# Eating Disorder: The Causes and Effects

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*Abstract:* Eating disorders (EDs) are a group of psychosomatic disorders characterized by abnormal eating behavior and psychological disorders, with high mortality and easy chronicity. Eating disorders characterized by bulimic behavior include binge eating disorder (BED) and bulimia nervosa (BN) while eating disorders characterized by anorexic behavior include anorexia nervosa (AN). Patients can experience varying mental distress, various somatic complications, and impairment of health and social functioning. Although the pathogenesis of the disease has not been completely elucidated, there is inevitably a strong connection with psychological, biological, family, and social factors. Among them, genetic factors play a tremendous role, with a genetic potential of 28% to 83%. The main treatments nowadays are cognitive behavioral therapy guided self-help (CBT-GSH) which is a kind of cognitive behavioral therapy, dialectical behavior therapy (DBT), interpersonal psychotherapy (IPT), and family-based treatment (FBT). However, the advent of virtual reality technology has provided new ideas for interventions in eating disorders in which binge eating behavior is the main symptom. Virtual reality technology intervenes with BED/BN populations by taking an emotional and cognitive perspective. Related studies show virtual reality exposure therapy is more effective than traditional interventions for BED/BN populations.

*Keywords:* eating disorder, bulimia nervosa, binge eating disorder, anorexia nervosa, virtual reality

## 1. Introduction

The prevalence of eating disorders (EDs) has gradually increased in recent years, with a prevalence rate of approximately 3% to 6% in young women and 3% in men and a lifetime prevalence rate of roughly 2% to 4% in women. It has become one of the young people's most common chronic psychological disorders. As the number of patients increases, society pays more attention to eating disorders, and many studies have been conducted on the causes and effects of eating disorders. However, the causes of eating disorders have not been clearly described, and this article addresses the etiology from four perspectives: psychological, biological, family, and social. With the development of technology, the emergence of new technologies, especially the broader application of VR, has provided new ideas for BED/BN interventions. BED/BN interventions have provided

new ideas. The eating disorders treatment summary is used to help with early intervention and treatment of patients with eating disorders.

## 2. Literature Review

### 2.1. Introduction to Eating Disorders

Eating disorders are severe and often fatal disorders related to people's eating behaviors and associated thoughts and emotions. EDs are roughly divided into two types, those with anorexic behavior and those with binge eating. Among these binge eating behaviors are mainly BED and BN. Although both are about "episodes of binge eating," the fact is that BED and BN are entirely different. According to the DSM-5, Patients need to have binge eating behaviors and inappropriate compensatory behaviors, which may include purging behaviors (e.g., emetics, laxative abuse, etc.) or non-purging behaviors (e.g., fasting and excessive exercise, etc.) that happen on average once a week for three months to confirm bulimia nervosa. The diagnosis of BED requires behaviors that occur at least once a week on average and last for a quarter. The only behaviors for BED are binge eating; there is no inappropriate compensatory behavior. Patients with BED do not engage in behaviors that force them to vomit the food they have just eaten. The difference is that people with BN empty their stomachs immediately after eating, such as by vomiting or using laxatives. The causes of binge eating triggers are not the same in BED and BN. Patients with eating disorders have structural and functional changes in their brain reward systems, according to research using brain imaging. The primary disorder of anorexic behavior is Anorexia nervosa. The patient's abnormally low weight, intense worry about weight growth, and misperceptions about body weight are characteristics of the condition. Patients with anorexia nervosa emphasize weight control and go to extreme lengths, often with serious life consequences.

### 2.2. The Crowd's General Situation

The prevalence of eating disorders (EDs) has significantly grown over the past several years, with a prevalence of about 3% to 6% in young women and 3% in men and a lifetime prevalence of about 2% to 4% in women. It has become one of the young people's most common chronic psychological disorders. Related research shows that adolescents aged 13-20 are at the peak of eating disorder onset [1]. Regarding gender, women have a higher incidence than men [2].

### 2.3. Formation Mechanism

Because of the uncertainty, instability, and superposition of self and social factors that constitute eating disorders, no definite conclusion has been found on the causes of eating disorders.

First, kreipe [3] concludes that the issues with poor self-evaluation are among the personality factors that might raise the chance of having an eating disorder, difficulty in expressing negative emotions and dealing with conflicts, pleasing others, seeking perfection, being dependent, need to be noticed, difficulty in managing relationships with parents, hard to live independently, parents' high expectations, fear of growing up.

