 - Parental weight or fat talk
 - Pressure to be thin from parents and/or friends
 - Weight teasing from family and/or friends
 - Practice of ballet or sports that requires a lean body
 - Low self-esteem
 - Perfectionism
 - Depression
 - Chronic illness (e.g., type 1 diabetes mellitus)
-

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Ma R, Mikhail ME, Fowler N, Culbert KM, and Klump KL (2019) The role of puberty and ovarian hormones in the genetic diathesis of eating disorders in females. *Child and Adolescent Psychiatric Clinics of North America* 28(4): 617–628.

Portela de Santana ML, da Costa Ribeiro Junior H, Mora Giral M, and Raich RM (2012) La epidemiología y los factores de riesgo de los trastornos alimentarios en la adolescencia: una revisión [Epidemiology and risk factors of eating disorder in adolescence: a review]. *Nutrición Hospitalaria* 27(2): 391–401.

Schaumberg K, Welch E, Breithaupt L, Hübel C, Baker JH, et al. (2017) The science behind the Academy for Eating Disorders' nine truths about eating disorders. *European Eating Disorders Review* 25(6): 432–450.

and Strandjord, 2016; Sacco and Kelley, 2018). Also, shorter tools have been developed that are easy and quick to administer and interpret, with the SCOFF (Morgan et al., 1999) being the most studied and disseminated. Even though there are those who describe its use in youth, most of its validation studies have been carried out in adult population (Lichtenstein et al., 2017), with few investigations in adolescents, so its value in this age group has yet to be determined.

Evaluation

Any case in which suspicion of an ED is raised, should be further evaluated, with BN being one of the possibilities. This evaluation should include a comprehensive history, a physical examination, and laboratory tests (Rosen and Committee on Adolescence, 2010; Lock et al., 2015; Engel et al., 2020). It is intended to make the diagnosis of the ED; detect medical complications and mental health problems commonly associated with these diseases; assess the patient's motivation for recovery; determine which level of care will be needed for treatment; and give feedback to the patient and his or her parents about the findings and the required treatment, enhancing their motivation to do it (Rosen and Committee on Adolescence, 2010; Damiano et al., 2015; Vall and Wade, 2015; Mairs and Nicholls, 2016; National Institute for Health and Care Excellence, 2017; Gregertsen et al., 2019; Wade, 2019). To carry it out, both the skills necessary for the clinical care of adolescents (which details are outside the scope of this article) and others specific to the EDs field must be considered.

History

The presence of the cognitive and behavioral symptoms of EDs should be assessed. Questions for this purpose have been described in several previous articles on the subject (Rosen and Committee on Adolescence, 2010; Rome and Strandjord, 2016; Sacco and Kelley, 2018). In the event that BN is suspected, it is especially important to obtain descriptions of the binge episodes; including their frequency, types and quantity of food eaten, amount of time spent bingeing, and feelings during and after the binges (Castillo and Weiselberg, 2017). Methods and frequency of compensatory behaviors should also be elicited. As part of the diet history, a 24 h dietary recall can be helpful to determine the patients' intake when not bingeing, as they often try to restrict on days before or following a binge (Castillo and Weiselberg, 2017). It should be kept in mind that the simple denial of problems by the adolescent does not exclude the possibility that he or she has an ED, even more if those close (e.g., parents, peers, teachers or coach) suspect it, cases in which the probability that the condition exists is high (Rome and Strandjord, 2016).

Changes in body weight should be assessed through obtaining the patient's highest and lowest weights during adolescence (and his or her heights at that times) (Rosen and Committee on Adolescence, 2010; Campbell and Peebles, 2014; Rome and Strandjord, 2016; Castillo and Weiselberg, 2017) and also, ideally, through his or her growth chart, to visualize the growth pattern prior to the ED and fluctuations in weight, as those with BN may have rapid and large swings (Castillo and Weiselberg, 2017). Physical symptoms associated with the ED (Table 3) should be identified (Rosen and Committee on Adolescence, 2010; Campbell and Peebles, 2014; Rome and Strandjord, 2016).

