

Differential criteria for binge eating disorder and food addiction in the context of causes and treatment of obesity

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Summary

Aim. To establish the differential criteria for Binge Eating Disorder (BED) and Food Addiction (FA)

Methods. We performed a detailed analysis of comparative diagnostic criteria for BED and Substance use disorder contained in the Diagnostic and Statistical Manual of Mental Disorders DSM-V. We applied the diagnostic criteria for both disorders to scientific publications on the issue of excessive eating in obese people, during the years 2005–2016, available on PubMed. We isolated specific similarities and differences between Binge Eating Disorder and Food Addiction. We formulated differential criteria for BED and FA.

Results. In BED as well as FA the following characteristics are apparent: preoccupation with food, excessive eating, loss of control over the amount of food and manner of eating, inability to change behavior, continuing behavior despite negative consequences, increased impulsiveness and emotional imbalance. Differences between BED and FA relate to the function of food, reaction to omitted food, psychological mechanisms of coping with excessive eating and body image, the issue of tolerance, withdrawal syndrome and the correlation between excessive eating and other areas of life.

Conclusions. The criteria of differentiation between BED and FA concern the following: function of food, eating circumstances, reaction to the unavailability of food, awareness of the problem. Appropriate diagnosis of these disorders and their differentiation increases the chances of adequate treatment of obese patients.

Key words: binge eating disorder, food addiction, differential criteria

Introduction

Obesity is a growing public health problem in developed countries [1]. Etiology of obesity is complex and includes biological, as well as psychological and environmental factors [2]. More than \$ 209 billion per year is spent only in the United States on the treatment of obesity and its complications. It represents more than 20% of all healthcare spending [3]. Since the effectiveness of the treatment is not satisfactory, the mechanisms responsible for excessive eating are still searched for. Excessive eating is responsible for over 90% of obesity [4].

The tendency to overeat is caused by the availability of attractive food, but primarily by the individual features of the person. These include improper eating habits, inefficient psychological regulatory mechanisms and abnormal interactions between hormonal and metabolic factors vs. central nervous system and its neuroregulatory mechanisms [2]. Neuroregulation in eating disorders is still unclear. We do not know either whether these disorders are secondary to diet or they are rather primary changes, based on which abnormal eating behavior develops. Studies conducted in obese patients revealed a number of neurotransmitters involved in the process of feeding and maintaining energy balance. These neurotransmitters are synthesized centrally (CNS) as well as peripherally. In each group there are those that inhibit and those that stimulate appetite. The group of protein neurotransmitters which increase appetite contains among others: melanin-concentrating hormone (MCH), neuropeptide Y (NPY), agouti-related protein (AGRP), ghrelin. Among those which inhibit appetite there are: urocortin (melanocortin family), cocaine – and amphetamine-regulated transcript (CART), brain-derived neurotrophic factor (BDNF), glucagon-like peptide 1 (GLP-1), cholecystikinin (CCK), galanin, peptide Y (PYY) [5]. It seems that the above mentioned peptides not only play an essential role in the direct regulation of hunger and satiety, but also have an influence on the nutritional status, metabolic processes and mental state. It is considered that their neuroendocrine action affects the activity of the hypothalamic-pituitary-peripheral axis [6].

The scope of this manuscript does not allow for a detailed discussion on various mechanisms of action of the peptides mentioned above. However, it is worth to mention for example the significance of serotonin and dopamine. As it is known over-reactivity to the hedonic properties of food may be caused by inter alia reduced levels of serotonin. On the other hand, excessive willingness to intake food and the problem with self-control of the amount of food are associated with impaired functioning of the so-called reward system, the mesolimbic pathway running from the ventral tegmental area (VTA) to the nucleus accumbens (NAc). In some cases, specific activities or substances cause excessive secretion of dopamine and inadequately strong feeling of pleasure, which in turn leads to a constant search for stimulus reinforcement [7]. Furthermore, irregular eating promotes craving for high-calorie products due to unfavorable changes

in the level of blood glucose and the presence of hypoglycemic states. It has also been proven that long intervals between meals increase cravings for carbohydrates [8].

