



# The challenges of bulimia nervosa

**Debra K. Katzman, MD**, The Hospital for Sick Children  
**Johanne Harvey, MD, MPH**, Centre de santé et de services sociaux de Chicoutimi  
**Margo A. Lane, MD**, Health Sciences Centre, Winnipeg  
**Mark Norris, MD**, Children's Hospital of Eastern Ontario  
**Danielle Taddeo, MD**, UHC Sainte-Justine  
**Leora Pinhas, MD**, The Hospital for Sick Children

## What are the diagnostic criteria of bulimia nervosa?

Bulimia nervosa (BN) is an eating disorder characterized by the Diagnostic and Statistical Manual-IV (DSM-IV) as episodes of bingeing defined as eating a larger than normal amount of food in a relatively short period of time. The binges are accompanied by feelings of loss of control, guilt or shame. These adolescents overvalue body shape and weight and have some compensatory behaviours aimed at weight loss, such as self-induced vomiting, misuse of laxatives, diuretics, ipecac, diet pills and other medications, fasting, or excessive exercise. Bulimia nervosa is divided into two subtypes:

- purging, where self-induced vomiting or misuse of laxatives, diuretics and enemas are part of the presentation, and
- non-purging, where these particular compensatory behaviours do not regularly occur.<sup>1</sup>

To meet the DSM-IV diagnostic criteria, the binges and inappropriate compensatory behaviours must occur on average twice a week for at least three months.

## Is the epidemiology of bulimia nervosa well described?

Bulimia nervosa is thought to occur in 1% of the adolescent population with partial symptoms occurring in 3–6% of the population. BN is most common in late adolescent females. While BN typically affects adolescent and young adult females, increasing numbers of individuals in other groups are being recognized. One study reported that boys made up 10% of their BN population. There are also reports of purging in prepubertal children with restrictive eating disorders. In one Canadian community sample, the rates of bulimic behaviours (of which only a minority would meet full criteria for BN) in girls ranged from 0.7% in 12-year-olds to 1.3% in 18-year-olds.<sup>2</sup> No data is available for boys. In a community sample of children between nine and 14 years, the prevalence of binge eating and purging (use of vomiting or laxatives) has been reported to be 0.2% in girls and 0.1% in boys, monthly.<sup>3</sup> Studies have shown that adolescent populations with BN are from all racial and socioeconomic groups. Mortality rates range from 0% to 6%.



### **What are risk or protective factors?**

A number of risk factors have been identified for BN. Adolescent girls and boys have somewhat different risk profiles. Dieting in adolescence, a common behaviour, increases the risk for developing BN in both sexes.<sup>4</sup> Early puberty or menarche, early sexual experiences and increasing age are risk factors for developing BN in girls.<sup>5</sup> Early or late puberty are risk factors for developing BN in boys.<sup>5</sup>

In community samples, healthy family functioning appears to be a protective factor. A maternal presence is protective for teens of both sexes, while high parental expectations, connectedness with friends and adults outside the family are protective for boys. For girls, family connectedness, positive family communication, and high parental supervision and monitoring are protective. Conversely, poor parental communication, low parental expectations and caring, as perceived by the adolescent, place adolescents at risk of developing disordered eating. Negative teasing with respect to weight and negative maternal modeling regarding food are also correlated with the development of bulimic symptomatology in young adolescents.

One needs to keep in mind that the majority of studies to date are cross-sectional in design, thus it is difficult to ascertain whether family dysfunction is a predisposing factor or a result of the eating disorder. The BN population is heterogeneous with respect to family functioning. It is important to note that family stressors trigger eating disorder symptoms only in a subset of patients with problematic family environments. This supports the notion that other more individual factors (e.g., temperament, bullying, etc.) are likely to also play a role.