The patient's social functioning at home, in school, and with peers should be evaluated (Rosen and Committee on Adolescence, 2010), as well as the presence of mental health and high-risk behaviors commonly associated with these disorders (National Institute for Health and Care Excellence, 2017; Engel et al., 2020). Exposure to social media and Web sites that can contribute to EDs should also be explored (Rosen and Committee on Adolescence, 2010; Saul and Rodgers, 2018). Healthcare professionals should also be alert to signs of bullying, teasing, abuse (emotional, physical and sexual) and neglect (National Institute for Health and Care Excellence, 2017). An assessment of the parents' reaction to the illness is important too (Rosen and Committee on Adolescence, 2010).

Relevant personal and family history should be obtained. The adolescent's growth and development and gynecological history if female must be assessed, including age at menarche, regularity of cycles, last menstrual period and contraception. Family history of obesity, EDs and other psychiatric disorders should be investigated as well as past and current treatments (Rosen and Committee on Adolescence, 2010; Castillo and Weiselberg, 2017).

It is also necessary to determine the degree of understanding of the problem and motivation to receive help, of both the patient and his or her parents (Rosen and Committee on Adolescence, 2010). A high level of ambivalence on the part of the patient in BN is usual, driven largely by expectancies that thinness and control over weight, shape, and eating will lead to an improved life (Wade, 2019).

It is common for adolescents with BN to be brought for an evaluation by their concerned parents, who suspect the bingeing and/or purging, because food "disappears quickly" at home or empty food containers are found hidden in the patient's bedroom; the adolescent makes frequent trips to the bathroom during and after meals; or evidence of vomiting has been found in the bathroom (Castillo and Weiselberg, 2017). According to the experience of the authors, binge eating should also be suspected in patients who progressively gain weight despite showing decreased or normal intake during regular meals.

Due to the tendency of these patients to hide their symptoms for the reasons already explained, obtaining the history from both the patient and the parent(s) is important; information from the latter(s) can be crucial in clarifying behaviors or cognitions that the adolescent may not report (Campbell and Peebles, 2014; Lock et al., 2015). Nevertheless, time alone with the adolescent is recommended (Campbell and Peebles, 2014), during which the most sensitive issues will be assessed. These include not only the usual ones (e.g., sexual behavior or substance use), but also those ED behaviors that young people insist in keeping out of the

knowledge of others (e.g., vomiting and its frequency; binge eating, its content and frequency; and use of laxatives and other medications for weight control) (Rome, 2012) and the suicidal and self-harm behaviors.

Other skills that the clinician should especially have in mind when performing the history in these cases are:

- Empathy, compassion and respect must be shown (National Institute for Health and Care Excellence, 2017), avoiding judgmental, negative or surprise attitudes towards behaviors that the patient is already finding difficult to share, since the young person will be inhibited from doing so and his or her resistance to the situation will increase.
- The professional should be sensitive when discussing the adolescent's weight and appearance (National Institute for Health and Care Excellence, 2017).
- The limits of confidentiality must be explained (which sensitive information may be shared with others and which professionals and services can have access to information about the patient's care) (National Institute for Health and Care Excellence, 2017).
- It is convenient to adopt a motivationally enhancing stance during the assessment given the high level of ambivalence associated with BN (Wade, 2019).

It should also be noted that the diagnosis of BN in younger patients may be challenging due to age-related developmental issues. Children and early adolescents have limited verbal capacities, fewer abstract thinking abilities and less awareness of emotions than older adolescents and adults. These characteristics can make it difficult for them to report the typical symptoms of BN. For example, the cognitive criterion for BN, which specifies that self-evaluation is unduly influenced by body shape and weight, requires abstract capacities that evolve well into late adolescence (Bravender et al., 2007). Thus, overt BN behaviors appear to be more reliable as a diagnostic index of the disease in younger patients (Bravender et al., 2007). Nevertheless, assessing behaviors in individuals of these ages has its difficulties, too. The identification of binge episodes can be complicated by factors such as limitations in the reporting of food intake and in estimating what constitutes an objectively large amount of food due to the variability in caloric needs because of active growth (Bohon, 2019). Moreover, even though loss of control (LOC) over eating seems more important than consumption of an objectively large amount of food in the assessment of binge eating in children and early adolescents (Marcus and Kalarchian, 2003), the ability to articulate LOC at these ages may be limited by lack of understanding of the concept (Bohon, 2019). For these reasons, clinician-expert interviews and parental reports about the child's behavior are necessary to obtain an accurate history (Lock et al., 2015; Bohon, 2019).

