The Psychological and Medical Factors Associated With Untreated Binge Eating Disorder

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ABSTRACT

Objective: Although binge eating disorder (BED) is the most prevalent eating disorder, the impact of untreated BED is underappreciated. This review describes the relationship of BED to physical and mental health, quality of life, and functionality.

Data Sources: PubMed searches were conducted on March 21, 2014; searches were limited to English-language research articles, meta-analyses, and reviews published between January 1, 2003 and March 21, 2014. Search terms included *(binge eating* OR *binge-eating* OR *binge eating disorder*) AND (*cardiovascular* OR *metabolic* OR *metabolic syndrome* OR *gastrointestinal* OR *health* OR *rehabilitation* OR *recovery* OR *sleep* OR *pregnancy* OR *quality of life* OR *functional impairment* OR *activities of daily living* OR *QoL* OR *SF-12* OR *ED-5D* OR *SF-36* OR *psychosocial* OR *depressive* OR *anxiety* OR *self-esteem* OR *suicidality* OR *suicide* OR *productivity* OR *family*).

Study Selection/Data Extraction: Of 326 identified publications, 43 were relevant to the topic and reported on the association of BED with psychiatric and medical comorbidities, quality of life, and functional outcomes.

Results: Individuals diagnosed with BED have increased rates of mental health comorbidities (eg, depression and anxiety) and more pronounced medical impairments (eg, cardiovascular disorders) compared with individuals without BED. BED is also associated with functional impairment and reduced quality of life.

Conclusions: Binge eating disorder is associated with impairments in physical and mental health, which can decrease quality of life and functionality and lead to increased health care utilization and decreased productivity. However, some caution is warranted in interpreting these findings because it remains unclear whether BED is an antecedent condition, a complication associated with a comorbid psychiatric condition, or an unrelated feature that occurs concurrently with these comorbidities and impairments. Much of the research on BED is based on observational or epidemiologic studies. Controlled studies are needed to clearly define the long-term impairments associated with BED.

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Binge eating disorder (BED) has recently received formal recognition in the *Diagnostic and Statistical Manual of Mental Disorders*, Fifth Edition (*DSM-5*) as a distinct eating disorder among previously recognized eating disorders, such as bulimia nervosa and anorexia nervosa.[1] Binge eating disorder is characterized by recurrent binge-eating episodes that occur during a discrete period of time and are associated with the consumption of more food than is typical of most people. Binge-eating episodes are associated with feelings of lack of control over eating during the episodes and marked distress. For a diagnosis of BED, binge-eating episodes must occur at least once a week for a minimum of 3 months. Furthermore, episodes of binge eating must not be associated with recurrent inappropriate compensatory behaviors and must not occur exclusively during the course of bulimia nervosa or anorexia.[1] Although the BED diagnostic criteria in the *DSM-5* remained essentially the same as in the *DSM-IV-TR*, the binge-eating episode frequency criterion in the *DSM-5* (at least once a week for a minimum of 3 months)[1] is less stringent compared with the *DSM-IV-TR* criterion (at least twice per week for a minimum of 6 months).[2]

Twelve-month prevalence rate estimates for BED based on *DSM-IV-TR* provisional diagnostic criteria indicate that 0.8%–1.2% of the population has BED, which is twice the 12-month prevalence estimate for bulimia nervosa (0.3%–0.4%).[3,4] Lifetime prevalence rate estimates are also higher for BED compared with bulimia nervosa (1.9%–2.8% vs 1.0%, respectively).[3,4] With the new *DSM-5* criteria, BED lifetime prevalence estimates are projected to increase by approximately 3% compared with those diagnosed using *DSM-IV-TR* criteria[5] because the frequency and duration of symptoms required for a *DSM-5* diagnosis are less stringent.[6] In addition to being more prevalent than bulimia nervosa or anorexia nervosa, BED is estimated to have a mean lifetime duration (14.4 years) that is longer than that of bulimia nervosa (5.8 years) and anorexia nervosa (5.7 years).[7] Consistent with the longer overall lifetime duration of BED, persistence estimates based on the ratio of 12-month to lifetime prevalence indicate that persistence is higher for BED (44.3%) than for bulimia nervosa (37.3%).[3] In contrast, persistence curves indicate that BED persists for a shorter period than bulimia nervosa (mean duration: 4.3 vs 6.5 years), suggesting that BED symptoms may fluctuate over time. These epidemiologic data suggest that BED is the most prevalent eating disorder and, based on estimated 0.8%–1.2% 12-month prevalence rates of BED[3,4] and a US adult population estimate of approximately 240 million,[8] affects approximately 2 to 3 million people in the United States.

Despite the fact that BED is more prevalent than other eating disorders, a 2004 survey of physicians found that > 40% of physicians never diagnosed BED in their patients.[9] In addition, many individuals with BED have expressed a desire for an increased knowledge of BED and its associated comorbidities from their health care providers.[10] Therefore, there is a need for increased awareness of BED and its associated comorbidities among primary health care providers. To

Clinical Points

- Primary care clinicians should be aware that individuals with binge eating disorder are at increased risk for mental health comorbidities, including depression, anxiety, and substance use disorders.
- Primary care clinicians should be aware that individuals with binge eating disorder are at increased risk for developing medical comorbidities, including obesity, type 2 diabetes, hypertension, dyslipidemia, and gastrointestinal tract problems.
- The medical and mental health comorbidities in individuals with binge eating disorder most likely play important roles in the decreased quality of life, impaired role attainment and daily functioning, and increased health care utilization.

more fully elucidate the relationship of BED to physical and mental health, quality of life, and productivity, this review examines the association of BED with impaired physical and mental health, function at work, social life, family life, home responsibilities, and quality of life. The impact of these pervasive impairments on increased health care utilization and decreased work productivity is also explored.

