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Epidemiology of Binge Eating Disorder: Prevalence, Course, Comorbidity, and Risk Factors

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Epidemiology of Binge Eating Disorder: Prevalence, Course, Comorbidity, and Risk Factors

Purpose of review: Binge eating disorder (BED) is a new DSM-5 and ICD-11 diagnosis. This narrative review provides an overview of the epidemiology of BED, emphasizing studies published in 2018-21.

Recent findings: DSM-5 BED is currently estimated to affect 1.5% of women and 0.3% of men worldwide; a lifetime diagnosis of DSM-5 BED is reported by 0.6%-1.8% of women and 0.3%-0.7% of men. In adolescence, BED is even more prevalent but often transient. Many adults with BED report longstanding symptoms; less than half are recognized in healthcare. Commonly co-occurring conditions include obesity, type 2 diabetes, and hypertension. In a nationally representative US-based study, up to 23% of individuals with BED had attempted suicide, and virtually all (94%) reported lifetime mental health symptoms: 70% mood disorders, 68% substance use disorders, 59% anxiety disorders, 49% borderline personality disorder, and 32% posttraumatic stress disorder. Data on mortality are scarce, but the standardized mortality ratio of BED is estimated to be 1.5-1.8. Various minority statuses, deprivation, violence, trauma, and major mental illness may increase the risk of BED.

Summary: BED is often invisible and overlooked, perhaps due to societal biases. For this reason, prevention, detection, and management of BED is closely linked with social justice and equity.

Keywords: binge eating disorder, prevalence, epidemiology, eating disorders, comorbidity

Key points

Many people report regular binge eating, but only a minority of them meet diagnostic criteria for binge eating disorder (BED).

Lifetime BED can be diagnosed in 0.2-6.1% of adolescents, 0.6-1.8% of adult women, and 0.3-0.7% of adult men.

BED is frequently associated with obesity weight-related disorders, major depression, trauma and substance related symptoms and suicide attempts.

Poverty, violence, traumatic events, and major mental illness may contribute to the onset of BED.

Introduction

Binge eating disorder (BED) is a new eating disorder diagnosis in the DSM-5 [1] and ICD-11 diagnostic systems [2]. The diagnosis of BED is based on regularly occurring loss of control over eating, eating large amounts of food, marked psychological distress, and the absence of compensatory behaviors (Table 1).

A diagnostic gold standard of BED is a structured clinical interview, but many different self-report measures have been developed to facilitate assessment of binge eating and related behaviors in various settings.

Assessment and management of BED often require multidisciplinary expertise, as BED is often associated with excess body weight, metabolic disturbances, type 2 diabetes, psychiatric disorders, and attempted suicide. Because individuals with BED often do not fit classic stereotypes of eating disorders, delays in diagnosis and treatment are common [3].

The purpose of this narrative review is to provide an overview of prevalence, course, comorbidity, mortality and risk factors of BED based on major studies published in 2018-21.

How and why do we measure occurrence of BED?

Estimating the occurrence of BED is important for appropriate planning of detection, treatment, and prevention. Healthcare registry-based studies of BED are still scarce, as BED did not have an independent diagnostic code in the ICD-10 system. This will hopefully change with the adoption of ICD-11.

Presently, epidemiology of BED relies on community-based studies. Community-based studies can involve lengthy diagnostic interviews or simple online questionnaires. They can be nationwide or designed to target high-risk or minority populations. Flexibility of methods and definitions means that generalization across studies is often difficult.

Community-based studies of BED commonly estimate its current prevalence, or the proportion of individuals who are currently experiencing symptoms of BED. 'Current' can

mean the time of assessment, past month, three months, or year. Sometimes community-based studies also estimate lifetime prevalence, or the proportion of participants who report having experienced the constellation of BED symptoms at some point of their lives; this introduces the possibility of recall bias.

Meta-analyses that pool estimates of prevalence from different settings would be highly useful for service planning. However, these are sometimes based on unrealistic assumptions: it is reasonable to expect that prevalences and methods of their estimation vary widely across time, place, and context [4].