Assessment tools

Self-report questionnaires like the Bulimic Investigatory Test Edinburgh (BITE), Children's Eating Attitudes Test (ChEAT), Eating Disorder Examination Questionnaire for Adolescents (EDE-A), among others, may be useful complementary measures to help in the assessment process (Mairs and Nicholls, 2016; National Institute for Health and Care Excellence, 2017). The use of these tools has been evaluated in terms of its utility and cost effectiveness (National Institute for Health and Care Excellence, 2017). The overall conclusion is that they should not be used on their own without a full clinical diagnostic interview that includes both the adolescent and a parent (Mairs and Nicholls, 2016; National Institute for Health and Care Excellence, 2017).

Semi-structured diagnostic interviews such as the Eating Disorder Examination (EDE), the Eating Disorder Assessment for DSM-5 (EDA-5) and the Development and Well-Being Assessment (DAWBA) are also available to assist with the diagnosis (Mairs and Nicholls, 2016; Engel et al., 2020). However, these tools are infrequently used in clinical practice as they need appropriate training and time, so their application is commonly left for specialized evaluation or research purposes (Engel et al., 2020).

Physical examination

A complete physical examination should be performed to evaluate for physical signs and medical complications of EDs (Rosen and Committee on Adolescence, 2010; Rome, 2012; Campbell and Peebles, 2014). It should include vital signs (blood pressure and pulse should be obtained supine and then standing), height, weight, Tanner staging, and calculation of BMI (Rome, 2012). BMI-for-age and height-for-age (for the corresponding sex) should be plotted on growth charts, evaluating their trajectories in the context of earlier growth patterns (Golden et al., 2015; Lock et al., 2015). In addition, if BN is suspected, the presence of the signs detailed in the Table 4 must be explored, bearing in mind, however, that in these cases the physical examination is usually normal (Castillo and Weiselberg, 2017).

Laboratory exams

Most laboratory tests yield normal results in patients with EDs, but they may provide insight into the severity of illness, current medical complications, or other possible etiologies (Rome and Strandjord, 2016). In the case of BN, laboratory screening should include a metabolic panel to evaluate metabolic and electrolyte status (Forney et al., 2016; Castillo and Weiselberg, 2017; ClinicalKey, 2019). A complete blood count and a urinalysis should also be done (Forney et al., 2016; Castillo and Weiselberg, 2017). There are those who recommend screening for vitamin D deficiency in adolescents with BN (Golden et al., 2014, 2015). Although it remains unclear if this ED has a detrimental effect on bone mineral density (Robinson et al., 2016; Solmi et al., 2016), the high prevalence of low vitamin D in patients with BN found in some studies (Modan-Moses et al., 2015; Mehler et al., 2018)

would support obtaining a serum 25-hydroxy vitamin D in these cases. Measuring amylase in BN patients has been suggested (Lock et al., 2015) based on some evidence that highlighted hyperamylasemia as a potential marker for self-induced vomiting (Brown and Mehler, 2013; Lock et al., 2015). However, the absence of elevated amylase levels in individuals with purging disorder in the study of Wolfe et al. (2011) seems to show that this abnormality, prevalent in BN cases (Brown and Mehler, 2013), is more closely related to binge eating. Additional testing may be warranted based on clinical presentation, including thyroid function tests; follicle stimulating hormone, luteinizing hormone, prolactin, estradiol, and a pregnancy test if there is amenorrhea; and an electrocardiogram if there is bradycardia or a risk for an arrhythmia (Castillo and Weiselberg, 2017).

