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REVIEW

Features of Addiction in Binge-Eating Disorder: Considerations for Screening and Treatment

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Abstract: Similarities have been reported between the diagnostic and associated characteristics of binge-eating disorder (BED) and substance-related and non-substance-related disorders. This has resulted in interest in using addiction models to inform clinical care for people with BED. The purpose of this paper was to review features of addiction in BED with a focus on clinical implications. First, we briefly summarize similarities and differences in diagnostic and mechanistic features and symptoms for BED and food addiction, substance-related disorders, and non-substance-related disorders. Then we review aspects of addiction in BED that have clinical implications for screening and treatment of this condition. Similarities in diagnostic criteria between BED and substance-related and non-substance-related disorders include loss of control, greater use than intended, continued use despite adverse consequences, and marked distress. Addiction models may help inform aspects of clinical care of BED, particularly for shared antecedents and mechanisms underlying both disorders and to enhance engagement in treatment. Yet, there are large gaps in evidence regarding the effects of many aspects of addiction models to BED. More research is needed to examine the safety and efficacy of using addiction theories and frameworks for clinical strategies for BED.

Keywords: addiction, binge-eating disorder, eating disorder, substance-related disorders, treatment

Emerging evidence has demonstrated overlaps between binge-eating disorder (BED) and substance-related and non-substance-related disorders,[1,2] which may be relevant for the clinical care of BED. BED is the most common eating disorder with an estimated 17.3 million people with this condition globally.[3] BED is defined as recurrent episodes of binge eating, the consumption of an objectively large amount of food in a short-time period while feeling a loss of control over eating (Table 1).[4] To meet the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) criteria for the condition, binge-eating episodes must occur at least once a week for the previous three months, be associated with marked distress regarding the episodes, occur in the absence of regular inappropriate compensatory behaviors, and be accompanied by at least 3 of 5 associated features: eating faster than normal; eating until feeling uncomfortably full; eating large quantities of food, even when hunger is not felt; eating alone due to embarrassment of how much food is being consumed; and having feelings of disgust, depression and guilt after overeating.[4] The severity of BED can be classified as mild (1–3 episodes per week); moderate (4–7 episodes per week); severe (8–13 episodes per week); and extreme (14 or more episodes per week). In addition to overlaps in features and symptoms, substance-related disorders and BED commonly co-occur; 24–27% of patients with BED also meet the diagnostic criteria for substance-related disorder at some point in their lifetime.[5,6] This suggests shared mechanisms that may be relevant for clinical interventions.

The purpose of this paper was to review features of addiction in BED with a focus on clinical implications. First, we briefly summarize similarities and differences in features and symptoms between BED and food addiction, substance-related disorders, and behavioral addictions. Then we review aspects of addiction in BED that have clinical implications for screening and treatment of this condition.

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Table 1 Diagnostic Features for Binge-Eating Disorder, Food Addiction, Substance Use Disorder, and Gambling Disorder