METHOD

A search of PubMed was conducted on March 21, 2014, that included the period from January 1, 2003, to March 21, 2014; the starting date roughly coincides with when the *DSM-IV-TR* was published. The search was restricted to titles and abstracts of English-language systematic reviews, meta-analyses, clinical trials, randomized controlled trials, journal articles, and letters. The search terms used were *(binge eating* OR *binge-eating* OR *binge eating disorder*) AND (*cardiovascular* OR *metabolic* OR *metabolic syndrome* OR *gastrointestinal* OR *health* OR *rehabilitation* OR *recovery* OR *sleep* OR *pregnancy* OR *quality of life* OR *functional impairment* OR *activities of daily living* OR *QoL* OR *SF-12* OR *ED-5D* OR *SF-36* OR *psychosocial* OR *depressive* OR *anxiety* OR *self-esteem* OR *suicidality* OR *suicide* OR *productivity* OR *family*). Additional references were added based on the authors' knowledge of relevant articles in the published literature and on a review of the reference list from relevant articles in the literature search.

RESULTS

Summary of Search Results

A total of 326 publications were retrieved; 284 were eliminated as being nonrelevant to the purposes of this article based on a review of the published abstract. The primary reason for article exclusion was a lack of information on the effects of untreated BED. Excluded articles did not describe impairments associated with BED. Rather, they focused on therapeutic intervention or pharmacotherapy for BED, the pathophysiology of BED, diagnostic criteria or predictors of BED, other eating disorders, binge-eating behaviors in individuals not diagnosed with BED, or discussion of the biologic and/or genetic correlates of BED. A total of 43 publications (42 from the literature review and 1 additional reference added based on the authors' knowledge) were considered relevant for inclusion (Table 1).

BED and Mental Health

Individuals with BED often report symptoms of depression and anxiety, with approximately 30%–80% showing lifetime comorbid mood or anxiety disorders.[4,15–17,19,20,26,32,33] Depressive and anxiety symptom levels are higher in individuals with BED than in those without BED, including the general population, obese individuals without BED, and overweight relatives of individuals with BED.[4,14,17,19,20,26] Estimated current and lifetime prevalence rates of any mood disorder in obese individuals with BED are 27.3% and 52.3%, respectively.[20] In comparison, obese individuals without BED have markedly lower current (4.9%) and lifetime (23.0%) rates of any mood disorder.[20] However, in another study,[23] depressive scores on the Beck Depressive Inventory and the level of mental stress (a potential index of anxiety) in morbidly obese individuals (mean body mass index [BMI] of 47.0 kg/m^2) classified as meeting *DSM-IV-TR* BED criteria did not differ from morbidly obese individuals who did not meet the BED criteria. Other psychiatric comorbidities reported in individuals with BED include gambling problems, bipolar disorder, attention-deficit/hyperactivity disorder, and substance abuse disorder.[4,17,19,22,26,27] Individuals with BED are also at increased risk for abuse of or dependence on alcohol or illicit drugs (odds ratios of 2.2–4.9).[3,4]

The presence of comorbid depressive symptoms in individuals with BED does not appear to be solely related to obesity, as both obese (mean BMI of 38.7 kg/m^2) and normal-weight individuals diagnosed with BED show similar levels of depressive symptom severity as measured by mean (SD) Beck Depression Inventory total scores (obese with BED: 22 [12]; nonobese with BED: 19 [12]).[12] There may be complex interactions among binge eating, obesity, and comorbid mood disorders; it has been reported that individuals with eating disorders (including BED) and a comorbid mood disorder have higher BMIs and an increased frequency of binge eating compared with those with eating disorders alone.[52]

Ethnicity and race may also affect depression and anxiety in individuals with BED. Black and Hispanic individuals with BED are more than twice as likely as white individuals with BED to have comorbid mood and anxiety disorders.[16] The lifetime prevalences of BED between white individuals (1.41%) and ethnic and racial minorities, including black individuals (1.48%) and Hispanics (2.11%), do not statistically differ.[46] However, minority populations are less likely to utilize mental health care services,[46] possibly leading to underdiagnosis of BED and associated comorbidities in these populations.

In a Swedish sample of women with BED,[25] 6.7% were reported to have made a suicide attempt (9/125). The presence of comorbid depressive symptoms in individuals with BED may impact rates of suicidality and suicidal ideation. In 1 sample of adult outpatients with BED,[11] 28% of

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Table 1. Summary of Studies Reviewed