Overeating which leads to obesity does not result mostly from physical hunger, but from psychological reasons. According the cognitive-motivational model of obesity the presence of food stimulates positive associations, inclinations of attention and motivational orientation, which leads to increased eating behavior. Thus, certain cognitive schemas trigger emotions and behaviors towards food by modifying, among others, the processes of perception [9]. An important role in overeating is also played by inefficient mechanisms of emotional regulation. They are associated with the predominance of excitation processes over inhibition processes and result in e.g. the escape style of coping with stress, reduced ability to defer gratification and impulsiveness [10].

Improper regulation of the level of neurotransmitters as well as psychological mechanisms described above, are observed not only in people suffering from obesity. They are present also in eating disorders associated with overeating and most often lead to excess body mass in this group of patients. Until recently, in terms of eating disorders medical classifications only mentioned bulimia (Bulimia Nervosa – BN), placing the other problems associated with overeating into the “non-specific” category (Eating Disorders Not Otherwise Specified – EDNOS) [11].

In the latest DSM-5 (Diagnostic and Statistical Manual of Mental Disorders) Binge Eating Disorder (BED) is placed additionally next to the eating disorder [12]. It is characterized by recurrent loss of control over the amount and mode of eating and incurring psychological expenses secondary to overeating. Some authors deny the legitimacy of recognizing excessive eating as a psychiatric disorder. They postulate that it is a form of a risky but still normal behavior. Furthermore, they argue that overeating, as well as obesity, most frequently coexists with or even results from other psychiatric problems, such as anxiety and depression [13].

Diagnostic criteria of BED according to the DSM-5 are shown in Table 1.

Table 1. **Diagnostic criteria for Binge Eating Disorder (BED) according to DSM-5**

- A. Recurrent episodes of binge eating (same as bulimia nervosa)
- B. Binge eating episodes are associated with three (or more) of the following:
 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 embarrassment;
 5. Feeling disgusted with oneself, depressed, or very guilty after overeating.
- C. Marked distress related to binge eating is present.
- D. At least once a week for 3 months.
- E. Binge eating is not associated with recurrent use of inappropriate compensatory behavior.

The Binge Eating Scale is the basic tool used to diagnose BED [14]. However, the questionnaire had not been adapted to the Polish conditions. BED is strongly correlated with obesity. It is estimated that from 15.7% to as much as 40% of obese patients suffer from BED [15, 16], and between 1.12% and 6.6% of general population [17, 18].

Simultaneously with studies on formulation of diagnostic criteria for BED, there is an ongoing discussion in the scientific and clinical world about a disorder with similar symptoms, which also contributes to development of obesity. It was noted in the 60s of the twentieth century [19] that some people are specifically adapted to one or more of the consumed products (e.g. corn, wheat, coffee, milk, eggs, potatoes). This adaptation results in the presence of symptoms similar to an addiction to various substances, especially alcohol. The diagnostic criteria of substance use disorder consistent with DSM-5 [12] are presented in Table 2.

Table 2. **Diagnostic criteria for Substance use disorder according to DSM-5**

Substance often taken in larger amounts or over a longer period than was intended.
Persistent desire or unsuccessful efforts to cut down or control substance use.
Great deal of time is spent in activities necessary to obtain or use the substance or recover from its effects.
Craving, or a strong desire or urge to use the substance.
Recurrent substance use resulting in a failure to fulfill major role obligations at work, school, or home.
Continued use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the substance.
Important social, occupational, or recreational activities are given up or reduced because of substance use.
Recurrent substance use in situations in which it is physically hazardous.
Substance use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance.
Tolerance
Need for markedly increased amounts of the substance to achieve intoxication or desired effect.
Markedly diminished effect with continued use of the same amount of the substance.
Withdrawal
Withdrawal syndrome (differs by substance)
Substance is taken to relieve or avoid withdrawal symptoms.