Global prevalence of BED, burden of disease, and mortality

A meta-analysis of 32 studies estimated that the worldwide current prevalence of BED in the period 1995-2017 was 0.9% (95% confidence interval: 0.7-1.0%) [5]. The prevalence of BED did not vary systematically between studies conducted in high-income countries, Latin America, and the Middle East [5]. Diagnostic definitions of BED have evolved over time: the prevalence of current DSM-5 BED was 1.5% (95% confidence interval: 1.2-1.7%) among women and 0.3% among men (95% confidence interval: 0.1-0.6%) based on five studies [5].

Pooled estimates of prevalence [4] have been used to estimate the global and local burden of disease attributable to BED. Worldwide, 17.3 million people (95% uncertainty interval 11.3-24.9 million) were estimated to be affected by BED in 2019 [6]*. In the same period in the US, BED was estimated to affect 2 033 000 women and 427 000 men, causing 3100 excess deaths every year [7]. Studies of BED-related mortality are scarce because of lack of specific diagnostic codes, but early reports based on specialist services in Europe estimate that BED-associated standardized mortality ratio is 1.50 (95% confidence interval 0.87-2.40) [8] to 1.77 (95% confidence interval 0.60-5.27) [9].

In the US, almost a third of total estimated economic costs associated with eating disorders were attributable to BED [7]. The tangible economic cost of BED in 2019 was estimated to

be \$ 9533 per person; costs from loss of wellbeing were estimated to be \$ 63373 per person [7].

Local prevalence of BED, 2018-21

Local estimates of prevalence are particularly useful for understanding changing populations, situations and time frames, and often preferable to global estimates. An overview of key community-based studies of BED is presented in Table 2. In the following sections, prevalence of BED in different communities, minorities and high-risk populations will be discussed in detail.

Adolescents

In a Danish community-based study, 15.5% of adolescents reported weekly overeating, and 8.5% overeating with loss of control; however, only 3.1% met ICD-11 criteria for BED and 2.6% DSM-5 criteria for BED; reported current prevalence of BED was 3.6% for girls and 1.2% for boys [10]**. All participants were born in the year 2000 and reported their symptoms via an online questionnaire. Based on this study, binge eating is relatively common among young people, but only a minority meet a diagnostic definition.

An US-based longitudinal study of adolescent girls found that BED symptoms are highly prevalent. Among adolescent girls assessed repeatedly by questionnaires for DSM-5 BED symptoms, the lifetime prevalence of BED was 6.1% and the lifetime prevalence of subthreshold BED was 12.2%; symptoms were most frequent among 19-22-year-old participants [11]. Because of the longitudinal study design involved multiple waves, current prevalences at each wave were not reported.

In a school-based study of Australian 12-19-year-old adolescents, one in five participants reported symptoms compatible with an eating disorder, and the current prevalence of BED was 1.0%: 0.2% among boys, 1.8% among girls, and 1.5% among gender-diverse youth; current prevalence of subthreshold BED was 0.3%: 0.5% among girls and 0% among other genders [12]**. Assessment was based on the EDE-Q questionnaire and limited to past-month prevalence [12]**.

Adults

In a Canadian community-based study, over a thousand 15-71-year-old women and men self-reported binge eating and related behaviors in the past month using the EDE-Q questionnaire [13]*. Regular binge eating was reported by 13.5% of women and 4% of men. Compensatory behaviors were also very common: driven exercise was reported by 10.6% of women and 8.8% of men, fasting by 2.0% of women and 0.7% of men, self-induced vomiting by 1.7% of women and 0% of men, laxative misuse by 0.9% of women and 0% of men [13]*. Although binge eating was highly prevalent, compensatory strategies were almost equally common. For this reason, few individuals would meet diagnostic criteria for BED. The study did not address binge eating-related psychological distress.

Three recent community-based studies have addressed the prevalence of DSM-5 BED by interviews.

In the US, in a large, nationwide study of over 36 000 participants aged 18 and older, 1.25% of women and 0.42% men met criteria for a lifetime diagnosis of BED, and 0.6% of women and 0.2% men reported symptoms consistent with a current diagnosis of BED [14]. The participants were interviewed using the Alcohol Use Disorder and Associated Disabilities Interview Schedule. Information elicited from this interview was rescored to estimate the prevalence of DSM-5 BED [14].