Study	Study Design and Participants	Key Findings
BED prevalence estimates		
Hudson et al (2007)[4]	Population-based survey of a household US sample (N = 9,282)	The 12-mo and lifetime prevalence rates, respectively, for BED (1.2% and 2.8%) were higher than those for bulimia nervosa (0.3% and 1.0%)
Kessler et al (2013)[3]	Community-based survey by the World Health Organization across 14 countries	12-mo and lifetime prevalence rates were higher for BED (0.8% and 1.9%) than for bulimia nervosa (0.4% vs 1.0%); on the Sheehan Disability Scale, 46.7% of individuals with 12-mo BED exhibited role impairment and 13.2% reported severe impairment
BED and mental health		
Carano et al (2012)[11]	Cross-sectional study of adults with BED (N = 80) seeking weight-loss therapy	27.5% of individuals with BED expressed current suicidal ideation, and 12.5% had a previous suicide attempt
Dingemans and van Furth (2012)[12]	Exploratory study of adults diagnosed with BED (N = 174) who were recruited from a treatment trial and 2 experimental studies	No differences were found in the severity of depressive symptoms, levels of restraint, or concerns about eating and body shape between obese (n = 123) and nonobese (n = 51) individuals with BED
Dunkley and Grilo (2007)[13]	Observational study of overweight treatment-seeking adults with BED (N = 236)	In adults with BED, self-criticism and overevaluation of weight and shape were partially mediated by depressive symptoms and low self-esteem
Fandiño et al (2010)[14]	Observational study of obese treatment-seeking women (N = 212)	Compared with those without BED (n = 149), those with BED (n = 54) had more psychiatric symptoms (ie, depression and anxiety)
Grilo et al (2009)[15]	Clinical interview study of adults meeting BED diagnostic criteria (N = 404)	73.8% of adults with BED had ≥ 1 lifetime comorbid psychiatric disorder, with mood (54.2%) and anxiety (37.1%) disorders being most common; 42.8% of adults with BED had ≥ 1 current comorbid psychiatric disorder, with mood (26%) and anxiety (24.5%) disorders being most common
Grilo et al (2013)[16]	Clinical interview study of an ethnically diverse population of obese adults (N = 142) meeting BED criteria	36.6% of obese adults with BED had ≥ 1 current comorbid psychiatric disorder; current psychiatric comorbidities were significantly higher in black (48.1%) and Hispanic individuals (52.6%) than in white individuals (21.3%)
Grucza et al (2007)[17]	Descriptive epidemiologic survey of a community sample of adults (N = 910)	Among those meeting BED criteria (6.6%), the odds for having major depression, generalized anxiety disorder, panic attacks, and history of suicide attempts were increased regardless of their obesity status; quality of life was reduced in those meeting BED criteria compared with obese individuals without BED
Hilbert et al (2011)[18]	Latent structure analysis of women with BED (n = 159), women with other psychiatric disorders (n = 102), and women with no psychiatric disorders (n = 259)	BED co-occurs with mood and anxiety disorders but is distinct from these disorders; the co-occurrence of these disorders suggested individuals with comorbid BED and mood disorders have shared characteristics that may be maintained by associations between negative mood or anxiety and binge-eating behavior
Javaras et al (2008)[19]	Case-control study of overweight or obese adults with BED (n = 150) and without BED (n = 150) and their first-degree relatives (n = 135 and 699, respectively)	Individuals with BED (both probands and relatives) exhibited higher rates of multiple comorbid psychiatric disorders than those without BED, including major depressive disorder (45.6% vs 20.1%), bipolar disorder (10.9% vs 2.6%), generalized anxiety disorder (12.3% vs 4.2%), and drug abuse/dependence (25.6% vs 11.7%)
Jones-Corneille et al (2012)[20]	Preoperative evaluation of obese bariatric surgery candidates with (n = 62) or without (n = 89) BED	Individuals with BED had higher rates of prevalence of current Axis I psychiatric disorders (47.7% vs 16.5%), including mood (27.3% vs 4.9%) and anxiety disorders (36.4% vs 16.4%); levels of self-esteem were also lower in individuals with BED compared with those without BED
Pisetsky et al (2013)[21]	Survey of adult women who were part of the Swedish Twin study (N = 13,035)	Women with BED who had attempted suicide (n = 3) had higher rates of comorbid major depressive disorder than women with BED who had not attempted suicide (n = 19)
Ramacciotti et al (2005)[22]	Observational study of BED in adults diagnosed with bipolar I disorder (N = 51)	17.6% of individuals (9/51) with bipolar I disorder also had current or lifetime BED
Riener et al (2006)[23]	Observational study of morbidly obese adults with BED (n = 19) or without BED (n = 69) seeking weight-loss treatment in an outpatient clinic	No difference in the level of mental stress was observed between individuals with and without BED
Sawaoka et al (2012)[24]	Observational study of overweight or obese adults (N = 113) meeting criteria for BED seeking weight-loss treatment	Social anxiety was positively correlated with self-consciousness, depressive symptoms, binge-eating frequency, shape and weight concerns, and global Eating Disorder Examination score
Runfola et al (2014)[25]	Observational study of women with an eating disorder (N = 3,040) identified through a Swedish database	Of 209 women who had attempted suicide, 9 were diagnosed with BED (6.7%)
Schulz and Laessle (2010)[26]	Observation study in obese women defined as meeting (n = 40) or not meeting (n = 44) *DSM-IV* criteria for BED	Women meeting criteria for BED had a higher rate of mood disorders (63.4% vs 32.6%) and anxiety disorders (63.4% vs 32.6%) than women not meeting criteria for BED; anxiety and emotional eating were predictors of BED
Yip et al (2011)[27]	Adults with BED (N = 94) being evaluated for treatment in a university-based research program	Among individuals with BED, 18.7% met criteria for features of problem gambling; those with problem gambling features had significantly higher levels of alcohol and drug use and significantly lower self-esteem scores than those without problem gambling features

(continued)