Differential diagnosis

The differential diagnosis of BN (Table 6) includes medical and psychiatric illnesses that occur with hyperphagia/binge eating or recurrent vomiting (Engel et al., 2020).

Determining the level of care in which the patient should be treated is also an important component of the initial evaluation (Rosen and Committee on Adolescence, 2010). At the end of the assessment, a feedback to the patient and his or her family is important, including relevant factors detected in the various domains (physical, psychological and social), together with the diagnosis, comorbidities and risks (Mairs and Nicholls, 2016). It should also include the level of care recommended. The young person is offered a choice where possible and should be involved in decision making where appropriate (Mairs and Nicholls, 2016). Motivational strategies can be used to favor treatment engagement (Vall and Wade, 2015; Gregertsen et al., 2019; Wade, 2019).

Treatment

It is well known that adolescents with EDs should receive treatment as early as possible to improve their prognosis (Golden et al., 2016). This treatment includes addressing nutritional and psychological issues, use of psychotropic drugs for ED when indicated, and management of medical complications and psychiatric comorbidities (Gowers and Green, 2009; National Institute for Health and Care Excellence, 2017).

There is a shortage of scientific literature about the nutritional treatment of BN. The Spanish consensus on the nutritional evaluation and management of EDs published in 2018 (Gómez Candela et al., 2018) highlights that the nutritional intervention in this disorder should contemplate not only dietary advice that guarantees an adequate nutritional status, but must also seek to educate the patient, providing the necessary information that allows the cessation of binge eating and purging behaviors and the long-term modification of eating habits. Nutritional rehabilitation should be based on the normalization of the eating pattern with the aim of reducing binge eating and purging and reestablishing a healthy and varied diet without exclusions or restrictions, and the promotion of healthy but not excessive exercise patterns (Gómez Candela et al., 2018). Evidence does not support the use of nutritional counseling as a sole treatment for BN (Lock et al., 2015; National Institute for Health and Care Excellence, 2017).

Regarding psychological treatment, there are only four published randomized controlled trials on the effectiveness of psychotherapies for adolescents with BN. They have compared family therapy that involved components of Family-Based Treatment (FBT) with self-help guided cognitive behavioral therapy (CBT), a modified version of CBT for eating disorders (CBT-ED) with psychodynamic psychotherapy, and FBT adapted for BN (FBT-BN) with supportive psychotherapy and CBT-ED adapted for adolescents

Table 6 Differential diagnosis for bulimia nervosa.

Psychiatric disorders
• Anorexia nervosa (binge-eating/purging type)
• Binge eating disorder
• Purging disorder
• Major depressive disorder
• Features of borderline personality disorder
Medical disorders
• Obesity
• Prader-Willi syndrome
• Kleine-Levin syndrome
• Klüver-Bucy syndrome
• Gastrointestinal pathology such as gastroparesis and gastric outlet obstruction
• Central nervous system tumors
• Cyclic vomiting syndrome

Engel S, Steffen K, and Mitchell JE (2020) Bulimia nervosa in adults: Clinical features, course of illness, assessment, and diagnosis. In: Yager J (ed.) *UpToDate*. Waltham, MA: Post TW.

Lock J, La Via MC, and American Academy of Child and Adolescent Psychiatry (2015) Practice parameter for the assessment and treatment of children and adolescents with eating disorders. *Journal of the American Academy of Child and Adolescent Psychiatry* 54(5): 412–425.

Mairs R and Nicholls D (2016) Assessment and treatment of eating disorders in children and adolescents. *Archives of Disease in Childhood* 101(12): 1168–1175.

Rome ES and Strandjord SE (2016) Eating disorders. *Pediatrics in Review* 37(8): 323–336.