Binge-Eating Disorder	Food Addiction	Substance Use Disorder	Gambling Disorder
Recurrent episodes of binge eating. An episode of binge eating is characterized by both of the following: a. Eating in a discrete period of time (2-hour period) an amount that is definitely larger than most people would eat in a similar period of time under similar circumstances b. The sense of lack of control overeating during the episode	Consuming the substance in larger amounts or for longer periods than one intends	Taking the substance in larger amounts or for longer than one intends	Recurrent gambling behavior leading to clinically significant impairment or distress, as a. Indicated by the individual exhibiting four (or more) of the below criteria in a 12-month period b. The gambling behavior is not better explained by a manic episode
Binge eating episodes are associated with three (or more) of the following: a. Eating much more rapidly than normal b. Eating until feeling uncomfortably full c. Eating large amounts of food when not feeling physically hungry d. Eating alone because of being embarrassed by what or how much one is eating e. Feeling disgusted with oneself, depressed, or very guilty after overeating	Wanting to cut down or stop consuming the substance but not managing to decrease the behavior	Wanting to cut down or stop using the substance but not managing to decrease use	Needs to gamble with increasing amounts of money in achieve the desired excitement
Presence of marked distress regarding binge eating behaviors	Spending a lot of time getting, using, or recovering from consumption of the substance	Spending a lot of time getting, using, or recovering from use of the substance	Restless or irritable when trying to cut down or stop gambling
Binge eating occurs, on average at least 1 day a week for 3 months	Cravings and urges to consume the substance	Cravings and urges to use the substance	Has made repeated, unsuccessful attempts to control, cut back, or stop gambling
The binge eating is not associated with regular use of inappropriate compensatory behaviors (eg, purging)	Not managing to fulfill obligations at work, home, or school because of substance consumption	Not managing to fulfill obligations at work, home, or school because of substance use	Is often preoccupied with gambling (eg, having persistent thoughts of reliving past gambling experiences)
	Continuing to consume the substance, even when it causes problems in relationships	Continuing to use, even when it causes problems in relationships	Often gambling when feeling distressed
	Giving up important social, occupational, or recreational activities because of substance consumption	Giving up important social, occupational, or recreational activities because of substance use	After losing money gambling, often returning to "get even" ("chasing one's losses")

(*Continued*)

Table 1 (Continued).

Binge-Eating Disorder	Food Addiction	Substance Use Disorder	Gambling Disorder
	Consuming substances again and again, even when it puts the user in danger	Using substances again and again, even when it puts the user in danger	Lies to conceal the extent of involvement with gambling
	Continuing to use, even when one knows they have a physical or psychological problem that could have been caused or made worse by the substance	Continuing to use, even when one knows they have a physical or psychological problem that could have been caused or made worse by the substance	Has jeopardized or lost a significant relationship, job, or educational or career opportunity because of gambling
	Needing more of the substance to get the effect one wants(tolerance)	Needing more of the substance to get the effect one wants(tolerance)	Relies on others to provide money to relieve desperate financial situations caused by gambling
	Development of withdrawal symptoms, which can be relieved by consuming more of the substance	Development of withdrawal symptoms, which can be relieved by taking more of the substance	
Severity			
Mild: 1–3 episodes per week	Mild: 2–3 symptoms	Mild: 2–3 symptoms	Mild: 4–5 symptoms
Moderate: 4–7 episodes per week	Moderate: 4–5 symptoms	Moderate: 4–5 symptoms	Moderate: 6–7 symptoms
Severe: 8–13 episodes per week	Severe: 6+ symptoms	Severe: 6+ symptoms	Severe: 8–9 symptoms
Extreme: 14+ episodes per week			

Notes: Diagnostic criteria for binge-eating disorder, substance use disorder, and gambling disorder are defined according to DSM-5 criteria. Diagnostic criteria for food addiction have been defined based on the DSM criteria for substance use disorder. This table is included to illustrate some of the similarities and differences in the diagnostic criteria for binge-eating disorder, food addiction, substance use disorder, and gambling disorder.

Diagnostic Features and Mechanisms

Food Addiction

A related concept to BED is "food addiction", which is commonly assessed using the Yale Food Addiction Scale (YFAS).[7] The YFAS adapts the diagnostic criteria for substance-related and addictive disorders to food and eating.[7] The prevalence of food addiction in adults is approximately 20%.[8] It is not yet recognized as a formal clinical diagnosis and there is debate over the strengths and limitations of the concept.[9,10]

One critique of food addiction has been the phenotypic overlap and co-occurrence with BED.[1] These conditions include similar symptoms such as a loss of control, food taken in larger amounts than intended, use continuing despite adverse consequences, and clinically significant distress (Table 1).[11] The prevalence of food addiction is 55% among those with BED.[8] In a study of adults with obesity, 72% of participants who met YFAS criteria for food addiction also met criteria for BED.[12] This indicates commonalities between these conditions but some unique and distinct features.