Table 1 (continued). Summary of Studies Reviewed

Study	Study Design and Participants	Key Findings
BED and physical health		
Algars et al (2014)[28]	Survey of adult women (N = 11,503) enrolled in the Swedish Twin study	Women with BED (n = 59) were more likely to report amenorrhea (16.95% vs 9.32%) or oligomenorrhea (50.85% vs 32.36%) than women without BED (n = 11,444)
Barnes et al (2011)[29]	Cross-sectional analysis of obese adults with BED (N = 81) from primary care facilities	43.2% of individuals with BED met criteria for metabolic syndrome; more men (66%) than women (35%) met criteria for metabolic syndrome; there were no significant differences in rates of metabolic syndrome across ethnic groups (black: 33%; Hispanic: 45%; white: 46%)
Bulik and Reichborn-Kjennerud (2003)[30]	Narrative literature review	The published literature tentatively supports a relationship between BED and poor health in individuals with BED
Cremonini et al (2009)[31]	Population-based survey from a US community sample of adults (N = 4,096)	2.7% of individuals were diagnosed with BED; after controlling for BMI, individuals with BED were more likely to have heartburn, acid regurgitation, dysphagia, bloating, and diarrhea than those without BED
Friederich et al (2006)[32]	Observational study of obese women with BED seeking treatment (n = 38) and age-matched controls (n = 34)	Women with BED had a significantly higher rate of psychiatric comorbidities (50% vs 17.6%), including depression (34.2% vs 8.8%), than those without BED; during a mental stress test, heart rate variability decreased more in women with BED than in women without BED
Guerdjikova et al (2007)[33]	Medical chart review of obese individuals with BED (N = 88) enrolled in outpatient weight management program	Men (n = 44) and women (n = 44) with BED had comparable lifetime rates of psychiatric comorbidities (84% and 84.6%, respectively), type 2 diabetes (13.6% and 9%), and metabolic syndrome (27.2% and 36.3%)
Hudson et al (2010)[34]	Survey of overweight or obese adults with BED (n = 134) or without BED (n = 134)	Over 5 years of follow-up, individuals at risk for developing a metabolic syndrome component with BED had higher rates of dyslipidemia (30% vs 17%), hypertension (24% vs 18%), and any metabolic syndrome component (40% vs 28%) than did individuals without BED
Messerli-Bürgy et al (2010)[35]	Study of obese women with BED (n = 13) or without BED (n = 13)	During a post–mental stress recovery period, heart rate variability in women with BED was unchanged but was reduced in women without BED
Roehrig et al (2009)[36]	Observational study of treatment-seeking obese adults meeting criteria for BED (N = 93)	60.2% of adults with BED met criteria for metabolic syndrome, with men having higher rates than women (90.9% [20/22] vs 50.7% [36/71]) and white adults having higher rates than black adults (66.2% [47/71] vs 35.7% [5/14])
Siega-Riz et al (2008)[37]	Cross-section analysis of pregnant women from the Norwegian Mother Child Cohort study (N = 30,040)	Women with symptoms of BED before and during pregnancy (n = 650) had higher total caloric and total fat intake and lower intake of folate, potassium, and vitamin C than women without an eating disorder (n = 28,200)
Striegel-Moore et al (2005)[38]	Observational study of a community sample of women from the National Heart, Lung, and Blood Institute Growth and Health study meeting criteria for BED or bulimia nervosa (n = 67; 40 with BED) or healthy controls (n = 1,072)	Women with any BED or bulimia nervosa tended to report more emergency room visits than healthy controls
Ulman et al (2012)[39]	Cross-sectional study of pregnant women from the Norwegian Mother Child Cohort study (N = 72,435)	Women with BED symptoms before and during pregnancy (n = 1,495) had more sleep disturbances during the first 18 weeks of pregnancy than women without BED symptoms (n = 68,784)
Udo et al (2013)[40]	Observational study of obese treatment-seeking men (n = 49) or women (n = 141) with BED from primary care settings	Women with BED exhibited earlier onset of being overweight and dieting than men with BED; men with BED reported higher rates of strenuous exercise, had higher rates of meeting criteria for metabolic syndrome, and were more likely to show clinically relevant increases in triglycerides, blood pressure, and fasting glucose than women with BED
Webb et al (2011)[41]	Observational study of obese individuals seeking weight-loss surgery (N = 488)	Of the total sample, 114 had BED (23.4%) and 40 had both BED and type 2 diabetes (8.2%); individuals with BED only and BED plus type 2 diabetes reported higher levels of depressive symptoms compared with those without BED
BED, quality of life, and functionality		
Grenon et al (2010)[42]	Observational study of overweight treatment-seeking women with BED (N = 105)	Women with BED had higher health care costs and lower health-related quality of life than age- and sex-matched norms from a US community sample
Kessler et al (2014)[43]	Community-based survey by the World Health Organization across 12 countries	Early onset BED was associated with reduced odds of being married among women and reduced odds of being employed among men compared with those without BED
Kolotkin et al (2004)[44]	Survey of obese men (n = 213) and women (n = 317) seeking weight-loss treatment in a residential program	Rates of BED were 10.8% in men and 22.7% in women; individuals with BED showed significantly lower weight-related quality of life than obese individuals without BED, but these differences were largely accounted for by demographic variables, BMI, and psychological symptoms

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Table 1 (continued). Summary of Studies Reviewed