Overuse of a certain food, as well as substances is associated with the malfunctioning of the reward system and may lead to the development of addiction. By analogy to the dependence to certain substances, the term food addiction is used more commonly. It refers mainly to highly processed products containing sugar, salt, additives (mainly enhancers of flavor) and high fat content, eaten more often than the person had originally planned.

The Yale Food Addiction Scale (YFAS) is broadly used for the diagnosis of food addiction, but it also does not have a Polish version to date [20]. Some authors criticize

correlating the criteria of substance dependence directly with problems with excessive eating. They suggest that symptoms such as tolerance, neglect of life activities or withdrawal syndrome do not apply in the case of FA [21]. However, it should be noted that the YFAS questionnaire used to diagnose FA defines tolerance somewhat differently than in case of substances such as alcohol. Namely, in case of FA, tolerance is understood as an increasing amount of food needed to reduce the negative mood, to correct it or to increase the feeling of pleasure. Also, regarding the “neglect of other activities”, YFAS focuses rather on the process of growing involvement in matters related to food. The withdrawal syndrome is in turn described by similar symptoms as in the case of alcoholism, e.g.: agitation, anxiety, craving for “forbidden” products [22]. Up 11.4% of the general population may show symptoms of food addiction, while about 25% to 42% of obese patients meet the criteria [20, 23].

This issue has not been widely explored on the Polish scientific and clinical ground. In PubMed there are no reports of Polish authors on food addiction and the relationship between the disorder and development of obesity. Lack of clearly defined differential criteria between Binge Eating Disorder and Food Addiction can prevent doctors and therapists from establishing a proper diagnosis. Therefore it may reduce the effectiveness of the treatment of these disorders and obesity in general. It is particularly worrying because the number of obese people is increasing every year in all developed countries [24]. In Poland excessive body weight involves 62.4% of men and 44.6% of women [25]. It can be assumed that at least some of them suffer from a mental disorder that results in excessive eating and unhealthy weight gain. Therefore the main aim of this study was to create differential criteria for BED and FA.

Material and methods

For the purpose of the study the following sources were exploited:

1. The diagnostic criteria for Binge Eating Disorder and the diagnostic criteria for Substance use disorder contained in the Diagnostic and Statistical Manual of Mental Disorders DSM-5 [12].
2. Scientific publications focused on excessive eating from 2005 to 2016 available in PubMed, with particular emphasis on reports of BED, substance dependence and symptoms of food addiction in the general population and in the obese population; publications were searched by the following keywords: food intake, disordered eating, eating disorders, binge eating, addiction, food addiction, obesity.

The acquired data was supplemented by author’s observations from her own clinical practice (the author has been a clinical psychologist for 15 years, specializing in the diagnosis and treatment of eating disorders as well as psychological aspects of obesity).

First, a detailed analysis of comparative diagnostic criteria for BED and substance dependence was made. Then, reference diagnostic criteria for both disorders were applied to scientific reports on the presence of BED and symptoms of food addiction in obese people, and to the data from author's own clinical practice. Subsequently, specific similarities and differences between the two disorders were identified. Finally, basic differential criteria for BED and FA were formulated on the basis of the differences.

Results

Similarities between the Binge Eating Disorder and Food Addiction include ([7, 12, 26], own clinical practice):

- recurring situations of excessive eating (eating more than you need to satisfy hunger);
- eating not related to the energy requirements of the body (lack of objective hunger);
- feeling of relief during excessive eating;
- eating up to an unpleasant feeling of fullness (problem with ending food intake);
- preoccupation with food, craving (food becomes the object of thoughts, emotions and actions);
- limited control over the amount of food and the manner of eating);
- limited ability to reduce or stop excessive eating (repeated unsuccessful attempts to change behavior);
- continuing the behavior despite increasing problems in various areas of life (including health consequences of obesity, and emotional problems – due to lack of acceptance of one's appearance);
- inability to completely withdraw problematic substances, namely food;
- triggering excessive eating by a stressor (a result of stress there is an increased desire to consume and negative affect);
- emotional dysregulation, or ineffective modulation of negative affect;
- elevated levels of impulsivity;
- increased likelihood of coexisting mood disorders and anxiety disorders (similar patterns of neural activity, e.g. dopamine).