Individual body awareness is high, influenced by society, family, media, and other external influences. Under the pressure of social mainstream culture, which takes thinness as a symbol of beauty, individuals, especially women, have a cognitive bias in evaluating one's figure, suffering from body image disturbance. Body image disturbance is a distorted perception of an individual's physical appearance. It is one of the symptoms of psychiatric disorders and one of the diagnostic standards for eating disorders.

Related studies have shown that this cognitive bias can lead to body monitoring and shame, significantly reducing sexual self-esteem. Patients associate changes in body weight with obesity, associate thinness with self-worth, and keep thinking they are too fat even though they are already skinny. They develop incorrect perception patterns about themselves, which ultimately produces body image distress.

Therefore, treating bulimia nervosa requires more help from patients to change their eating attitudes and overcome disorders related to body image cognitive dissonance and uncontrolled eating behavior [2].

Patients' negativity, anxiety, and fear levels are significantly higher than in normal subjects. Many researchers have explored the relationship between emotion and eating behavior in ED patients. An inappropriate connection between emotional experience and eating behavior can lead to emotional anorexia and binge eating [3]. The Emotional Cognitive Model suggests that the leading cause of BN bulimia is negative emotions. Some women binge eat to cope with their intensely unpleasant feelings. During the binge eating process, their attention is shifted to immediate food stimuli to the point of disinhibited eating. Emotional stability and then attention shifts back, and negative emotions increase, leading to dysregulation of emotions [4]. Studies have shown that self-harm and suicidal behavior result from emotional dysregulation and, thus, the transfer of cognitive and mental pain to the body [5]. In addition, the high prevalence of BN in women is also based on emotional impulsivity, where psychologically or physically induced emotions affect cognition, leading to reduced self-control. Eventually, impulsive emotions are transferred to impulsive eating. Therefore, the treatment of bulimia nervosa requires more attention to the regulation of the patient's emotions. Thus, self-harming behaviors due to emotion regulation disorders and compulsive behaviors due to emotional impulses are avoided.

Second, research results showing genetic factors affect eating disorders in 28% to 83% of cases. Research in molecular genetics suggests that three types of genes play a role in ED: (1) genes related to factors such as mood, anxiety, and impulse regulation; (2) appetite, body mass, and metabolic level factors; and (3) gender differences [2].

Thirdly, the Eating disorder is probably responsible for a family environment. Some related studies show that family member relationships and parental marital harmony influence the development of eating disorders in children [6]. Moreover, parental tension in childhood is associated with eating disorders [7].

Lastly, in countries with a high prevalence of eating disorders, the dominant culture of society promotes "thinness as beauty." This may lead individuals, especially women, to control their weight to fit the social culture through various methods, which include fitness, dieting, and hyperventilation.

## 2.4. How Eating Disorder Affects Body and Mind

Many studies have demonstrated that anorexia nervosa and bulimia nervosa may be related to a disorder in the brain's reward circuitry [8-12]. The brain's reward circuitry connects many parts of our brain that control and oversee our ability to feel delighted. Activated by environmental reward stimuli, the nucleus accumbens releases the neurotransmitter dopamine. When dopamine binds to dopamine receptors, it transmits the message of excitement and pleasure to our brain. Brain imaging studies have shown structural and functional alterations in the brain reward circuitry of eating disorder patients [10]. In addition, neuroimaging has studied brain activation when people see food versus non-food pictures [11]. When we see food, some areas of the brain are activated; where activated areas include the orbitofrontal cortex, which is involved in decision-making and cognitive processes; the ventral striatum, which is related to the reward circuit; the amygdala, which is related to emotion and motivation; and the insula which region is responsible for self-awareness, etc. The

experiments also compared changes in the brain when people saw low-calorie foods with high-calorie foods. These functional magnetic resonance imaging studies showed that high-calorie foods elicited more activity in the medial prefrontal cortex and dorsal striatum than in low-calorie foods.

Eating disorders are challenging to treat because of their comorbidity, which is divided into three main components: personality disorders, mood disorders, and anxiety disorders. Milos et al. investigated 248 women with eating disorders [13, 14]. The study showed a high level of psychiatric comorbidity in the overall population 71% axis I disorders and 68% axis II disorders; axis I disorders are the most common disorders, including anxiety disorders, panic disorder, social anxiety disorder, and post-traumatic stress disorder and axis II disorders include mental retardation and personality disorders. Only 17% of the cases were free of psychiatric disorders. The sample suffered from anxiety (52%), and mood disorders (50%) were the most common axis I disorders. Cluster C personality disorder (52%) and Cluster B personality disorder (25%) were the most common disorders within Axis II. Comorbidities are associated with increased severity of ED symptoms. For example, individuals associated with specific comorbidities may experience an increased number of binge-eating behaviors through binge-eating when they experience difficulties or adverse effects. It could also be argued that eating disorders are severely associated with aggravating comorbidities. Although there were some associations between affective disorders and eating disorder symptoms in the bivariate model, these associations disappeared while other concomitant conditions were under control [15]. Comorbidity symptoms can often be seen in patients with eating disorders, and priority should be given to treatment to control for possible overlapping effects between psychiatric disorders.

