

The Connection Between Depression and Eating Disorders: Case Reviews and Treatment Options

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ABSTRACT

The past century has seen extensive research on the connection between mental illnesses and eating disorders. In this paper, we review the connection between depression and two common eating disorders, anorexia nervosa and bulimia. We highlight these disorders, summarize the statistical evidence of this association, and discuss the hereditary role in this association. We elaborate on practical primary and secondary treatment options such as electroconvulsive therapy and positive imagery cognitive bias modification by reviewing a few case studies.

Introduction

Mental health and behavioral disorders have been recorded as early as the Hellenistic and Medieval times.¹ It was not until the 1800s that mental health illnesses became classified as disorders.¹ Anorexia nervosa and bulimia nervosa are two common eating disorders prevalent in today's society. Both eating disorders usually involve body dysmorphia, and if left untreated, they can negatively impact physiological and psychological functions.² Often, people with anorexia nervosa are malnourished and underweight, leading to health conditions such as osteoporosis and hormonal imbalances.⁵ In many patients, the fear of becoming overweight grows into a fear of eating, which eventually leads to anorexia.³ In general, bulimic patients can be classified into two types---those with purging bulimia and those with non-purging bulimia.⁴ Patients classified into the first type try to vomit, take drugs, or fast for long periods of time, whereas those in the second type engage in extreme workouts.⁴ These conditions can cause patients to develop anxiety, which can lead to mental illnesses such as depression.⁴

The interplay between mental health and eating disorders has attracted extensive research over the past century due to their increasing prevalence, and in turn, we see the connection between depression and two eating disorders, anorexia nervosa and bulimia nervosa, a lot more in society. Whereas patients with anorexia nervosa or other eating disorders do not always suffer from mental illnesses, a recent study consisting of 36 sub-studies found that 33 to 50 percent of patients with anorexia have a comorbid mood disorder such as anxiety or depression.⁶ These mood disorders are more common in binge disorders (e.g., bulimia), rather than restrictive disorders (e.g., anorexia).⁶

Epidemiological evidence shows that depression is a common and destructive mental disorder among the United States population.⁷ Symptoms of depression include heightened anxiety, loss of energy and interest, loneliness, and insomnia.⁷ The extent of its prevalence in the worldwide population varies due to several factors such as gender, race, age, and geography.⁷ For example, according to studies done globally, Afghanistan experiences the highest rate of depression with almost one in five residents suffering from the disorder.⁸ In contrast, Japan has one of the least depressed populations with a diagnosed rate of less than 2.5 percent.⁸ Furthermore, in the United States, depression is more common in the Black and Hispanic populations between the ages 45 to 65.⁷ This disparity can be explained via patterns at both the individual and country levels. It also has been found that depression is twice as common in women than in men because women tend to produce more stress hormones than men, and progesterone in females

prevents the stress hormone inducer from suppressing itself, making women more susceptible to depression.^{9,10} Especially during the COVID-19 pandemic, patients without mental health disorders such as anxiety, obsessive-compulsive, and depression are suffering from heightened symptoms of depression as a result of external stress factors.¹¹ In the United States, the reported cases of depression have tripled in adults, jumping from 8.5% to 27.8%, with exponentially growing numbers.¹¹ From March 31, 2020, and April 13, 2020, a case study, conducted in the United States, that surveyed two populations and compared the results to the National Health and Nutrition Examination Survey from 2017 to 2018 reported that the severity of depression in all demographic groups increased about three-fold during the beginning of the lockdown¹². Since these disorders are endemic in the United States and continue to rise, the need for treatment options is growing rapidly.

With advances in research on the connection between mental illnesses and eating disorders, a few treatment options such as electroconvulsive therapy (ECT) and positive imagery cognitive bias modification (CBM) have shown positive results. Of these treatments, electroconvulsive therapy is where seizures are intentionally generated in the brain using electroshocks.¹³ This relieves the symptoms of the mental disorder, though it rarely cures the disorder itself. ECT treatment usually involves therapy two to three times a week for a period of six to twelve sessions.²¹ Another proposed therapy is positive imagery CBM in which patients suffering from depression are trained to look at ambiguous events and find positive resolutions in hope to improve cognitive development.²⁰ Understanding the association between eating disorders and depression will help elucidate why certain therapies are better than others, identify tailored or patient-specific therapies, and discover future novel psychiatric therapies.