A population study conducted in Australia [15]** estimated the prevalence of BED using the diagnostic gold standard, face-to-face Eating Disorder Examination adapted for DSM-5 and ICD-11. Among adults, the lifetime prevalence for broadly defined BED was 1.9% for women and 0.7% for men; current prevalence of BED was 0.2% for women and 0.03% for men [15]** Participants aged 25–34 were most likely to be diagnosed with BED. Most participants with BED (>60%) reported body mass indices over >30 kg/m².

A third population-based study conducted in Finland among young adult twins found that the lifetime prevalence of DSM-5 BED was 0.6% for women and 0.3% for men [16]. A further 0.7% of women and 0% of men reported lifetime subthreshold BED, and 4.5% and 1.6% of participants reported unspecified feeding or eating disorder symptoms

[16]. Assessment was based on the Structured Clinical Interview adapted for DSM-5; current prevalence was not reported.

Minority populations

New studies provide insights into the prevalence of binge eating and BED among various minority populations in Western countries.

There is emerging evidence that sexual minorities are at an increased risk for eating disorders [17]. A nationally representative US-based study of adults addressed the likelihood of BED among heterosexual and non-heterosexual participants based on a brief assessment [18]. The prevalence of BED was 2.2% among non-heterosexual participants vs. 0.8% among heterosexual participants [18]. Future studies should examine this potential association in other settings and in further detail.

A meta-analysis of 30 studies attempted to estimate the prevalence of BED and related behaviors among black participants: estimates of binge eating ranged from 1.5% to 36% and estimates of the prevalence of BED ranged from 0.06% to 2.2% [19]*. As a result, the authors stated that the likelihood of binge eating and BED is equal or higher in black women compared to white women [19]*.

Studies conducted in Australia have assessed the likelihood of binge eating among local minority populations. A study conducted among First Australians found that 14% of participants reported recurring binge eating without marked distress, but only 1% met the criteria for BED [20]*. Another study compared binge eating and related behaviors among immigrants and the majority population. Weekly binge eating was significantly less frequently reported by first-generation migrants (40%) compared to Australian-born participants (57%), but there were no significant differences in purging and dieting between these populations [21].

Classifying participants by country of origin may oversimplify complex local realities. In a study conducted among Indian adolescents attending English-language schools in Mumbai [22], a high proportion of participants reported binge eating (50% moderate binge eating, 37% severe binge eating) based on the self-report Binge Eating Scale. Binge eating

was often associated with overweight or obesity [22]. These studies show that although BED is a Western construct, binge eating may be a growing global concern.

High-risk populations

Certain life events and experiences are associated with an increased risk of BED and related behaviors. New studies have studied the prevalence of BED among war veterans and individuals who have experienced major mental illness.

An US-based study addressed eating disorder symptoms among a high-risk population, Iraq and Afghanistan war veterans, using the EDDS self-report scale [23]*. Overall, one in three women and almost one in five men reported eating disorder symptoms. Symptoms compatible with a diagnosis of BED were reported by 4.4% of women and 2.9% of men, and subthreshold BED by 1.4% of women and 0.6% of men. Individuals with eating disorders had a higher mean BMI and experienced more mental health symptoms compared to their peers without eating disorders.

Individuals with major mental illness constitute another population at high risk for BED. In a clinical series of 156 participants with schizophrenia or schizoaffective disorder, the prevalence of BED was estimated to be 4.4%, and subthreshold BED 18.7%; night eating symptoms were reported by 30% of the participants [24]. Patients treated with clozapine and olanzapine were most likely to report binge eating. The high likelihood of binge eating among people who experience serious mental health issues shows that symptoms of BED should be routinely assessed when antipsychotic medication is prescribed.

Help-seeking and course

Most people with BED do not seek or receive medical attention. In an US-based population study of adults, 49.0% of participants with BED had ever sought help for their symptoms; men and participants from ethnic or racial minorities were significantly less likely to engage in help-seeking than were women or non-Hispanic whites [25].

The situation is no different in countries with universal healthcare. In a community-based study of young adults conducted in Finland, 33.3% of participants with DSM-5 BED had

been diagnosed by a healthcare professional, but only 16.6% had received any treatment [26]*.