There are also fundamental differences between Binge Eating Disorder and Food Addiction ([7, 12, 26] own clinical practice). They are presented in Table 3.

Table 3. Differences between Binge Eating Disorder and Food Addiction

Factor	Binge Eating Disorder	Food Addiction
course	there are episodes of disturbed behavior	disturbed behavior is continuous (due to disturbed state of mind)
hunger	eating occurs despite not feeling subjective hunger (although need for eating is present)	there is a subjective feeling of nagging craving for particular food
taste	food may not be tasty or properly composed, large amounts are important	there appears to be a desire for particular food, which is perceived as extremely tasty
pleasure	food is not a source of pleasure	particular food induces a sense of pleasure
function of eating	the function of eating is to reduce mental tension (caused by for example: cognitive distortions related to food, embarrassment caused by shape and weight, eating restraint)	food is used to induce hedonistic satisfaction (pleasant psychophysiological feelings)
lack of food	situations that prevent overeating are perceived positively (to protect against psychological discomfort after overeating)	inability to eat a certain food increases anxiety and anger (can lead to aggressive behavior)
other activities	overeating appears in the so-called free time (when there are no ongoing tasks and interpersonal relationships)	tasks and relationships are neglected by the compulsion to overeat
other people	excessive eating occurs most often in solitude	presence of other people does not matter, although company may trigger overeating
awareness	there is awareness of too large portions	psychological defense mechanisms are activated (e.g. denial, projection), resulting in inability to properly assess portion size
feeling guilty	there is shame and distress due to disturbed eating	disordered eating has no substantial effect on mood and self-esteem because the system of delusions is active
body concern	there is increased concern about the shape/weight of the body	lack
body mass	body mass is always excessive	body mass is excessive or normal (e.g. when the dependence relates to one specific product)
typical symptoms of addiction	lack	there are: the phenomenon of tolerance, withdrawal syndrome, devoting a certain amount of time to activities associated with eating and neglecting or abandoning other activities for food

Discussion

The high incidence of Binge Eating Disorder and Food Addiction in obese patients was the reason for these conditions being equated with obesity until recently. Especially the relationship between FA and obesity incorrectly presented by the media and public opinion as a cause-effect relationship [27]. At the same time, due to similar symptomatology, excessive eating was not differentiated into BED and FA. Initially both disorders were included in the group of unspecified eating disorders, and then as binge eating disorders.

Few scientific reports on the simultaneous occurrence of Binge Eating Disorder and Food Addiction in obese people show a strong correlation between both disorders [26, 28, 29]. It is estimated that between 40% and 60% of obese patients with BED seeking treatment also present with symptoms of dependence on food [28]. This means that a significant proportion of people who suffer from episodes of uncontrolled eating at the same time experiences constant, intense desire for eating certain foods/dishes that produce a sense of pleasure. It may be said that the lives of these people are dominated by food, which is reflected in a steadily increasing body weight. Certainly, the co-existence of both disorders significantly hinders or even prevents control over the amount of calories ingested with food, and thus reduction of excess body weight.

Reports of some authors [30], as well as own clinical practice also point to a problem of semantic nature concerning the term “food addiction”. Many obese patients complain not so much of persistent desire for a particular food product or dish, but of a desire to eat in general. In such a case we should talk not about being addicted to food, but to the act of eating itself. It remains unexplained whether desired psychophysiological state of pleasure is produced by the chewing and swallowing food only, or maybe a range of products/dishes causing pleasure in these individuals is extremely broad. It seems important to initiate research in this area to distinguish between dependence on food from dependence on eating because in everyday language and scientific discourse both terms are frequently used interchangeably.

Similar semantic doubts in the discussed context are raised by the Polish translation of BED [31]. The term “binge attacks” suggests that the patient has no control over the amount of eaten food and the moment of initiation of excessive eating. However, clinical practice suggests that this is not true. People suffering from BED overeat mostly in solitude because the consciousness of too large portions causes their psychological discomfort when they are observed. The initiation of the process of overeating bears the hallmarks of self-control, but out of control is the amount of consumed food. This is the reason why the term “unrestrained eating” would be more appropriate than the term “binge attacks”. The author hopes that the arguments above will open a scientific discussion on this topic between specialists dealing with eating disorders.