In the following section, to understand the relationship between depression and eating disorders, we review case studies that discuss the following questions: (1) What are some genetic and environmental factors that affect and connect these two disorders?; (1) What behavioral and personality traits develop with time from these disorders?; and (3) How have positive imagery CBM and ECT been used in previous case studies? In the discussion, we elaborate on the implementation of novel therapies such as positive imagery intervention and electroconvulsive therapy and their potential drawbacks.

Case Reviews

Correlation between depression and anorexia nervosa

To further understand the association between eating disorders and depression, we discuss a case study conducted in Singapore, indicating the struggles of anorexia nervosa and its impact on mental health.¹⁴ The goal of the paper was to compare the observed clinical characteristics of anorexic patients in Singapore with characteristics observed during the early (14 years or younger) and classic later-onset (14 years or older) cases. In this study, anorexia nervosa was defined using the criteria listed in the DSM-IV(9), an index that classifies the severity of the depression.¹⁵ Patients were also classified either as binge-purge type or restrictive type, according to DSM-IV criteria. The results found that mental health illnesses are more prevalent in people with eating disorders than the popular notion identifies. “40 (31.7%) had co-morbid psychiatric diagnoses. Of these, 12 had more than one psychiatric diagnosis. 33 (25.4%) had co-morbid depression, five (3.9%) had anxiety, four (3.2%) had obsessive-compulsive disorder, five (3.9%) had some form of substance abuse and three (2.3%) were diagnosed to have some sort of personality disorder (Lee, 2005).” The doctors concluded that this study was one of the largest studies to be done on anorexia nervosa locally, allowing them to gauge the typical characteristics of an anorexic patient in Singapore and compare them to those of Western countries.¹⁴

A psychosocial model to characterize the relationship between depression and eating disorders

Another study compared the personality traits and suicide attempts in women with anorexia nervosa, bulimia nervosa, and major depression.¹⁶ The study used the Temperament and character inventory (TCI) scale, a scale that shows a comprehensive psychosocial model of the patient's personality and behavior as it develops, outlining the relationships that create their personality.¹⁷ This method compared the prevalence and severity of suicide attempts (n=death ratio) in women with anorexia nervosa (TCI:n = 68), bulimia nervosa (TCI:n = 152), and major depression with no history of an eating disorder (TCI:n = 59) and examined the relationship between the TCI scale and suicide attempts.¹⁶ The series of tests showed comparable numbers in all three groups in terms of death from suicide. Further, the study identified personality traits that showed self-directedness and self-transcendence, which are common characteristics in patients with depression and anorexia nervosa.¹⁶ The study showed that the effects of depression are equivalent or more extreme in patients with anorexia when compared to those without, since patients with an anorexic disorder had larger TCI ratios. This causal relationship between depression and eating disorders is inverted in some cases. It can be concluded that anorexia nervosa and depression have linked symptoms and that patients with eating disorders and depression are equally likely to have suicidal thoughts.¹⁶

Factors influencing the relationship between anorexia nervosa and depression

Further studies about the correlation between anorexia nervosa and depression show that genetic and environmental factors play a role in the development of these diseases.¹⁸ Researchers conducted a double-blind, population-based longitudinal study--a study on a group of people for an extended period of time---on Caucasian female twins drawn from the Virginia Twin Registry.¹⁸ The researchers used a bivariate structural equation to model the correlation between anorexia nervosa and depression and to quantify the correlations between each of the two phenotypes and various genetic and environmental factors.¹⁸ The results suggested that genetic factors influence the risk of anorexia nervosa and contribute to the observed relationship between anorexia nervosa and major depression.¹⁸ After analyzing the data from the software, the researchers derived that the proportion of shared genetic variance between anorexia nervosa and major depression is 34% (95% confidence interval (CI)=13%–71%), and by itself, “anorexia nervosa was estimated to have a heritability of 58% (95% confidence interval=33%–84%) (Bulik, 1999).” From the data, the researchers concluded that there was a hereditary influence and a correlation between the risks of anorexia and depression.¹⁸ Another case study compares the clinical descriptives, genetics, treatments, and biological studies of depression and eating disorders. It suggests that there is a stronger connection between bulimia nervosa and depression rather than anorexia nervosa and depression.¹⁹ The model used in this study demonstrated types of pathophysiology and psychopathology conditions in each eating disorder, showing somewhat higher rates of depression in bulimia anorexia and bulimia nervosa patients than in anorexia nervosa patients.¹⁹