(CBT-A) (Le Grange et al., 2007, 2015; Schmidt et al., 2007; Stefini et al., 2017). Overall, FBT-BN has some advantages over CBT-ED, such as greater abstinence rates at the end of treatment and at 6-month follow-up and an indirect impact in depressive symptoms (Le Grange et al., 2015; Valenzuela et al., 2018). The outcomes of psychodynamic psychotherapy were similar to those of CBT-ED. Although the evidence is scarce to make strong recommendations, international guidelines agree to endorse FBT-BN as the first option of psychological treatment for adolescents with BN, and CBT-A as the second line of treatment (National Institute for Health and Care Excellence, 2017; Couturier et al., 2020).

FBT-BN is a behavioral systemic therapy in which caregivers, usually parents and siblings, are guided by the therapist to help the patient recover. They are seen as the main resource to conduct this task. Initially developed for AN, FBT has been successfully adapted for adolescents with BN. In this version, the first phase of the therapy is focused on interrupting binges and compensatory behaviors; the second, involves gradually returning control over eating and weight related behaviors back to the adolescent and attending to other psychological or family problems that are related or affecting the adolescent's symptoms; and the third phase is centered on supporting the adolescent in achieving a level of autonomy according to his or her development and helping the family to restructure their life integrating these changes and challenges (Le Grange and Lock, 2007).

CBT-ED focuses on changing patterns of relationships between cognitions, feelings and behaviors that maintain binge-purge cycles and addresses the function of BN in the adolescent's life (Mairs and Nicholls, 2016). CBT-ED adapted for adolescents (CBT-A) is available in different modalities (individual therapy, self-help and guided self-help), and more recently, in its "enhanced" form (CBT-E for adolescents) (National Institute for Health and Care Excellence, 2017; Dalle Grave et al., 2019a,b).

There are other psychotherapies that have been less explored or their effectiveness has less evidence to date but are worthy of mention due to their promising results, such as dialectical behavioral therapy (DBT) (Salbach-Andrae et al., 2008; Fischer and Peterson, 2015), multi-family therapy (Stewart et al., 2019), and emotion focused family therapy (EFFT) (Couturier et al., 2020). More studies are needed to further explore these and other psychotherapeutic models.

The role of psychotropic medication in the management of BN is extremely limited. Recommendations are mainly based on pharmacological research for adults and the main conclusion is that this type of intervention should not be provided as stand-alone treatment for adolescents with BN (National Institute for Health and Care Excellence, 2017). Off-label use of fluoxetine at this age is common and recommended in doses of 60 mg/day mainly due to the extrapolation of positive outcomes observed in adults (Hail and Le Grange, 2018; Stahl, 2019). There is only one small open clinical trial available in adolescents that found that 60 mg/day of fluoxetine added to supportive psychotherapy significantly reduced binge and purges episodes and was well tolerated (Kotler et al., 2003). Due to the increased risk of suicidality reported for SSRIs in young people and also in BN, it is relevant to discuss it with the patient and family in case of prescribing these medications and closely monitor its use and consequences (Gorrell and Le Grange, 2019). It has been suggested that its use should be limited to patients with significant comorbid mood disorders or to those who have not responded well to psychotherapy alone (Kotler et al., 2003; Van Den Heuvel and Jorjaan, 2014).

On the other hand, patients with BN should be regularly monitored to detect and manage the associated medical complications, and those who purge should be even more closely followed due to their higher risk of severe ones (AED, 2016; Peebles and Sieke, 2019). Likewise, the psychiatric comorbidity should be evaluated and treated (AED, 2016).

It is recommended that the treatment of EDs in youth involves a multidisciplinary team that is developmentally aware, sensitive, and skilled in the care of children and adolescents with these conditions (Lock et al., 2015). The team usually includes mental health (psychiatrist, psychologist), medical (pediatrician or adolescent medicine specialist) and nutritional professionals (Rome, 2012; Lock et al., 2015; DerMarderosian et al., 2018; Hail and Le Grange, 2018), but it can also include others depending on the needs of the patients and the level of care required (Derenne, 2019). Due to the frequent dental complications and the increased prevalence of risky sexual behaviors in BN patients, it is also important to consider dental and sexual and reproductive health care in the management of these cases (Brown and Mehler, 2013; Kimmel et al., 2016; Castellini et al., 2020). Another essential element of the treatment is the inclusion of the parents, who should have an active and central role in the management (Lock et al., 2015; National Institute for Health and Care Excellence, 2017; Treasure et al., 2020).