Study	Study Design and Participants	Key Findings
BED, quality of life, and functionality (continued)		
Latner et al (2008)[45]	Survey of women seeking outpatient treatment for an eating disorder (N = 53)	Individuals with eating disorders, including those with BED (6% of study population), reported worse mental health–related quality of life ratings than nonclinical population norms
Marques et al (2011)[46]	Pooled analysis of data from the National Institute of Mental Health Collaborative Psychiatric Epidemiologic Surveys	12-month and lifetime prevalence rates of BED, respectively, did not significantly differ across racial/ethnic groups (Asian: 0.7% and 1.24%; black: 0.68% and 1.48%; Hispanic: 1.11% and 2.11%; white: 0.55% and 1.41%); black individuals were less likely to utilize mental health services than the overall population over the course of their lifetime
Masheb and Grilo (2004)[47]	Cross-sectional study of men (n = 21) and women (n = 73) meeting criteria for BED who had been recruited for a clinical trial	Among individuals with BED, health-related quality of life scores were significantly lower than US norms on the SF-36; large effect sizes were observed for vitality, mental health, emotional limitations, and social functioning
Perez and Warren (2012)[48]	Pooled analysis of US community sample from the National Institute of Mental Health Collaborative Psychiatric Epidemiologic Survey (N = 20,013)	Obese adults with BED (n = 126) reported significantly lower quality of life than did obese individuals without BED (n = 4,585); black adults with BED reported more physical impairment than white or Hispanic adults with BED; and white adults reported more mental impairment than black or Hispanic adults
Rieger et al (2005)[49]	Observational study of obese adults with BED (n = 56) from a randomized controlled treatment study and obese adults without BED (n = 62)	Obese adults with BED exhibited significantly more weight-related impairments in quality of life than obese individuals without BED
Sandberg et al (2013)[50]	Observational study of obese individuals seeking weight-loss surgery with BED (n = 18) or without BED (n = 99)	Obese adults with BED reported worse mental health–related quality of life than those without BED
Vancampfort et al (2014)[51]	Observational study of obese treatment-seeking individuals with BED (n = 40), obese individuals without BED (n = 20), and nonobese controls (n = 40)	Individuals with BED reported significantly lower mental and physical health quality of life ratings than obese individuals without BED and nonobese controls; women with BED reported significantly lower mental health quality of life scores than men with BED

Abbreviations: BED = binge eating disorder, BMI = body mass index, SF-36 = Medical Outcomes Study 36-item Short-Form Health Survey.

individuals reported suicidal ideation on the Scale of Suicidal Ideation. Similarly, data from the Swedish Twin Registry indicated that women with BED and comorbid depression had higher suicide attempt and suicide completion rates compared with those with BED but without major depressive disorder.[21] However, these results should be interpreted with caution because of the small number of individuals with BED included in this study and because there were no comparisons of depressed individuals with BED to depressed individuals without BED.[21]

It is unclear whether psychiatric comorbidities are antecedents of BED or complications resulting from BED or whether treatment for BED would alleviate their severity. However, a latent structure analysis indicated that although BED is often comorbid with mood and anxiety disorders, it is distinct from them.[18] These findings suggest that, at least in some instances, BED is not the result of antecedent mood or anxiety disorders.

In addition to psychiatric comorbidities, individuals with BED report interpersonal, personality, self-esteem, self-criticism, and self-consciousness problems.[13,20,24] For instance, in women with BED, more severe binge-eating behavior was associated with higher (worse) scores for interpersonal sensitivity, paranoid ideas, psychoticism, and obsessive compulsiveness on the Symptom Checklist-90.[14]

BED and Physical Health

Binge eating disorder is associated with increased medical morbidity and poor physical health,[30] including cardiovascular problems, components of metabolic syndrome, and type 2 diabetes.[32–35] Two studies reported greater decreases in high-frequency heart rate variability in response to mental stress (an index of decreased parasympathetic cardiac control) in obese individuals with BED than in obese individuals without BED[32,35]; such decreases in heart rate variability are associated with greater risk of coronary heart disease.[53]

Individuals with BED are at an increased risk of hypertension, dyslipidemia, and type 2 diabetes (ie, key components of metabolic syndrome) than are obese individuals without BED.[34] Approximately 40%–60% of obese individuals with BED seeking weight-loss treatment meet criteria for metabolic syndrome, with higher rates of metabolic syndrome being observed in men than in women and in white individuals than in black individuals.[29,36,40] In 1 study,[41] approximately 8% of individuals met diagnostic criteria for both type 2 diabetes and BED, with black race and male sex being strong indicators of the co-occurrence of these disorders.

Individuals with BED report other physical health problems. After controlling for BMI and other relevant cofactors, BED is associated with significantly greater risk for upper and lower gastrointestinal tract problems, including acid regurgitation, heartburn, dysphagia, bloating, and diarrhea.[31] Women with BED symptoms (ie, at least weekly binge-eating episodes without compensatory behaviors) before and during pregnancy report higher frequencies of sleep problems before and during pregnancy and for 18

months after childbirth relative to women without eating disorder symptoms before or during pregnancy.[39] The effect of BED on sleep in pregnant women is consistent with studies reporting effects of BED on hormonal regulation and possible complications during pregnancy. More menstrual dysfunction (amenorrhea and oligomenorrhea) occurs in women meeting criteria for BED compared with women not meeting criteria for BED.[28] Pregnant women meeting criteria for BED consume more total calories and fat but fewer nutrients, including vitamin C and folic acid, before and during pregnancy than pregnant women not meeting criteria for BED.[37]