Individuals with BED and those with food addiction display some parallels in neurobiological profiles. For example, studies that have compared individuals with BED to those without this condition have suggested an increased responsivity to food cues,[13,14] coupled with a diminished ability to exert inhibitory control over these responses.[15,16] Similar findings have been found among individuals meeting criteria for food addiction relative to those without food addiction.[17,18] However, few studies have directly compared people with BED and those with food addiction and studies typically do not exclude people with food addiction from binge eating studies or vice versa.

BED is defined by the quantity of food consumed and frequency of binge-eating episodes, as well as behavioral and psychological symptoms.[19] Some individuals who meet criteria for food addiction may binge eat. However, others may meet food addiction criteria if they compulsively and repetitively eat or graze on problematic foods throughout the day,

even if the quantity ingested during each episode is not objectively large. An underlying tenant of food addiction is that it is a substance-related disorder to certain foods, particularly those that are ultra-processed.[20] This hypothesis posits that exposure to highly palatable foods alters the reward circuits of the brain, resulting in a phenotype similar to substance-related disorders.[21] However, others have described food addiction as a condition more akin to a behavioral addiction.[22] Further research is needed to determine if food addiction provides additional, meaningful clinical information above and beyond BED given the phenotypic overlaps between food addiction and BED as well as their high co-occurrence.[23] In addition, studies are needed to examine the unique mechanisms that link and differentiate these two conditions. In this paper, we limit discussions to BED, though acknowledge that there is some overlap with "food addiction".

Substance-Related Disorder

The DSM-5 includes 11 criteria for substance-related disorders that are grouped into four categories: physical dependence, risky use, social problems, and impaired control. There are similarities and differences in diagnostic criteria for BED and substance-related disorders (Table 1). Similarities include eating larger amounts of food than intended, inability to decrease binge eating despite concerted efforts, reducing other pleasurable activities during binging, and binging despite persistent negative consequences. The DSM-5 definition of substance-related disorders includes 10 separate classes of drugs—alcohol, caffeine, cannabis, hallucinogens, inhalants, opioids, sedatives, hypnotics or anxiolytics, stimulants, and tobacco.[24]

Several theories have been used to describe the etiology and maintenance of addictions and include those that center on biological/disease, psychodynamic, social and environmental, and biopsychosocial processes.[25] The biological model is largely focused on a physiological predispositions and responses to substances including how drugs influence people and biological aspects that may make people more vulnerable to drugs.[26–28] Similarities have been noted in neural responses to problematic stimuli in people with substance-related disorders and those with BED. As described above, these tend to present as an increased responsivity to problematic cues[13,14] demonstrated by dysfunctional dopaminergic and opioid pathways, and a reduced ability to exert inhibitory control over these responses[15,16] with reduced activity in the orbitofrontal and prefrontal cortex areas of the brain, which are associated with self-control.[29] In addition, some studies have demonstrated shared genetic risk between binge eating and substance-related disorders, which may increase vulnerability to the development of BED and/or substance-related disorders.[30,31] However, binge eating is defined by the quantity and pattern of the food consumed in an episode without specification of the precise food ingested. In contrast, substance-related disorders specify the problematic drug and consumption patterns of addictive substances can vary. For example, four clinically relevant patterns of alcohol consumption have been identified in adults with alcohol dependence and include binge, episodic, sporadic, and steady.[32] There are neurobiological differences between the effects of drugs and foods, with drugs demonstrating a more potent effect on neurobiological processes.[29] Foods also contain a combination of macro- and micronutrients with widespread effects on the body and neural receptors.[33] Though ultra-processed foods that include a combination of fat and refined carbohydrates are identified as foods with high addiction risk[20] and are those most commonly consumed during binge-eating episodes,[34] an addictive ingredient has yet to be demonstrated in foods.