The empirical evidence regarding the course of BED remains unclear. In a longitudinal study of US-based adolescent women in the community, BED appeared highly prevalent and highly transient: only a minority met criteria for BED in subsequent assessments [11]. Diagnostic transitions did not explain this observation, as relatively few participants (17%) crossed over to other eating disorders [11].

In contrast, in a Finnish community-based study of young adults, the mean duration of BED was 4 years; the likelihood of recovery 5 years after onset of symptoms was 40% [26]*.

In a US-based population-based study of adults, the mean self-reported age of onset for BED was 25 years: the 12-month persistence of BED was 63.5%, and the mean duration of symptoms was 15.9 years [14]. More than half of participants reported that BED symptoms interfered with their daily activities [14].

These findings show that detection and management of BED requires further study. Although adolescents with BED may experience transient symptoms, many adults with BED report longstanding symptoms. This is particularly important because BED is associated with many health consequences.

Medical aspects of BED

In a nationally representative study of US-based adults, BED was associated with type 2 diabetes, hypertension, and elevated cholesterol and triglycerides [27]. BED and excess weight were also associated with lower levels of physical activity and poorer health [28].

A systematic review of 10 studies involving over 6000 participants estimated the likelihood of BED among individuals with type 2 diabetes. Current prevalence of BED among adults with type 2 diabetes mellitus was 1.2-8.0% [29]. Participants with BED had a higher body weight compared to participants with no BED, but no differences in HbA1c levels were observed based on BED status [29].

Co-occurring mental health conditions

In a nationally representative study of over 30 000 US adults, BED was significantly associated with psychiatric disorders: 93.8% of individuals with BED (vs. 57.6% of participants with no eating disorder) met diagnostic criteria for at least one additional lifetime psychiatric disorder [27]. Common comorbid disorders included lifetime mood disorders (70%), anxiety disorders (59%), substance use disorders (68%), and personality or conduct disorders (56%) [27]. The most prevalent comorbidity was major depressive disorder, reported by 69.9% of individuals with BED, followed by alcohol use disorder (52.0%), borderline personality disorder (49.2%), nicotine use disorder (40.2%), general anxiety disorder (33.0%), and posttraumatic stress disorder (31.6%), and other drug use disorder (24.7) [27]. In addition, 22.9% of individuals with BED had ever attempted suicide; BED symptoms predated the suicide attempt in >70% of participants [30]. The history of suicide attempt in participants with BED was associated with significantly increased odds of any mood disorder, anxiety disorder, or personality disorder, particularly major depressive disorder, panic disorder, agoraphobia, post-traumatic stress disorder, antisocial and borderline personality disorder, conduct disorder, and drug use [30].

Risk factors

Several recent studies have provided new insights into the risk factors of BED.

In a US-based study of over 2000 adolescents and young adults, binge eating was prevalent in different socioeconomic status (SES) groups, with 4.9% of high-SES and 6.3% low-SES youth reporting binge eating [31].

Excess weight, weight-related teasing, body dissatisfaction and dieting were widely shared risk factors of binge eating across all socioeconomic groups [31]. Overvaluation of weight and shape was associated with greater BED-related functional impairment [32]. Among low-SES youth, food insecurity appeared to be an important risk factor of binge eating [31]. Restricted access to food in childhood due to caregiver neglect was also implicated as a risk factor of BED in a nationwide study [33,34]

In several large studies, binge eating was associated with a history of abuse and neglect, and violence. Childhood emotional and physical abuse and maltreatment were associated with a greater number of binge eating symptoms in women [35]. Participants reporting binge eating symptoms also frequently reported post-traumatic symptoms [36]. In a study of over 10 000 US-based college students, past-year emotional, physical and sexual abuse was associated with binge eating [37]. Together, these findings show that binge eating may be a strategy to cope with traumatic distress [36].

Conclusions

The epidemiology of BED is mostly based on reports from Western countries. Many studies of prevalence have been conducted, but far fewer systematic studies have addressed the incidence, course, comorbidity or mortality associated with BED. These areas of research should be emphasized in the future. Despite much research, individuals with BED frequently remain undetected and underserved. Adults with BED often experience longstanding symptoms and serious health consequences, but few studies have addressed their specific needs.