Positive imagery cognitive bias modification for treating depression

Although there are no completely effective treatments for depression, positive imagery CBM has yielded promising results.²⁰ The researchers hypothesized that a person with depression can be treated from a computerized mental imagery training program in which the patients create positive images about each of the challenging scenarios. During this treatment period, there was first an in-person session followed by 12 sessions that were completed online. During the first six sessions, audio presentations of training stimuli were used, and patients listened to brief descriptions of everyday situations. These simulations were structured so that they would induce the patients to think about a positive end result for the scenario. One such subject, Theresa, imagined herself in a given scenario and was asked to focus on a positive outcome. In the following six sessions, the training stimuli were ambiguous photographs of mostly everyday scenes paired with short, positive captions. After looking at these pictures, Theresa had to think of a positive mental image that combined the photo and the caption. During all of the sessions, no single stimulus was repeated, and each session had 64 training stimuli arranged into eight blocks of eight scenarios with a general 20-minute self-paced break in between each of the eight blocks. The results of the study showed that people treated with positive imagery CBM

recovered faster and responded better to depression than they had initially experienced.²⁰ Additionally, the trials led to a decrease in symptoms of depression for the patients treated with CBM, and their depression moved to the minimal side of the scale.²⁰ Theresa had depressive episodes since the age of 21 and during the treatment, she was facing her longest episode yet of four years. She stated that the program was helpful and that it seemed to have helped her drastically with her symptoms. She started to become socially involved and got a gym membership, had a greater sense of motivation and started to engage in activities, and felt less anxious about her regular doctor visits. Although Theresa had faced a difficult personal situation after the treatment, she knew how to cope with the returning symptoms of depression because of her experience using positive imagery intervention and was able to help herself without treatment. From this set of results and data, the researchers were able to support their hypothesis that computerized mental imagery would yield positive effects on the treatment of depression.²⁰

Electroconvulsive therapy as a treatment for anorexia nervosa and depression

There are not many treatment options that have been explored for treating anorexia nervosa and depression, but a recent study has shown that symptoms of both anorexia nervosa and depression can be reduced by using electroconvulsive (ECT) and maintenance electroconvulsive therapy (mECT).²¹ In this case, the subject studied had both anorexia nervosa and a major depressive disorder which was diagnosed according to the criteria of the ICD-10, a medical classification list that contains several groups such as codes for diseases, signs and symptoms, and abnormal findings.²² The subject was 21 when she was admitted to the acute ward of the local psychiatric hospital, and her eating disorder began when she was 13 years old. She had several symptoms including reduction of energy, decrease in activity, reduced capacity for enjoyment and interest, diminished appetite, feelings of worthlessness, suicidal thoughts, and delusional thoughts about her body shape and weight; She refused to eat or drink water, tried to vomit aggressively, and exercised all the time as well. Because the symptoms of major depressive disorder were not relieved with antidepressant treatment, ECT was used three times a week. In all, there were 10 ECT sessions in her therapy session, and her Beck Depression Inventory score improved significantly from 35 to 52, suggesting that her symptoms of depression had reduced.²¹ The subject also experienced an improvement of mood, energy, hopefulness, appetite, and a marginal rise in body mass index from 15.0 to 15.3. Following her first 10 sessions, she went through 12 sessions of ECT and 23 mECT's and continued her medicines during the months she didn't have treatment. Overall, ECT and mECT were both efficient in improving the patient's symptoms of depression and improving her mood.²¹

Discussion

Depression and eating disorders are primarily treated by antidepressants and therapy. Since these treatments are not completely effective, we discuss two possible treatments, positive imagery cognitive bias modification (CBM) and electroconvulsive therapy (ECT). We also speculate on the question of whether mental illnesses lead to eating disorders or if eating disorders lead to mental illnesses.