BED, Quality of Life, and Functionality

The mental and physical impairments observed in individuals with BED can have direct consequences on quality of life. In 1 study, scores on all subscales of the Medical Outcomes Study 36-item Short-Form Health Survey (SF-36) were lower than US norms among individuals with BED,[47] indicating impaired quality of life was associated with BED. Consistent with this finding, another study reported lower mental health summary scores on the SF-36 in a sample of women with eating disorders (which included individuals with BED) compared with population norms.[45] Individuals with BED also report reduced quality of life on the mental component of the SF-12[50] and on the EuroQoL Group 5-Dimension 5-Level Self-Report Questionnaire.[42] Some quality of life domains may be more impaired in women than in men with BED, with women with BED reporting more impairment on the mental health component of the SF-36 than men with BED.[51]

The association of BED with reduced quality of life may not be solely related to obesity because obese individuals with BED report greater levels of impairment than obese individuals without BED on the Impact of Weight on Quality of Life-Lite (IWQOL-Lite) scale,[49] a scale that assesses weight effects on physical function, self-esteem, sexual life, public distress, and work.[49] Individuals with BED and high BMI (≥ 30 kg/m^2) also score significantly lower on physical component scores of the SF-36 (ie, reported worse quality of life) than those with BED and low BMI (< 30 kg/m^2).[47] Another study reported lower quality of life in obese individuals with BED compared with obese individuals without BED.[48] However, a role for obesity in impaired quality of life among individuals with BED cannot be fully discounted. Although IWQOL-Lite scores are reduced among individuals with BED, 1 study did not find an association between reduced quality of life and BED after controlling for BMI and psychological distress.[44]

Ethnicity and race may also influence the level of quality of life impairment associated with BED. In 1 study, black individuals with BED reported more physical impairment than white or Hispanic individuals with BED, and Hispanic individuals with BED reported more social impairment than black or white individuals with BED.[48]

In addition to its effect on quality of life, BED can also impair functioning. The Sheehan Disability Scale (SDS) assesses functional impairment in 3 domains: work/school, social life/leisure activities, and family life/home responsibilities.[54] On the SDS, role impairment (ie, the ability to fulfill expected roles in different aspects of an individual's life) was reported in individuals with BED (any role impairment: 46.7%, severe role impairment: 13.2%).[3] In a study based on a World Health Organization survey,[43] early onset BED was associated with reduced odds of being married among women with BED (but not among men with BED) and reduced odds of being employed among men with BED (but not among women with BED).

There are also more global and societal effects of BED. In a study of overweight women diagnosed with and/or seeking treatment for BED,[42] self-reported total health care costs were more than 35% higher than the age- and sex-matched national average. A history of eating disorders (BED or bulimia nervosa) in young women from a community sample was associated with more emergency room visits compared to healthy controls.[38] Although these differences were not statistically different, the authors concluded that a history of eating disorders was associated with increased health service utilization.

CONCLUSIONS

On the basis of the published literature, individuals with BED have increased rates of mental health comorbidities, including depression and anxiety. These associated mental health problems, particularly major depressive disorder, are associated with an increased rate of suicidal ideation and behavior in the BED population.[21] It remains unclear whether the association of BED with suicidality is entirely a consequence of these other comorbidities, or if BED independent of major depressive disorder would still be linked to suicidal ideations and behaviors. BED is also associated with physical comorbidities, including increased cardiovascular and gastrointestinal disorders. Overall, these associated physical and mental health impairments are likely to play important roles in the decreased quality of life, impairment of functioning, decreased role attainment (ie, poor role functioning), and increasing health care utilization in those with BED.

Epidemiologic data suggest that BED is the most prevalent eating disorder, but the pervasive effects of untreated BED are underappreciated. This may be because BED was only accepted as a formal psychiatric diagnosis with the 2013 release of the *DSM-5*. Although it is not definitively known how the *DSM-5* diagnostic criteria will alter BED prevalence rates compared with the provisional *DSM-IV-TR* diagnostic criteria, prevalence estimates are projected to increase because the frequency and duration of symptoms required for a *DSM-5* diagnosis are less stringent.[6]

Although the weight of evidence suggests BED has important associations with physical and mental health, quality of life, role attainment, and functional ability, some caution is warranted in interpreting these findings. At this time, the relationship between the onset of BED, impaired quality of life, and associated psychiatric comorbidities is not clearly defined in the published literature. As such, it

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remains unclear whether BED is an antecedent condition, a complication associated with a comorbid psychiatric condition, or an unrelated feature that occurs concurrently with these comorbidities and impairments. Therefore, when multiple conditions are present in individuals with BED, it may be prudent to consider treating each potentially contributing or aggravating condition as a separate target. Much of the research to date on the relationship between BED, physical and mental health, and quality of life and functional impairment is based on observational or epidemiologic studies, which often draw conclusions based on data from secondary endpoints or post hoc analyses. As such, studies that include mental health and functionality assessments as prespecified primary endpoints and that include participants who meet stringent inclusion and exclusion criteria are needed to more clearly define the long-term effects of BED and impairments associated with this disorder.