### **Is the outcome of patients with bulimia nervosa predictable?**

Little is known about the course of illness and outcome of BN in young people. Depending on the study, full recovery ranges from 33% at two years, to just under 50% after five years, and approximately 70% at six and 11 years.<sup>6</sup> There is a suggestion in the literature that shorter duration of illness predicts a better outcome.<sup>7</sup> Little is known about the pattern of recovery. However, during the first two years of treatment, the behavioural symptoms of bingeing and purging remit sooner than the psychological symptom of fear of gaining weight. Weight and shape preoccupation and disturbed body image perception seem to take longer to resolve. The symptoms that take the longest to resolve are non-purging compensatory behaviours.

### **What are the common signs and symptoms to look for?**

Since bingeing and purging are often done secretly and are associated with a sense of shame, adolescents often do not present to care. Only 4% of girls who reported binge eating and 6% of girls who reported purging had ever been assessed or treated for their eating difficulties.



## ***The challenges of bulimia nervosa (continued)***

### **Behavioural changes**

Parents may bring their adolescent for assessment after they notice a behavioural change. They may describe the disappearance of food or finding empty containers of food, or hoarding of high carbohydrate foods. Since eating can be experienced as an all-or-nothing activity, adolescents with BN may alternate between overeating and fasting or restriction. Adolescents with BN may go to the bathroom after meals in order to vomit their food intake and may flush the toilet or run the water to hide the sounds of vomiting. They may also use laxatives, diuretics, ipecac or enemas after eating. In addition, they may also use diet pills, drink lots of fluid or take complementary and alternative medicines to curb their appetite. Some adolescents may engage in excessive exercise before or after eating in order to burn calories.

### **Physical signs and symptoms**

The physical signs and symptoms of adolescents with BN are not easily detected, as they are usually of normal weight and often appear physically healthy.<sup>8</sup>

*Russell's sign*, a common physical sign of BN, is the scarring of the knuckles or the dorsum of the hand, caused by repeated contact of the central incisors to the skin when inducing vomiting by stimulation of the gag reflex using one's fingers. Some adolescents use a foreign body (e.g., toothbrush, cutlery, straws) to induce the gag reflex, while others do not require external stimulation to induce vomiting and therefore do not have a Russell's sign.

*Hypertrophy* of the salivary glands caused by frequent vomiting and binge eating has been reported. The prevalence and etiology in children and adolescents is unknown. Tissue biopsies of the glands have shown normal and inflammatory tissue. This hypertrophy is usually intermittent, bilateral and painless and may develop within several days of excessive binge eating or vomiting. It usually resolves with the cessation of vomiting.

The *oral health* of patients with BN depends upon the diet as well as the duration and frequency of the binge-purge behaviour. Dental enamel erosion is related to frequent regurgitation of highly acidic stomach contents into the oral cavity over a prolonged period. This may, in part, explain why this is an infrequent physical sign in children and adolescents. Young people with BN are at increased risk for dental caries, due to excessive carbohydrate intake during binge eating. Together, dehydration (secondary to vomiting, laxative or diuretic use, and decreased fluid intake) of the oral soft tissues, dietary deficiencies and poor oral hygiene can contribute to poor oral health. Finally, some young people may develop erythematous lesions or abrasions on the palate secondary to trauma by objects used to induce vomiting.



*Weight fluctuations:* It is not uncommon for adolescents to experience significant weight fluctuations (2.3–4.5 kg or 5–10 lbs. per week) as a result of their unpredictable eating and weight control behaviours.

*Irregular menstrual periods:* Girls may experience irregular menstrual periods, beyond the point in adolescent development where regular menstrual cycles should have been established.<sup>9-11</sup>

Clinicians should have a high index of suspicion for BN if their patient is reporting, or the parents are concerned about, any of the signs or symptoms described above. The diagnosis of BN requires a complete history and thorough physical examination. The differential diagnosis of BN is extensive and consists of a range of physical illnesses, such as inflammatory bowel disease, diabetes mellitus, hyperthyroidism, collagen vascular disease, infections (tuberculosis and human immunodeficiency virus), malignancies, including those of the central nervous system, pregnancy and mental health disorders, including mood disorders, obsessive-compulsive disorder, and anxiety disorders.