Effective treatment of EDs optimally considers different levels of care suited to individual patient needs (Golden et al., 2015). The majority of patients with BN can be treated as outpatients (Mairs and Nicholls, 2016; Rome and Strandjord, 2016). Greater

Table 7 Indications for hospitalization of adolescents with bulimia nervosa.

- Dehydration
- Hypokalemia
- EKG abnormalities (prolonged QTc, cardiac arrhythmia including severe bradycardia)
- Orthostatic hypotension
- Uncontrollable bingeing and purging
- Severe medical complication (e.g., seizures, severe gastrointestinal bleeding, gastric rupture)
- Comorbid psychiatric or medical condition that prohibits or limits appropriate outpatient treatment (e.g., suicidality, type 1 diabetes mellitus)
- Failure of outpatient treatment

Castillo M and Weiselberg E (2017) Bulimia nervosa/purging disorder. *Current Problems in Pediatric and Adolescent Health Care* 47(April): 85–94.

Golden NH, Katzman DK, Sawyer SM, et al. (2015) Update on the medical management of eating disorders in adolescents. *Journal of Adolescent Health* 56(4): 370–375.

ClinicalKey (2019) *Bulimia Nervosa. Clinical Overview*. Available from: https://www-clinicalkey-es.uchile.idm.oclc.org/#!/content/clinical_overview/67-s2.0-4e69ff24-86d3-42e0-a2b6-2965ca779337 (Accessed 25 October 2020).

intensity of care (inpatient medical or psychiatric, residential or partial hospitalization) should only be considered if the medical or psychiatric risk is high or there is an irresponsiveness to outpatient care (Mairs and Nicholls, 2016; Rome and Strandjord, 2016; Treasure et al., 2020). Indications supporting hospitalization of adolescents with BN are summarized in Table 7.

Course and prognosis

Overall, adolescents with BN have a better prognosis than adults (Rosen and Committee on Adolescence, 2010; Castillo and Weiselberg, 2017). Longitudinal studies in community samples of adolescents and young adults, have found remission rates between 63% and 100% during the follow-up periods (Stice et al., 2009, 2013; Nagl et al., 2016; Glazer et al., 2019). Just around 5% remained ill for more than 5 years (Glazer et al., 2019). These remission rates are higher than those found in clinical samples (Fichter and Quadflieg, 2007; Stice et al., 2013). For instance, a seminal study that followed a cohort of patients with BN for 20 years, found that 44% of them reached full recovery after all the follow-up period, 28.4% improved considerably and 10.7% had a chronic course (Steinhausen and Weber, 2009). Noticeably, almost 1/5 evolved into another ED during the period. More recent studies revealed that adolescents initially diagnosed with BN were more likely to crossover to another ED in comparison with other EDs groups (19–32% of BN cases depending of the study), being the transition to binge eating disorder and purging disorder the most common (Stice et al., 2013; Glazer et al., 2019).

Relapse after a period of remission is common in BN with rates ranging between 23% and 63% depending on the definition of relapse used in the study and the length of follow-up period (Stice et al., 2009, 2013; Olmsted et al., 2015; Nagl et al., 2016; Engel et al., 2020). Stice et al. (2009), found an overall relapse rate of 41% during an 8-year follow-up period in young people with BN. In an updated version of this study, applying the DSM-5 criteria, recurrence rates were 23% and 27% in BN and sub-threshold BN, respectively (Stice et al., 2009, 2013).

Low self-esteem, history of childhood obesity and personality disorder have been associated with longer duration of the illness (Lock et al., 2015). On the other hand, earlier response to treatment (as early as session 2 of psychotherapy for purging and 4 for binges) predicts abstinence (from binge eating and compensatory behaviors in the last 28 days before the assessment) at the end of the therapy independent of its type (CBT-A, FBT-BN or supportive psychotherapy) (Matheson et al., 2020).

