



In People with BN (bulimia nervosa), the Reward Mechanism for People with Food Addiction

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ABSTRACT. Firstly, an exhibition on eating disorders and body shaming is on display in Shanghai. The exhibition is designed by people who are patients with eating disorders. The exhibition is an introduction to the subject of eating disorders, and bulimia in particular. In addition, the exhibition highlights the dangers of the disorder. This includes binge eating as one of the consequences. The article then presents the definition of binge eating. Then, it was found that food addiction is present in many people with bulimia. Therefore, the article also analyzes the factors of binge eating from a child's perspective and personality. The final analogy is to the phenomenon of food addiction in people with obesity. So what are the reward mechanisms that cause food addiction in people with bulimia?

Keywords: Eating disorder, Bulimia nervosa, Food addiction.

1 Introduction

1.1 An exhibition on eating disorders

In Shanghai, China, wenwen organized an exhibition about body shame. The exhibition features the work of over 40 artists, most of whom have a history of eating disorders, such as anorexia or bulimia. Among the artists participating in Zhanlan, all but two are male artists and all are young girls, the youngest being 16 years old. [1] The curator of the exhibition was once an eating disorder patient, and she looks no different from any other girl in her 20s. However, it is inconceivable that this girl, who is around 1,60 meters tall, weighed only 28.8kg three years ago due to excessive dieting. When she went to hospital for a check-up she was admitted straight to the intensive care unit. And she was told that she was already in a critical condition. At the beginning when Wenwen decided to start losing weight, in addition to exercise, she gave herself a strict recipe. And she used an app on her phone to count calories at every meal. She then entered a negative cycle. Then she enters a negative cycle. For example, she asks herself to eat no more than 800 calories a day, and it would be nice if she could keep it under 500 calories. She lost weight, but her body had more abnormalities, especially in psychological terms. A year and a half later, her parents finally noticed the problem and diagnosed her with an eating disorder. Later, she lost control of her drinking. As she gradually

became physically normal, her parents paid less attention to her. Wenwen knew, however, that she still had psychological problems. For example, the feeling of no longer having control made her hate herself for her inability. This was accompanied by alcohol excesses, and eventually she became severely depressed.

2 Current status of research on eating disorders

As Wenwen, the curator of the exhibition, recounts her own experience, research shows that 95% of people with eating disorders are women. What's scary is that the age of onset is gradually decreasing, with the majority now between 14 and 25 years old. In a recent survey of 206 randomly selected college students in Shanghai, it was found that roughly 17% of them suffered from atypical eating disorder symptoms. Data from the European Union in the *Lancet* also showed that one in six to seven young women out of 2,000 had an eating disorder. Eating disorders include: anorexia nervosa, anorexia nervosa atypical, bulimia nervosa, hyperphagia associated with other psychological disorders and vomiting associated with other psychological disorders.[2] According to statistics, 1.6% of women and 0.8% of men in developed countries suffer from bulimia. Anorexia nervosa and binge eating disorder are more common in women, with a prevalence about ten times higher than in men, and the onset is mostly in late childhood or early adulthood. The lifetime chance of having anorexia nervosa in an individual female is 4% and bulimia nervosa is 2%.[3] The prevalence of this disease seems to be lower in developing countries compared to developed countries. [4]

However, most patients' BMIs (Body Mass Index) are within normal values [5]. But patients who engage in such compulsive vomiting behavior may lead to thickening of the skin of the joints and breakage of the teeth. Of course bulimia often match with other psychiatric disorders such as depression, drug or alcohol addiction.[6] In more severe cases, there is a high risk of suicidal and self-harming tendencies which can also occur.[7] In this article, we will focus on a small subset of eating disorders under the broad classification of eating disorders, bulimia nervosa. First we will understand what bulimia is. What are the specific manifestations of bulimia? What are the causes of such results in the current study? Then, analogous to the phenomenon of food addiction in people with obesity. Obesity is a state in which an individual accumulates too much fat, which has a negative impact on health. In Western countries, a BMI greater than 30 kg/m² is considered obese; some East Asian countries use more stringent criteria, for example, China considers a BMI of ≥ 27 to be obese. Obesity is genetically related and also lifestyle related separated by the square of height in meters [8]. However, young children are not suitable to be assessed by the adult BMI criteria [9] In the case of bulimia, on the surface, people are addicted to food. But what kind of reward mechanism is hidden behind this addictive behavior.

3 Discussion

3.1 What is bulimia? What are its specific manifestations?

Typically, bulimia begins during adolescence or young adulthood [10]. In the early stages of bulimia, it usually occurs during or after restrictive dieting with the aim of losing weight. The patient is usually doing this with the goal of losing weight. Of course, the succession of stressful life events, such as the departure of a loved one, academic or career stress, etc., can also increase the likelihood of the onset of bulimia. In clinical samples, the course of the illness may be chronic or intermittent. Alternatively, periods of remission may alternate with periods of recovery or the patient enters a cycle of diet-binge-regret [11]. However, in long-term follow-up studies, symptoms appeared to resolve regardless of whether treatment was received. This is despite the fact that treatment clearly affects prognosis in terms of life status. For example, mortality (all causes, including suicide) increases in bulimia patients [12]. At this point, the crude mortality rate for bulimia nervosa is approximately 2% per decade [13]. However, the transition from the initial diagnosis of bulimia nervosa to anorexia nervosa occurs infrequently (10-15%).