## 2.5. Treatment of ED

For the treatment of anorexia nervosa, the primary treatment goal for patients severely weakened by anorexia nervosa is to restore their weight to a safe range, with involuntary hospital admission if necessary. A team approach is usually used to treat anorexia nervosa, which includes a psychotherapist and a dietitian. Patients with mild symptoms can be treated with home-based therapy and individual therapy. However, the patient's weight needs to be checked in real-time, and if the patient is weak due to anorexia, they will need to be treated promptly in the hospital. No medications are approved for treating anorexia nervosa, as none are effective. However, antidepressants or psychotropic medications can help treat comorbidity, including depression and anxiety disorders.

Treating binge eating disorder and bulimia nervosa reduces binge eating behaviors and develops healthy eating habits. Because bulimia can be related to other negative emotions, treatment may also involve addressing these and other mental health issues, such as depression. The main treatments nowadays are cognitive behavioral therapy (CBT), interpersonal psychotherapy (IPT), and dialectical behavior therapy (DBT). Cognitive behavioral therapy aims to help patients transform thoughts and negative thinking that do not correspond to reality to achieve an optimistic mood. Interpersonal psychotherapy was originally a method concluded from the study of depression to alleviate negative emotions by improving interpersonal problems to alleviate negative emotions. Dialectical behavior therapy is guided by the philosophy of dialectics and promotes the balance between acceptance and change. It is a comprehensive psychotherapy approach [2].

Lisdexamfetamine dimesylate (Vyvanse) is the first FDA-approved medication to treat adults' moderate to severe binge-eating disorders [13]. Psychotherapy combined with antidepressants may be the most effective way to overcome this disorder for patients with BN. The primary forms of psychotherapy nowadays are CBT, IPT, and Family-based treatment. The only FDA-approved antidepressant specifically for the treatment of BN is fluoxetine. The advent of virtual reality

technology has provided new ideas for interventions in eating disorders in which binge eating behavior is the main symptom.

In addition to traditional CBT, the advent of virtual reality technology has provided new ideas for eating disorder interventions. When people are exposed to virtual environments, they develop emotional and behavioral responses in the virtual environment that are similar to those in the real world [15]. Exposure to virtual environments aims to reduce the risk of binge eating associated with BN or BED patients by eliminating/habituating specific food cravings (intense and uncontrollable cravings for specific foods) and food-related anxiety reactions. Therefore, in recent years, virtual reality therapy has provided new ideas for interventions for eating disorders with binge eating behavior as the primary symptom, including BED and BN. An experiment [15] confirmed the validity of this method in patients with BN and BED. The sample consisted of 29 patients with BED and 35 patients with BN, currently without other severe psychiatric disorders. The entire sample maintained binge-eating behavior after the first CBT session. Subsequently, participants were randomly assigned to two groups: a VR-CET intervention session and an additional CBT session. In VR-CET, participants were exposed to a virtual environment in which various food-related situations were simulated, including foods that participants perceived to trigger the highest cravings. Results showed that both adjunctive treatments improved the patients' binge-eating behavior and eating-related anxiety. However, overall short-term and long-term outcomes were better in the VR-CET group compared to the CBT group, with a reduced tendency to binge eat and anxiety attacks. Thus VR therapy has better results than cognitive behavioral therapy.

## 3. Conclusions

Although eating disorders can lead to severe consequences, the duration of anorexic and binge eating behaviors varies from person to person, from brief to recurrent episodes. Although anorexic and binge eating behaviors can disappear, the disorders underlying eating disorders can only be alleviated, not eliminated. BED can lead to physical disorders such as type two diabetes and metabolic syndrome; and mental disorders such as depression and anxiety. Up to 80% of people with AN will suffer from major depression at some time in their lives, and 75% will suffer from anxiety disorders. In addition, approximately 80% of BN experience other disorders at some time in their lives. The most common psychiatric co-morbidities include anxiety disorders, major depression, substance abuse, and personality disorders. Treatment, therefore, no longer targets the specific eating disorder (e.g., BN) but rather the psychopathology of the eating disorder and its maintenance process. If diagnosed and treated at an early stage, as well as other treatments, the physical effects of the disorder and its complications are significantly reduced. Studies have shown that patients who can make early behavioral changes (e.g., establish a more regular diet) are more likely to be treated with success.

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