Other theories have examined psychological and psychodynamic aspects highlighting that substances may be used for self-medication and as a maladaptive coping strategy,[35] which has also been demonstrated among some individuals with BED.[36] Certain personality differences may be associated with increasing and maintaining pathological processes associated with both substance-related disorders and BED such as external cue reactivity,[29] craving, emotion dysregulation, and impulsivity.[1] Social and environmental influences have also been implicated in both conditions including social structure, social bonds, social interaction and cultural factors.[37,38]

Behavioral Addiction

While some have viewed BED in a similar manner to substance-related disorders, akin to a state of developing pathophysiology created by excessive stimulation of brain reward circuitry by ultra-processed foods, others have examined overlaps with behavioral addictions.[39,40] Behavioral addiction refers to repeated and uncontrolled impulsive behavior that can cause undesirable consequences and seemingly shares neurobiological and clinical similarities with

substance-related disorders.[41,42] However, behavioral addiction exists in the absence of psychoactive substance. Gambling disorder, internet addiction, video game addiction, food addiction, sexual addiction, and shopping addiction have been considered in the context of behavioral addictions, though gambling disorder is the only non-substance-related disorder currently included in the DSM-5.[43] To be diagnosed with gambling disorder, according to the DSM-5, an individual must meet at least 4 of 9 diagnostic criteria within a 12-month period (Table 1). Given the overlap between BED and addictions, using a behavioral addiction framework may be informative to improve the screening and treatment of BED.

Screening

Both BED and addictions are underrecognized and underdiagnosed, despite the availability of effective treatments. The lifetime prevalence of BED is estimated to be 1.9%.[44] Despite its commonality, it often goes underdiagnosed and untreated. In a survey, 93% of general healthcare providers and 89% of psychiatrists could not correctly identify the diagnostic criteria for BED.[45] Based on data from the World Health Organization World Mental Health Survey, only 38.3% of those with lifetime BED received treatment for an eating disorder.[44] The National Center for Drug Abuse Statistics reported that of the 15.1 million adults in the United States aged 26 and older who need substance abuse treatment, only 1.4% received treatment.[46]

With both BED and various addictions, there are several barriers that may prevent individuals from seeking treatment. Individuals may feel uncomfortable disclosing information about their behaviors to healthcare providers due to shame, guilt, stigma, or lack of recognition of a problem.[47,48] Additional barriers to screening of addictions as well as BED include time and workflow constraints and lack of clinician knowledge.[45,49–51] Increasing screening rates of BED can play an important role in identifying patients with these conditions and providing or referring to treatment.[52]

The US Preventative Services Task Force has concluded that there is insufficient evidence to recommend for or against screening for eating disorders in asymptomatic adults of normal to high body mass index.[53] They did not find enough evidence to conclude the benefits and harms of screening for eating disorders in these populations.[53] Whereas, screening for substance-related disorders in adults 18 years and older was recommended by the United States Preventative Services Taskforce in 2020[54] and determined to have a moderate net benefit when services for accurate diagnosis of unhealthy drug use, of drug use disorders, effective treatment, and appropriate care can be offered or referred.[55] Several guidelines state that healthcare providers should be able to recognize and identify signs and symptoms of eating disorders and screen those at increased risk of eating disorders.[56–58] Screening questionnaires for BED that could be used in primary care include the Eating Disorder Screen for Primary Care[59] and Screen for Disordered Eating.[60] The SCOFF Questionnaire is commonly used to detect eating disorders but it may fail to detect BED.[61] Further studies are needed to examine the benefits and harms of universal screening for eating disorders among people who are asymptomatic or seeking care for other conditions.

Treatment

Psychological and Behavioral

Currently, the first-line treatment for BED is psychotherapy,[62–64] based on evidence that these therapies result in meaningful reductions in binge eating, with binge-eating abstinence rates generally around 50%.[10,65] Several forms of psychotherapy have been shown to be effective for BED including cognitive-behavioral therapy (CBT), interpersonal therapy, and dialectical behavioral therapy.[66] Interpersonal therapy, is an affect-, life-event, and present-focused psychotherapy that focuses on the interpersonal context of symptoms, and produces binge-eating abstinence in 50–60% of participants.[67,68] Dialectical behavioral therapy (DBT) teaches adaptive skills to better regulate emotional regulation[69] with remission achieved in 45% of participants.[70] Cognitive-behavioral therapy (CBT) for BED has been the most widely studied treatment.[66,71] It focuses on identifying and altering thought patterns and behaviors that contribute to binge eating including over-valuation of body shape and weight and dietary restraint. CBT emphasizes the regulation of food intake and moderation of dietary intake with exposure to "forbidden foods".