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REFERENCES

1. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*, Fifth Edition. Washington, DC: American Psychiatric Association; 2013.
2. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition, Text Revision. Washington, DC: American Psychiatric Association; 2000.
3. Kessler RC, Berglund PA, Chiu WT, et al. The prevalence and correlates of binge eating disorder in the World Health Organization World Mental Health Surveys. *Biol Psychiatry*. 2013;73(9):904–914.
4. Hudson JI, Hiripi E, Pope HG Jr, et al. The prevalence and correlates of eating disorders in the National Comorbidity Survey Replication. *Biol Psychiatry*. 2007;61(3):348–358.
5. Hudson JI, Coit CE, Lalonde JK, et al. By how much will the proposed new *DSM-5* criteria increase the prevalence of binge eating disorder? *Int J Eat Disord*. 2012;45(1):139–141.
6. Trace SE, Thornton LM, Root TL, et al. Effects of reducing the frequency and duration criteria for binge eating on lifetime prevalence of bulimia nervosa and binge eating disorder: implications for *DSM-5*. *Int J Eat Disord*. 2012;45(4):531–536.
7. Pope HG Jr, Lalonde JK, Pindyck LJ, et al. Binge eating disorder: a stable syndrome. *Am J Psychiatry*. 2006;163(12):2181–2183.
8. US Census Bureau. American Community Survey, July, 2012. http://www.census.gov/acs/www/. Accessed January 30, 2015.
9. Crow SJ, Peterson CB, Levine AS, et al. A survey of binge eating and obesity treatment practices among primary care providers. *Int J Eat Disord*. 2004;35(3):348–353.
10. Herman BK, Safikhani S, Hengerer D, et al. The patient experience with *DSM-5*–defined binge eating disorder: characteristics, barriers to treatment, and implications for primary care physicians. *Postgrad Med*. 2014;126(5):52–63.
11. Carano A, De Berardis D, Campanella D, et al. Alexithymia and suicide ideation in a sample of patients with binge eating disorder. *J Psychiatr Pract*. 2012;18(1):5–11.
12. Dingemans AE, van Furth EF. Binge eating disorder psychopathology in normal weight and obese individuals. *Int J Eat Disord*. 2012;45(1):135–138.
13. Dunkley DM, Grilo CM. Self-criticism, low self-esteem, depressive symptoms, and over-evaluation of shape and weight in binge eating disorder patients. *Behav Res Ther*. 2007;45(1):139–149.
14. Fandiño J, Moreira RO, Preissler C, et al. Impact of binge eating disorder in the psychopathological profile of obese women. *Compr Psychiatry*. 2010;51(2):110–114.
15. Grilo CM, White MA, Masheb RM. *DSM-IV* psychiatric disorder comorbidity and its correlates in binge eating disorder. *Int J Eat Disord*. 2009;42(3):228–234.
16. Grilo CM, White MA, Barnes RD, et al. Psychiatric disorder comorbidity and correlates in an ethnically diverse sample of obese patients with binge eating disorder in primary care settings. *Compr Psychiatry*. 2013;54(3):209–216.
17. Grucza RA, Przybeck TR, Cloninger CR. Prevalence and correlates of binge eating disorder in a community sample. *Compr Psychiatry*. 2007;48(2):124–131.
18. Hilbert A, Pike KM, Wilfley DE, et al. Clarifying boundaries of binge eating disorder and psychiatric comorbidity: a latent structure analysis. *Behav Res Ther*. 2011;49(3):202–211.
19. Javaras KN, Pope HG, Lalonde JK, et al. Co-occurrence of binge eating disorder with psychiatric and medical disorders. *J Clin Psychiatry*. 2008;69(2):266–273.
20. Jones-Corneille LR, Wadden TA, Sarwer DB, et al. Axis I psychopathology in bariatric surgery candidates with and without binge eating disorder: results of structured clinical interviews. *Obes Surg*. 2012;22(3):389–397.
21. Pisetsky EM, Thornton LM, Lichtenstein P, et al. Suicide attempts in women with eating disorders. *J Abnorm Psychol*. 2013;122(4):1042–1056.
22. Ramacciotti CE, Paoli RA, Marcacci G, et al. Relationship between bipolar illness and binge eating disorders. *Psychiatry Res*. 2005;135(2):165–170.
23. Riener R, Schindler K, Ludvik B. Psychosocial variables, eating behavior, depression, and binge eating in morbidly obese subjects. *Eat Behav*. 2006;7(4):309–314.
24. Sawaoka T, Barnes RD, Blomquist KK, et al. Social anxiety and self-consciousness in binge eating disorder: associations with eating disorder psychopathology. *Compr Psychiatry*. 2012;53(6):740–745.
25. Runfola CD, Thornton LM, Pisetsky EM, et al. Self-image and suicide in a Swedish national eating disorders clinical register. *Compr Psychiatry*. 2014;55(3):439–449.
26. Schulz S, Laessle RG. Associations of negative affect and eating behavior in obese women with and without binge eating disorder. *Eat Weight Disord*. 2010;15(4):e287–e293.
27. Yip SW, White MA, Grilo CM, et al. An exploratory study of clinical measures associated with subsyndromal pathological gambling in patients with binge eating disorder. *J Gambl Stud*. 2011;27(2):257–270.
28. Algars M, Huang L, Von Holle AF, et al. Binge eating and menstrual dysfunction. *J Psychosom Res*. 2014;76(1):19–22.
29. Barnes RD, Boeka AG, McKenzie KC, et al. Metabolic syndrome in obese patients with binge eating disorder in primary care clinics: a cross-sectional study. *Prim Care Companion CNS Disord*. 2011;13(2).
30. Bulik CM, Reichborn-Kjennerud T. Medical morbidity in binge eating disorder. *Int J Eat Disord*. 2003;34(suppl 1):S39–S46.
31. Cremonini F, Camilleri M, Clark MM, et al. Associations among binge-eating behavior patterns and gastrointestinal symptoms: a population-based study. *Int J Obes (Lond)*. 2009;33(3):342–353.
32. Friederich HC, Schild S, Schellberg D, et al. Cardiac parasympathetic regulation in obese women with binge eating disorder. *Int J Obes (Lond)*. 2006;30(3):534–542.
33. Guerdjikova AI, McElroy SL, Kotwal R, et al. Comparison of obese men and women with binge eating disorder seeking weight management. *Eat Weight Disord*. 2007;12(1):e19–e23.
34. Hudson JI, Lalonde JK, Coit CE, et al. Longitudinal study of the diagnosis of components of the metabolic syndrome in individuals with binge eating disorder. *Am J Clin Nutr*. 2010;91(6):1568–1573.
35. Messerli-Bürgy N, Engesser C, Lemmenmeier E, et al. Cardiovascular stress reactivity and recovery in bulimia nervosa and binge eating disorder. *Int J Psychophysiol*. 2010;78(2):163–168.
36. Roehrig M, Masheb RM, White MA, et al. The metabolic syndrome and behavioral correlates in obese patients with binge eating disorder. *Obesity (Silver Spring)*. 2009;17(3):481–486.
37. Siega-Riz AM, Haugen M, Meltzer HM, et al. Nutrient and food group intakes of women with and without bulimia nervosa and binge eating