A potential treatment option that can be utilized for patients with depression is positive imagery CBM. This treatment option helps patients with depression and affects everyday life by projecting a happier outcome in daily cognitive and physical activities.²⁰ It also increases optimism in daily life, increases positive expectations of future-oriented cognitive development, and increases activity leading to the reduction of depressive symptoms.²⁰ After recalling the images used during the CBM treatment session, involuntary and voluntary activity have led to positive behaviors and reactions to activities.²⁰ Since the effects of positive imagery intervention are temporary, this treatment can be used as a short-term treatment rather than a long-term treatment option.²⁰ This leads us to question whether positive imagery CBM would be better as a secondary treatment along with a primary one or whether it would be effective enough to be the primary treatment itself. Even though positive imagery CBM treatment has shown to be

successful and provide positive results on patients with depression, further investigations will have to be conducted prior to the global implementation of positive imagery intervention.

Another treatment option is electroconvulsive therapy. There has been a lot of debate regarding the use of ECT for the treatment of depression because of its approach and repercussions. Many of the patients that have been treated with ECT faced impaired cognitive abilities such as memory loss in verbal and cognitive function.²¹ A shop assistant, who was treated using ECT, had an IQ of 116 before the treatment, but after, her IQ dropped to 102.²¹ This led to the debate of whether ECT was effective in the long term or if it was damaging rather than helping the health of patients. Regardless, medical professionals have found that ECT helps about 80--85 percent of people who use the treatment.²³ Considering these facts, the benefits seem to outweigh the risks, and as more studies are conducted on ECT, we see more results about the safety of the treatment being laid out. These results can be used to propose changes to make electroconvulsive therapy safer for patients.

Further speculation has questioned whether eating disorders lead to mental illnesses or if mental illnesses lead to eating disorders. In some cases, physiological changes caused by eating disorders can often negatively affect the mood, leading to mental illnesses.²⁴ People with eating disorders are 50 times more likely to commit suicide, showing the overlap of symptoms between depression and eating disorders, thus suggesting that there is a high likelihood that eating disorders lead to mental illnesses.²⁴ Furthermore, evidence suggests that approximately 50% of the people that are diagnosed with eating disorders also have depression or have had a history of it.²⁴ Moreover, people with eating disorders often feel unhappy, so they try to achieve a physical state of perfection, which often begins with the unhealthy alteration to their diet.²⁴ The possible incidents that lead up to such desires can have underlying causes such as depression, anxiety, or emotional trauma.²⁴ On the other hand, there are situations wherein mental illnesses can lead to eating disorders. In a case study done in Spain, 216 female participants were tested to determine the linkage between the two.²⁵ The study concluded that societal standards such as socially prescribed or self-oriented perfectionism were mediators for the association between depression and eating disorders.²⁵ These studies help give us a better understanding of different patient cases, but the answer to this question of which disorder comes first will vary as there is no definitive explanation.

Studying the link between depression and anorexia nervosa is important in understanding the serious repercussions experienced by patients as well as in advancing available treatment options. Even though the steps required to develop an understanding of what can be done to help a person facing these disorders can seem tedious, this will bring us one step closer to building a connection between the two illnesses. These steps will not only help draw the necessary medical attention to patients with depression and eating disorders but will also end up benefiting the larger realm of medicine as well.

Conclusion

From the evidence presented throughout our paper, we can conclude that there is a significant connection between depression and the eating disorders: anorexia nervosa and bulimia. Both depression and eating disorders are two severe illnesses that require much time and care to be treated. From the bivariate structural equation, the researchers were able to derive that the linkage between depression and eating disorders can be hereditary and/or affected by environmental factors.^{18,19} Although not many invasive treatment options have been discovered for depression or eating disorders, the few available treatment options include electroconvulsive therapy and positive imagery CBM. Both treatments have been effective in patients who suffer from either disorder. Moreover, positive imagery CBM has effects outside of treating disorders such as having a more positive outlook on life and increasing physical activity, which can improve one's lifestyle.²⁰ Future research targeting the fundamental genetic, biochemical, and psychological factors of eating disorders and depression will help formulate more effective and patient-specific therapies.

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