CBT can be delivered by a clinician or guided-self-help.[72] Clinician-guided treatment is typically provided in specialist settings, limiting dissemination potential. Guided self-help versions of CBT are more scalable, cost-effective, and accessible and are the first-line treatment in guidelines from the National Institute for Health and Care Excellence (NICE).[62] CBT does not result in clinically significant weight loss, which may be therapeutically incongruent with some patients with BED, particularly those seeking weight loss. Behavioral weight loss (BWL) treatment, a more broadly available treatment,[73] has been found to decrease both binge eating and weight.[74] BWL trials have reported binge-eating remission rates ranging from 38% to 74% and percent initial weight loss ranging from 2.6% to 5.1%.[73–75] Individuals who do not demonstrate an early response to treatment (eg, ≥65% reduction in binge eating within the first four weeks) tend to have suboptimal long-term outcomes and may benefit from an alternative treatment approach.[76]

Pharmacological

Lisdexamfetamine is the only medication currently approved by the US Food and Drug Administration for BED which is moderate-to-severe.[77] Lisdexamfetamine is initially prescribed at 30 mg every morning and increased by 20 mg weekly for a recommended dose of 50–70 mg per day. Lisdexamfetamine has been shown to be superior to placebo for BED, resulting in binge-eating abstinence rates of 32 to 40%.[78,79] Lisdexamfetamine carries a "black box" warning for abuse and dependence, with guidance to clinicians to assess the risk of abuse before prescribing and monitoring for signs of abuse and dependence while on therapy. Several other medications, such as selective serotonin reuptake inhibitors antidepressants and antiepileptic medications (eg, topiramate) produce greater reductions in binge eating than placebo.[80,81] Only topiramate decreases both binge eating and weight either alone[82] or when combined with CBT.[83] Combined CBT and pharmacotherapy is more effective than pharmacotherapy alone but combined treatment does not appear to be superior to CBT alone,[84] with the exception of topiramate.[83] In the few trials with head-to-head comparisons pharmacotherapy for BED appears to be less effective than psychological treatments.[85]

There is heterogeneity in response to treatments for BED with almost half of participants who do not achieve binge-eating remission post-treatment.[81] There is a need for innovative treatment approaches. Below we highlight the implications of using an addiction framework for BED treatment strategies.

Abstinence

Treatment goals for BED are focused on reducing binge-eating episodes and abstaining from this behavior.[86] In CBT for BED, individuals are taught to interrupt binge-eating behavior, in part, by helping participants avoid long periods of fasting and that there are no "good" or "bad" foods: all foods can be consumed in moderation.[87]

The goal of most treatments for substance-related disorders is total abstinence from the substance. Abstinence is also the primary outcome for pharmacological treatments for FDA approval for substance-related disorders.[88] Behavioral and psychological therapies most frequently used for addictions include CBT and 12-step programs.[89] CBT focuses on helping patients modify cognitions and attributions related to the substance or problematic behavior and altering behaviors that increase vulnerability to the addiction. The 12-step model of Alcoholics Anonymous[90] and Narcotic Anonymous[91] is based on viewing addiction as a disease and that achieving recovery requires abstinence from all psychoactive substances; controlled use is not possible.