Biases associated with gender, sexuality, ethnic origin or race, age, weight, disability, and mental health may contribute to the relative invisibility of BED. There is increasing evidence that socioeconomic deprivation, violence and traumatic experiences contribute to the onset of BED. For this reason, prevention, detection and management of BED is closely tied to social justice projects.

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Table 1. Definitions of binge eating disorder in the DSM-5 and ICD-11 diagnostic systems

<p>Binge Eating Disorder (BED), DSM-5</p>	<p>A. Recurrent episodes of binge eating. An episode of binge eating is characterized by both of the following:</p> <ol style="list-style-type: none"> 1. Eating, in a discrete period of time (e.g., within any 2-hour period), an amount of food that is definitely larger than most people would eat in a similar period of time under similar circumstances 2. The 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) <p>B. Binge-eating episodes are associated with three (or more) of the following:</p> <ol style="list-style-type: none"> 1. Eating much more rapidly than normal 2. Eating until feeling uncomfortably full 3. Eating large amounts of food when not feeling physically hungry 4. Eating alone because of being embarrassed by how much one is eating 5. Feeling disgusted with oneself, depressed, or very guilty after overeating <p>C. Marked distress regarding binge eating is present.</p> <p>D. The binge eating occurs, on average, at least 1 day a week for 3 months</p> <p>E. The binge eating is not associated with the regular use of inappropriate compensatory behavior (e.g., purging, fasting, excessive exercise) and does not occur exclusively during the course of anorexia nervosa or bulimia nervosa.</p>
<p>Binge Eating Disorder of low frequency and/or limited duration, or Subthreshold BED, DSM-5</p>	<p>All of the criteria for binge-eating disorder are met, except that the binge occurs, on average, less than once a week and/ or for less than 3 months.</p>
<p>Binge Eating Disorder, ICD-11</p>	<p>Binge eating disorder is characterized by frequent, recurrent episodes of binge eating (e.g., once a week or more over a period of several months). 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 experienced as very distressing, and is often accompanied by negative emotions such as guilt or disgust. However, unlike in bulimia nervosa, binge eating episodes are not regularly followed by inappropriate compensatory behaviours aimed at preventing weight gain (e.g., self-induced vomiting, misuse of laxatives or enemas, strenuous exercise).</p>

Table 2. Key community-based studies on the prevalence of binge eating disorder conducted in 2018-2020

Reference	Mean age, years (standard deviation)	Country	N	Setting and measurement	Current prevalence of BED (with 95% confidence interval)	Lifetime prevalence of BED (with 95% confidence interval)
Glazer et al 2019 [11]	baseline: 12 years (1,6 years)	US	9031	Longitudinal community-based mail-in survey, based on the McKnight Risk Factor Survey validated against the Eating Disorder Examination	Not available	Girls: 6.1%
Mitchison et al 2020 [12]	14 years	Australia	5191	School, online survey, based on EDE-Q (past month)	Girls 1.8% Boys 0.2% Other genders 1.5%	Not available
Olsen et al 2020 [10]	16 years (4 months)	Denmark	2509	Community, online survey, approximated DSM-5 diagnostic criteria of BED	Girls 3.6% (2.6, 4.6%) Boys 1.2% (0.6, 1.8%)	Not available
Silén et al 2020 [16]	22 years (0.7 years)	Finland	1347	Community, interview, SCID adapted for DSM-5	Not available	Women 0.6% (0.2, 1.5) Men 0.3% (0.08-1.25%)
Udo and Grilo 2018 [14]	45 years	US	36309	Community study of participants aged 18 and older, interviewed using the Alcohol Use Disorder and Associated Disabilities Interview Schedule, rescored to create DSM-5 categories	Women 0.60% (0.46, 0.74%)* Men 0.20% (0.16, 0.36%)*	Women 1.25% (1.05, 1.45%)* Men 0.42% (0.30, 0.54%)*
Bagaric et al 2020 [15]	54 years (19 years)	Australia	2977	Community, interview based on the Eating Disorder Examination	Women 0.20% (0.09, 0.44%) Men 0.03 (0.01, 0.04%)	Women 1.85% (1.42, 2.40%) Men 0.74% (0.49, 1.11%)

*confidence interval calculated based on the standard error reported by the authors

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