### **Does BN cause medical complications?**

The medical complications of BN are associated with the frequency and duration of bingeing and purging. Repeated induced vomiting can cause fluid and electrolyte abnormalities, with the most common electrolyte abnormality being hypokalemia with hypochloremic, metabolic alkalosis.<sup>11</sup> This can result in cardiac arrhythmias, muscular weakness, and decreased gastrointestinal motility. Vomiting, diuretic, or laxative use can cause dehydration resulting in volume depletion. This can result in dehydration causing dizziness, syncope, weakness, and confusion. The clinician should have a high index of suspicion that an adolescent may be using these types of compensatory behaviours if the adolescent presents with hypotension, tachycardia, concentrated urine or increased blood urea nitrogen. Volume depletion can result in the overproduction of aldosterone, characterized by sodium retention and potassium excretion resulting in fluid retention and peripheral edema. This has been reported to occur after the sudden cessation of vomiting or the withdrawal of laxatives or diuretics.

Gastrointestinal complications can occur in children and adolescents who binge and purge. Frequent vomiting may cause Mallory-Weiss esophageal tears, and gastroesophageal reflux.<sup>11</sup> Binge eating can result in gastric dilatation, necrosis and perforation. Short-term laxative abuse, primarily from stimulant laxatives, may lead to diarrhea and fluid and electrolyte abnormalities, and long-term laxative use can result in severe constipation due to damage of the myenteric plexus. Frequent binge eating and vomiting behaviour has been associated with elevated serum amylase levels.

Cardiovascular abnormalities in adolescents with BN most commonly occur as a result of volume depletion or electrolyte imbalance. Electrolyte abnormalities predispose young people to cardiac arrhythmias. Syrup of ipecac, used to induce vomiting, is cardiotoxic and can lead to muscle weakness, hepatic toxicity and irreversible cardiomyopathy with sudden death.



## ***The challenges of bulimia nervosa (continued)***

### **What medical treatment is recommended?**

Anticipating, monitoring and treating medical complications that arise from BN are largely dependent on the severity of the disorder and the patient's purging method. Serum electrolytes tests should be obtained regularly in patients who continue to vomit or abuse purgatives. The frequency of these blood tests will depend on the patient's history and physical examination.

In severe cases, patients may develop any number of medical complications described above and thus require intensive stabilization and treatment in an inpatient setting. In such cases, patients can remain in hospital for short periods of time, with the primary aims being the re-establishment of metabolic stability and the provision of a supportive environment aimed at symptom interruption. Alternatively, and depending on available resources, the patient could enter into a specialized long-term inpatient program targeting eating disorder-specific symptoms, behaviours, comorbidity, as well as psychological effects of the illness. In the majority of cases, patients with BN can be effectively managed medically in an outpatient setting. Depending on the symptom in question, treatment may range from close observation to adjunctive pharmacotherapy.

The treatment of electrolyte abnormalities may involve gradual oral or intravenous (IV) electrolyte replacement. In some cases, prolonged administration of electrolyte replacement after normalization of serum electrolyte levels (e.g., potassium chloride for the treatment of hypokalemia) may be necessary to replenish depleted body stores.

Electrolyte abnormalities increase the likelihood of a cardiovascular emergency (e.g., arrhythmias, prolonged QTc interval) and life-threatening events. Therefore, patients with evidence of metabolic abnormalities should have an electrocardiogram (ECG) completed.

In rare occasions, patients may develop dehydration that requires IV fluids to restore volume depletion. More commonly, patients with mild fluid depletion can be rehydrated using oral fluids replacement alone.