With an addiction perspective to BED treatment, interventions would focus on mitigating the effects of food triggering the reward system in a manner that makes it more challenging for vulnerable people to moderate their intake.[92] Under this lens, foods may not merely be cognitively perceived as "forbidden" but may actually have chemical properties that make them have a higher propensity for binge eating and problematic consumption due to both cognitive and neurobiological reasons. Abstinence-based approaches of completely avoiding specific foods are incongruent with CBT for BED which aims at reducing rigid dietary rules and establishing regular eating with flexible and moderate food consumption of "forbidden foods".[87] Consumption of foods in moderation is based on theories that rigid dietary restraint is a core mechanism of BED,[87] whereas addiction models focus on addictive foods as a primary precipitant of binge eating.[93] Twelve-step programs of food addiction and Overeaters Anonymous encourage abstinence from foods and use food plans that encourage members to eliminate certain foods.[94] These programs are common, but these interventions have not been tested among individuals with BED. Further research should determine whether all patients with BED

should be treated with nonrestrictive strategies or whether a subgroup of individuals might benefit from abstinence-based approaches, and if there were such a subgroup, how to identify them. Concerns regarding rigid dietary restraint and exasperating BED behaviors are potential adverse consequences of these treatment methods, however, have not been well studied in clinical trials.

Harm-Reduction

An alternative approach to abstinence is harm reduction. This approach has emerged from recognition that some individuals seek to reduce or control their substance use rather than totally eliminate it.[95] Treatment is aimed at achieving moderation, reductions in use, and/or reductions in substance-related harms.[96,97] These treatment models include strategies to increase motivation to change, provide psychoeducation, and teach skills for regulating substance use. From an addiction perspective that binge eating is a physiological addiction to specific foods, some aspects of harm reduction are already incorporated into CBT for BED.[87] For example, CBT for BED helps patients address dichotomous thinking about foods in favor of more moderation-oriented goals.[87] However, a harm reduction perspective to BED would likely also involve eating less processed versions of foods (eg, whole-grain bread versus white bread), which may necessitate classifying certain foods as "harmful". This classification may be problematic for some patients with BED and may be in opposition to goals of improving flexible dietary restraint.

Precipitating Factors

There is overlap between BED and addictions in external and internal factors maintaining each disorder such as cravings, emotion dysregulation, and cue responsiveness. Many of these aspects are already addressed in CBT for BED. However, new approaches that reduce precipitants for substance use (eg, cravings, stress, cues) can likely be applied to reduce overlapping antecedents of binge eating, though studies are needed to assess these novel strategies. Innovative strategies that have been successfully used in addictions that may be useful to examine for BED treatment include biological/neurofeedback, pharmacotherapies for craving, just-in-time interventions, cognitive bias modification, and executive function training. In addition, strategies used in substance-related disorders to address ambivalence and improve engagement in treatment such as motivational enhancement therapy may be helpful for some patients with BED.

Chronic Status

Addictions are frequently viewed as chronic and relapsing brain disorders because neurobiological changes take place which can never be completely cured, even in remission.[26] To be in remission, the patient must meet 2 of the DSM-5 criteria for SUD over a 12-month period while being abstinent from the substance for at least 3 months.[24] The period from 3 to 12 months where symptoms are in remission is referred to as "early full remission". After 12 months, the condition is called "sustained remission". However, more than 40–60% of individuals with substance-related disorders relapse.[98] Due to this high risk of relapse, many addiction treatment approaches emphasize long-term monitoring, relapse prevention, and relapse management support. In contrast to the chronic care approach of SUD treatment, long-term studies of BED (while few) have shown that about half of individuals make a full recovery after receiving treatment without need for continued monitoring after a single episode of treatment.[99] More research is needed to examine long-term strategies to support individuals with BED.

Conclusion

There are many similarities between BED and addictions yet also notable differences. Addiction models may help inform aspects of clinical care of BED, particularly for shared antecedents and mechanisms underlying both disorders and to enhance engagement in treatment. Yet, there are large gaps in evidence regarding the effects of many aspects of addiction models to BED, including the use of abstinence-based approaches for this condition. Careful consideration and evaluation are needed when considering what aspects of an addiction perspective may be beneficial for clinical care of people with BED and the potential harms of such approaches.

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