Diversification of Binge Eating Disorder and Food Addiction has consequences, as they require slightly different treatments. This is important for the psychological treatment of obesity in general. To date, most scientific reports on the treatment of eating disorders associated with obesity are related to the use of CBT (Cognitive Behavioral Therapy) [32, 33]. It uses techniques such as e.g.: consumption monitoring, identification of automatic thoughts on food, developing alternative coping strategies, identifying triggers for problematic behaviors [34]. CBT appears to be effective in case of BED even when it is applied via the Internet [35] or when it takes the form of self-help, without the therapist [36]. Given the characteristics of certain eating disorders, it must be remembered that while controlled eating (occasionally or in small portions) of problematic products (e.g. high-calorie foods) can produce good results in BED, in addicted patients it usually leads to disinhibition and an eating spree [26]. Moreover, it is observed that cognitive behavioral therapy is effective in reducing eating episodes in patients with BED, but is not sufficiently effective for reduction of excess body weight [37].

Both in the treatment of BED as well as FA it is important to limit patient access to processed foods and high-calorie products and to take into account the following issues ([26, 38], own clinical practice):

- monitoring of food behaviors to identify triggers of excessive eating;
- identification of automatic thoughts about food or eating, as well as about body mass and body image in case of BED;
- develop constructive methods of coping (in high-risk situations, violation of abstinence, relapse);
- relapse prevention by analyzing the causes and consequences of recent over-eating;
- education about the causes, symptoms and consequences of excessive eating; additionally, education about correct diet, body weight, body image (in BED) and similarities between drugs and processed food (in FA);
- practice coping with stress (e.g. with negative affect, impulsivity, mental and physical tension, making decisions), and social skills (e.g. assertiveness, solving problems).

In terms of differences in treatments for BED and FA, aspects showed in Table 4 should be taken into account ([26, 38] own clinical practice).

Table 4. Differences in treatments for Binge Eating Disorder and Food Addiction

Factor	Binge Eating Disorder	Food Addiction
purpose of treatment	it is important to normalize eating through regular meals and to reduce/avoid factors that release an uncontrollable food intake	the goal is total abstinence from products that trigger an uncontrollable food intake, e.g. refraining from problematic food during intentional exposure

table continued on the next page

extent of treatment	it encompasses not only issues related to food, but also the perception of one's own body (weight, shape, image) and emotional relationship with patient's own body	it is necessary to take into account issues related to the specificity of the mechanism of addiction and addictive products
attitude to the problematic products	moderate consumption of problematic products is possible	complete avoidance of problematic products seems appropriate
meaning of social support	it is important but not necessary	it is important to integrate social support for addicted person and to inform relatives about the mechanisms of codependency

The above considerations will demonstrate the complexity of differentiation and treatment of eating disorders leading to obesity, especially when clinical symptoms are as similar as in case of Binge Eating Disorder and Food Addiction. There is a need for exploring this issue, particularly in terms of a variety of biological and psychological mechanisms, causally or functionally related to the occurrence of BED and FA. On Polish scientific ground, there is also a need of the epidemiological studies on both disorders. For this to be possible, diagnostic tools used for this purpose in other countries should be adapted to our conditions. Above all, it seems important to raise awareness among medical specialists and general practitioners treating obese patients in terms of eating disorders associated with obesity. Differential criteria set out in the conclusions section of this study may contribute to more effective diagnosis and treatment of obese patients, in whom change of eating habits and increased physical activity do not produce satisfactory results in terms of reducing excessive body weight.

Conclusions

1. Differential diagnostic criteria for BED and FA concern the following: function of food, circumstances of food intake, reaction to the inability to eat, awareness of the problem.
2. Proper diagnosis and differentiation of eating disorders increases the chances of adequate treatment of obese patients.

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