disorder during pregnancy. *Am J Clin Nutr*. 2008;87(5):1346–1355.
38. Striegel-Moore RH, Dohm FA, Kraemer HC, et al. Health services use in women with a history of bulimia nervosa or binge eating disorder. *Int J Eat Disord*. 2005;37(1):11–18.
39. Ulman TF, Von Holle A, Torgersen L, et al. Sleep disturbances and binge eating disorder symptoms during and after pregnancy. *Sleep*. 2012;35(10):1403–1411.
40. Udo T, McKee SA, White MA, et al. Sex differences in biopsychosocial correlates of binge eating disorder: a study of treatment-seeking obese adults in primary care setting. *Gen Hosp Psychiatry*. 2013;35(6):587–591.
41. Webb JB, Applegate KL, Grant JP. A comparative analysis of type 2 diabetes and binge eating disorder in a bariatric sample. *Eat Behav*. 2011;12(3):175–181.
42. Grenon R, Tasca GA, Cwinn E, et al. Depressive symptoms are associated with medication use and lower health-related quality of life in overweight women with binge eating disorder. *Womens Health Issues*. 2010;20(6):435–440.
43. Kessler RC, Shahly V, Hudson JI, et al. A comparative analysis of role attainment and impairment in binge eating disorder and bulimia nervosa: results from the WHO World Mental Health Surveys. *Epidemiol Psychiatr Sci*. 2014;23(1):27–41.
44. Kolotkin RL, Westman EC, Østbye T, et al. Does binge eating disorder impact weight-related quality of life? *Obes Res*. 2004;12(6):999–1005.
45. Latner JD, Vallance JK, Buckett G. Health-related quality of life in women with eating disorders: association with subjective and objective binge eating. *J Clin Psychol Med Settings*. 2008;15(2):148–153.
46. Marques L, Alegria M, Becker AE, et al. Comparative prevalence, correlates of impairment, and service utilization for eating disorders across US ethnic groups: implications for reducing ethnic disparities in health care access for eating disorders. *Int J Eat Disord*. 2011;44(5):412–420.
47. Masheb RM, Grilo CM. Quality of life in patients with binge eating disorder. *Eat Weight Disord*. 2004;9(3):194–199.
48. Perez M, Warren CS. The relationship between quality of life, binge eating disorder, and obesity status in an ethnically diverse sample. *Obesity (Silver Spring)*. 2012;20(4):879–885.
49. Rieger E, Wilfley DE, Stein RI, et al. A comparison of quality of life in obese individuals with and without binge eating disorder. *Int J Eat Disord*. 2005;37(3):234–240.
50. Sandberg RM, Dahl JK, Vedul-Kjelsås E, et al. Health-related quality of life in obese presurgery patients with and without binge eating disorder, and subdiagnostic binge eating disorders. *J Obes*. 2013;2013:878310.
51. Vancampfort D, De Herdt A, Vanderlinden J, et al. Health-related quality of life, physical fitness and physical activity participation in treatment-seeking obese persons with and without binge eating disorder. *Psychiatry Res*. 2014;216(1):97–102.
52. Hughes EK, Goldschmidt AB, Labuschagne Z, et al. Eating disorders with and without comorbid depression and anxiety: similarities and differences in a clinical sample of children and adolescents. *Eur Eat Disord Rev*. 2013;21(5):386–394.
53. Dekker JM, Crow RS, Folsom AR, et al. Low heart rate variability in a 2-minute rhythm strip predicts risk of coronary heart disease and mortality from several causes: the ARIC Study. Atherosclerosis Risk In Communities. *Circulation*. 2000;102(11):1239–1244.
54. Sheehan KH, Sheehan DV. Assessing treatment effects in clinical trials with the discan metric of the Sheehan Disability Scale. *Int Clin Psychopharmacol*. 2008;23(2):70–83.