Gastrointestinal problems, such as bloating and constipation, often result in abdominal discomfort, which is treated with gradual increases in regular nutrition and cessation of vomiting. Prescription of laxatives in patients with BN should be avoided. Because repeated vomiting causes recurring contact with gastric acids, patients can develop moderate to severe gastroesophageal reflux or esophagitis, which may benefit from anti-acid agents, such as ranitidine or proton-pump inhibitors. However, long-term relief is dependent on the patient's ability to cease purging.



Amenorrhea and irregular menstrual periods are risks factors for low bone mineral density. To date, there is no evidence that hormone replacement therapy prevents or reduces bone loss in patients with eating disorders. In fact, hormonal treatment often causes monthly withdrawal bleeding, which may be falsely interpreted as a return to health. Consequently, hormonal therapy should not be routinely recommended. However, sexually active adolescents with BN should be counseled about the potential for pregnancy, despite the absence of regular menstrual periods, and hormonal contraception should be offered.

### **Should patients with BN receive psychiatric treatment?**

The key to successful treatment of BN in children and adolescents is early recognition and early intervention; however, very little information on evidence-based treatment for adolescents with BN exists.

There are some practical strategies that may be helpful in caring for these adolescents in the primary care setting. First, it is important to recognize that adolescents with BN may restrict their eating or diet. Clinicians should recommend to their patients that they avoid restricting their food intake and dieting, as this has been shown to trigger a binge episode, leading to purging and more dieting. This can develop into a vicious cycle. For older and more motivated adolescents, a daily food diary may be helpful to help identify what leads or triggers (e.g., boredom, anger, loneliness) the bingeing and purging episodes, understand how this affects the adolescent and facilitate how to recognize what might stop the bingeing and purging. It can be easier for adolescents to control the bingeing and purging if they can actually identify a pattern. For younger patients, involving the parents to help identify triggers might be helpful.

Adolescents with BN can experience feelings of shame, guilt, and self-disgust. Furthermore, BN is associated with impulsivity, self-harm behaviours and risk-taking behaviours, as well as other psychiatric disorders. It is important to assess for concurrent mood or anxiety disorders and to rule out suicidal risk. As such, it is important for the clinician to assess the adolescent's thoughts and feelings, personality, family dynamics, peer relationships, present or past physical, sexual or emotional abuse and present or past history of suicidal ideation or intent.

Cognitive behavioural therapy (CBT) (a therapy that helps people change their thoughts and behaviours) has been effective in adults. Many adult studies involve subjects that are older adolescents or young adults suggesting that the findings of the efficacy of CBT in the adult population may be extrapolated to adolescents.<sup>13</sup> Limited data from adolescent studies also suggests that cognitive behavioural therapy, guided self-care or family-based treatment may be effective.<sup>14,15</sup>

Although there are no double-blind placebo-controlled studies in children or adolescents with BN, there is one open trial that suggests that fluoxetine may be helpful in the treatment of bulimic symptoms.<sup>16</sup> This is supported by the adult literature where double-blind placebo-controlled studies have supported the efficacy of selective serotonin reuptake inhibitors in the treatment of BN.<sup>12</sup>