In general, people who develop anorexia nervosa transition to bulimia nervosa or make multiple transitions between the two disorders. Some people with bulimia continue to binge eat, but no longer have the compensatory behaviors associated with it. Their symptoms therefore meet the criteria for binge eating disorder or other eating disorders or other specific eating disorders. The diagnosis should be based on the most recent clinical presentation (i.e. less than 3 months). For example, as we will mention later, what would be the specific manifestations of specific binge eating disorders?

First, the disorder does not occur exclusively during episodes of nervous anorexia. Bulimia nervosa episodes are characterized by two things.[14] The ingestion of far more food than most people absorb in a limited period of time (for example, less than 2 hours), over a similar period of time and in the same circumstances. And experiencing a loss of control over dietary behavior during a crisis. For instance, feel unable to stop eating, or unable to control what they eat. Or the person may feel a loss of control over what or how much they eat. There are also unsuitable and recurring compensatory behaviors to prevent weight gain, such as causing vomiting. There is also over-use of drugs such as laxatives and diuretics. From a psychological point of view, the impact on self-esteem is excessive because of weight and body image.

4 In current research, what are the causes of such a disease?

If we focus on bulimia nervosa, we will find that a proportion of people with bulimia nervosa have a food addiction. And, some studies have shown that food addiction is likely to improve when bulimia nervosa symptoms are in remission. [15] So, what is food addiction? What are the possible factors that may contribute to this phenomenon?

4.1 What is food addiction

The "food addicted" patient eats uncontrollably. In this condition the patient feels that their sense of control has been lost. The food addicted patient then experiences the consequences of binge eating, obesity, and overeating. Sara Parylak and her peers found that food addiction is not only a self-control issue, but also much deeper than that; it is the body taking control of a person to the point where the individual has no say in the food that enters their body, despite all the consequences of overeating. People who engage in binge eating may feel ravenous and consume large amounts of calories before they stop. Feelings of guilt and depression may follow the binge. [16]

4.2 What are the factors affecting the disease in the current study

The impact of food addiction on children and adults.

Yale University recruited 75 children from the community ranging from thin to obese and tested them on the Yale Food Addiction Scale (YFAS). The final result was that addictive processes may play a role in problematic eating behavior. And to a certain extent it confirms that if something is addictive, children receive as many impressions as adults because they are not yet developed on a psychological and neurological level. Even more, children can be influenced [17].

Is there a commonality in the personality of patients with food addiction in the group of eating disorder patients?.

By now, it is certain that food addiction is a concept that exists, particularly in the eating disorder community. First, some studies, through animal experiments, have concluded that sugar or high-fat foods can cause addictive behavior. And in a manner similar to the abuse of other substances [18,19]. Thus, humans can become addicted to foods characterized by high sugar, fat and salt content [20]. Not only that, but also at the neural level, imaging techniques have been used to confirm that it's similar between substance dependence and addictive eating behaviors in humans with respect to the reward and incentive value of the respective stimuli [21-23]). On the other hand, either the intrinsically addictive nature of particular foods or eating behaviors or the eating habits themselves play a major role in explaining addiction-like eating habits [24]. In 2009, the Diagnostic and Statistical Manual of Mental Disorders (DSM; American Psychiatric Association, 2013) applied the diagnostic criteria for substance dependence from the fourth edition to test for food addiction [25].

The idea that personality traits involved in addiction processes may also contribute to eating disorders is not new and has been confirmed by empirical data (Davis and Claridge, 1998; Lent and Swencionis, 2012[26-28]). People with eating disorders are more possible than healthy people to use addictive substances, such as tobacco, as well as illicit drugs, which supports the concept of a personality who is more possible to have an addiction [29]. In addition to this, a recent psychological analysis of eating disorders showed that patients with all eating disorder types had better capacity of injury prevention and those with bulimia nervosa had higher levels of novelty seeking.

[30] In conclusion bulimia nervosa and other unspecified eating disorders had higher persistence. [18].

Furthermore, in terms of self-directedness, eating disorder patients were less aware than healthy people. When comparing forms of addiction in patients with addictions of behavior and bulimia nervosa, these two groups present the capacity of directors themselves are so lacking but they don't present a type of reward depends. [31,32]. Overall, after studying and comparing 278 patients with eating disorders and examining their food addiction, impulsivity, and personality, we concluded that food-dependent patients were less self-oriented and had higher levels of negative urgency. In contrast, food-dependent patients were more lacking in perseverance. As a result, it's more difficult for the people who have eating disorders in completing works and focusing on the goal which they need to insist for long time, and are more likely to develop addictive eating habits.

5 The problem of reward circuits for food addiction and drug addiction


After examining the similarities in the neural pathways that process rewards from food and drugs, we can conclude that neural substances in the brain are associated with the gluttony that leads to obesity in humans. Changes in reward circuits following the consumption of such foods play a role in the development and maintenance of some obesity problems. Excessive food intake can be seen as a potential problem caused by "addiction". [33]

6 Conclusion

Overall, eating disorders are currently a relatively common disorder among young people. This disorder can cause a variety of problems both on a mental health level and physically. When we focus on bulimia nervosa as one of the eating disorders, we find that food addiction is one of the clearly related addictions. Through our research and conclusions, we have concluded that firstly, children are more affected by addiction to an item than adults, due to their immaturity on a psychological and neurological level. Also, as the research has shown, humans are prone to addiction to foods that are high in sugar and fat. In the case of food addicts, they are less self-directed and they have a higher level of negative urgency. In contrast, patients with food addiction are more lacking in perseverance. As a result, it is more difficult for people with eating disorders to complete work and focus on goals that they need to stick to over time, and are more likely to develop addictive eating habits.

7 Reference

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