Finally, BN increases the mortality risk three-fold compared to the general population (Castillo and Weiselberg, 2017). Overall standardized mortality ratios (SMR) in BN vary between 1.5 and 5.0 approximately (Crow et al., 2009; Franko et al., 2013; Suokas et al., 2013; Fichter and Quadflieg, 2016). In young people (under 20 years old) the crude mortality rate is 0.7% and increases with age (Crow et al., 2009). Mortality is related to medical causes and suicide (Crow et al., 2009; Franko et al., 2013; Suokas et al., 2013; Fichter and Quadflieg, 2016).

Conclusion

BN is a serious disease that usually begins in adolescence or early adulthood and can be associated with significant risk of morbidity and mortality. Its etiology is multifactorial and not yet completely understood. The disease is associated with many different medical complications ranging from mild to life-threatening, of which the major ones are due to the electrolyte and acid-base disturbances resulting from compensatory purging behaviors. BN is also significantly associated with psychosocial impairment, psychiatric comorbidities, suicidal risk and high-risk behaviors.

Individuals with BN frequently hide their symptoms due to guilt or shame, minimization of the consequences of the disease, and ambivalence about the treatment. Because the late diagnosis of EDs negatively impacts the chances of recovery, screening for these conditions is recommended in adolescent health care. The evaluation of cases in which BN is suspected should include a comprehensive history, a physical examination, and laboratory tests. The previous are intended to make the diagnosis of the ED; detect medical complications and associated mental health problems; assess the patient's motivation for recovery; determine which level of care will be needed for treatment; and give feedback to the patient and his or her parents about the findings and the required treatment, enhancing their motivation to do it. To carry the evaluation out, the skills necessary for the clinical care of adolescents and others specific to the EDs field must be considered. The diagnosis of BN in the earliest cases may be challenging due to age-related developmental issues that can make it difficult to report the typical symptoms. The clinical evaluation can be supplemented with assessment tools such as self-report questionnaires and semi-structured interviews.

Adolescents with BN should receive treatment as early as possible to improve their prognosis, which includes addressing nutritional and psychological issues, use of psychotropic medication for ED when indicated, and management of medical complications and psychiatric comorbidities. International guidelines agree to endorse FBT-BN as the first option for their psychological treatment and CBT-A as the second one. The role of psychotropic medication in their management is extremely limited and based mainly in research for adults. They should not be provided as stand-alone treatment. The management of these cases should involve a multidisciplinary team that is developmentally aware, sensitive, and skilled in the care of adolescents with these conditions and include the parents. The majority of patients with BN can be treated as outpatients. Greater intensity of care should only be considered if the medical or psychiatric risk is high or there is an irresponsiveness to outpatient care. Adolescents with BN have better prognosis than adults.

Clinical, prevention, intervention, and/or policy takeaways

Bulimia nervosa (BN) is a serious disease that usually begins in adolescence or early adulthood and can be associated with significant risk of morbidity and mortality due to medical complications and psychiatric comorbidities. Individuals with BN frequently hide their symptoms due to guilt or shame, minimization of the consequences of the disease, and ambivalence about the treatment. Screening for eating disorders (EDs) is recommended in adolescent health care. When BN is suspected, the clinical evaluation should include a comprehensive history, a physical examination, and laboratory tests and can be supplemented with other assessment tools. The diagnosis in younger patients may be challenging due to age-related developmental issues. Adolescents with BN should receive treatment as early as possible to improve their prognosis, which includes addressing nutritional and psychological issues, use of psychotropic medication for ED when indicated, and management of medical complications and psychiatric comorbidities. Treatment should involve a multidisciplinary team that is developmentally aware, sensitive, and skilled in the care of adolescents with EDs and include the parents. The majority of patients with BN can be treated as outpatients.

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Further reading

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Relevant websites

www.nice.org.uk/guidance/ng69—NICE.