## **The challenges of bulimia nervosa (continued)**

### **References**

1. American Psychiatric Association. Diagnostic and statistical manual for mental disorders, 4<sup>th</sup> ed. Washington, DC: American Psychiatric Association, 1994.
2. Jones J, Bennett S, Olmsted MP et al. Disordered eating attitudes and behaviours in teenaged girls: a school-based study. *CMAJ* 2001;165(5):547-52.
3. Field AE, Carmago CA Jr, Taylor CB et al. Relation of peer and media influences to the development of purging behaviors among preadolescent and adolescent girls. *Arch Pediatr Adol Med* 1999;153(11):1184-9.
4. Stice E, Killen JD, Hayward C et al. Age of onset for binge eating and purging during late adolescence: a 4-year survival analysis. *J Abnorm Psychol* 1998; 107(4): 671-5.
5. Kaltiala-Heino R, Rimpela M, Rissanen A et al. Early puberty and early sexual activity are associated with bulimic-type eating pathology in middle adolescence *J Adol Health* 2001;28(4):346-52.
6. Fichter MM, Quadflieg N, Gnutzmann A. Binge eating disorder: treatment outcome over a 6-year course. *J Psychosom Res* 1998;44:385-405.
7. Quadflieg N, Fichter MM. The course and outcome of bulimia nervosa. *Eur Child Adoles Psychiatry* 2003(Suppl. 1);12:99-109.
8. Brewerton TD. Bulimia in children and adolescents. *Child Adol Psychiatric Clin NAm* 2002;11(2):237-56.
9. Le Grange D, Loeb KL, Van Orman S et al. Bulimia nervosa in adolescents: a disorder in evolution? *Arch Pediatr Adol Med* 2004;158(5):478-82.
10. Gendall KA, Bulik CM, Joyce PR et al. Menstrual cycle irregularity in bulimia nervosa. Associated facts and changes with treatment. *J Psychosom Res* 2000;49(6):409-15.
11. Mehler PS. Bulimia nervosa. *N Engl J Med* 2003;349(9):875-81.
12. Goldbloom DS, Olmsted M, Davis R et al. A randomized controlled trial of fluoxetine and cognitive behavioral therapy for bulimia nervosa: short-term outcome. *Behav Res Ther* 1997;35(9):803-11.
13. Keel PK, Haedt A. Evidence-based psychosocial treatments for eating problems and eating disorders. *J Clin Child Adol Psychol* 2008;37(1):39-61.
14. Le Grange D, Crosby RD, Rathouz PJ et al. A randomized controlled comparison of family-based treatment and supportive psychotherapy for adolescent bulimia nervosa. *Arch Gen Psychiatry* 2007;64(9):1049-56.
15. Schmidt U, Lee S, Beecham J et al. A randomized controlled trial of family therapy and cognitive behavior therapy guided self-care for adolescents with bulimia nervosa and related disorders. *Am J Psychiatry* 2007;164(4):591-8.
16. Kotler LA, Devlin MJ, Davies M et al. An open trial of fluoxetine for adolescents with bulimia nervosa. *J Child Adol Psychopharmacol* 2003;13(3):329-35.

More references are available from the principal investigator or the CPSP office.



## Quiz

- The pattern of recovery for bulimia nervosa occurs as follows, except for:**
  - behavioural symptoms of bingeing and purging remit sooner than the psychological symptom of fear of gaining weight.
  - disturbed body image resolves early in the course of the illness.
  - weight and shape preoccupation seem to take longer to resolve.
  - non-purging compensatory behaviours take the longest to resolve.
- Medical complications commonly found in adolescents with bulimia nervosa include all of the following, except:**
  - hypokalemia
  - dehydration
  - Mallory-Weiss esophageal tears
  - hypothermia
- The following medical complication and corresponding treatment is appropriate, except for:**
  - electrolyte abnormalities may require gradual oral or intravenous (IV) electrolyte replacement.
  - dehydration may require oral or IV fluids.
  - esophagitis may benefit from anti-acid agents, such as ranitidine or proton-pump inhibitors.
  - low bone mineral density and the associated amenorrhea or irregular menstrual periods should be treated with hormone replacement therapy.
- Adolescents with bulimia nervosa and a history of purging may present with laboratory evidence consistent with:**
  - hyperchloremic metabolic alkalosis
  - hyperchloremic metabolic acidosis
  - hypochloremic metabolic acidosis
  - hypochloremic metabolic alkalosis
- Of the following, which is NOT recognized as a risk factor for bulimia nervosa?**
  - late puberty in a girl
  - early sexual experience in a girl
  - early puberty in a boy
  - late puberty in a boy
- Adolescents with bulimia nervosa may struggle with associated mental health issues, including:**
  - impulsivity
  - suicidal ideation
  - mood disorders
  - all of the above

1-b, 2-d, 3-d, 4-d, 5-a, 6-d  
Answers: