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Jennifer Ess

Western Michigan University, jennieess18@gmail.com

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**EATING DISORDERS: HOSPITALIZATION RATES, GENETICS, AND COVID-19
INFLUENCE**

By

Jennifer Ess

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Supervised by Holly Sisson, MA, AT, ATC

Introduction

The impact of the ongoing COVID-19 pandemic is continuing to be realized as it affects people's personal, family, and work life. Rodgers et al. (2020) reported an increased risk of developing and being diagnosed with an eating disorder during the start of the pandemic as people dealt with social isolation, exposure to media and social media regarding diets and exercise plans, and a disruption to daily activities such as physical activity, sleep, and work life. For some, the pandemic also increased financial burdens as some people were either out of work or needed to reduce work hours to take care of their children since schools and daycares closed. Financial burdens can be related to an increased amount of stress. The body's response to stress can manifest as physiological and/or emotional distress (Agostino et al., 2021).

Aspects of physiological distress include rapid heart rate, elevated blood pressure, fatigue, and insomnia (Xie et al., 2022). Xie et al. (2022) described the link between the COVID-19 virus and cardiovascular complications including arrhythmias, palpitations, and myocarditis. In fact, COVID-19 infections have contributed to about 15 million new heart disease cases (Xie et al., 2022). While heart conditions can be the result of a variety of causes, (Casiero & Frishman, 2006) discussed the negative association between eating disorders and cardiovascular health.

Like the mentioned physiological issues, emotional distress impacts a person's overall health and wellness. For example, Asch et al. (2021) reported cases of depression, anxiety, substance use/abuse, and eating disorders have continued to increase as the pandemic continues. While each of these disorders were prevalent prior to the pandemic, the initial isolation period that started in March 2020 amplified these concerns. Agostino et al. (2021) specifically highlighted the increase in hospital admissions for eating disorders in Canada during the first year of the pandemic. While people may recognize how COVID-19 has drastically impacted

individual's mental and physical health, the acknowledgement surrounding the COVID-19 pandemic and an increase in reported eating disorders is less known. Since eating disorders are often not frequently discussed as an issue related to the overall health and well-being of people, the purpose of this study is to examine the impact of the COVID-19 pandemic on reported or newly diagnosed eating disorders as well as review the neurological factors which may influence or make a person more vulnerable to eating disorders.

During the pandemic, many people found their home life altered such as when and what people ate, sleep schedules, exercise routines, and how connected people felt with their friends (Agostino et al., 2021). For children and teens, the isolation and reliance on technology made them more vulnerable and open to negative experiences such as poor information regarding diets and exercise (Agostino et al., 2021). To improve their bodies, aggressive workout routines and food restrictions such as trying low-calorie diets increased the number of people impacted by a form of eating disorder (Rodgers et al., 2020). Eating disorders have always been their own epidemic and the ongoing pandemic has amplified the number of reported cases. Otto et al. (2021) reported that hospitalizations for eating disorders increased 123% from April 1, 2020 to March 31, 2021. The average admission for this time rose to 125 new patients up from 56 admissions from each of the three years before the pandemic over the same date range.

There are many causes and triggers for eating disorders which can include pressure in certain sports, genetic influences, and opinions of friends and family (Devoe et al., 2022). For someone already struggling with body dysmorphia and/or other body image issues, these triggers contribute to a person's downfall to disordered eating. One of the largest triggers for eating disorders and body image issues is social media, which became many people's only connection to each other during the 2020 COVID-19 pandemic lockdowns (Health & Medical Journalist, 2021). Journalism students at the University of Georgia interviewed several students who felt the

pandemic contributed to their disordered eating (Health & Medical Journalist, 2021). TikTok and Instagram were specifically cited by interviewees as where they were bombarded with content from other viewers and advertisers regarding different diets, supplements, and workouts which triggered their eating disorders as well as the lack of perceived support during quarantine (Health & Medical Journalist, 2021).

For example, TikTok saw several weight loss or get fit challenges during the early days of the pandemic. During the first month, the trend called the “Quarantine-15” was popular to avoid gaining weight during the pandemic and had users document their daily workouts. Another example was the “2-week shred challenge” by Chloe Ting, a certified personal trainer and YouTube content creator, where women and girls were constantly exposed to unrealistic body standards and videos that touted unattainable body images for workouts leading to weight loss and specific body types such as “Tiny Waist and Round Butt.” When promised something so elusive such as the “perfect body” with no results to show for after following a plan, a person's mindset about how and what they are eating can change. In fact, some TikTok users insisted that the Quarantine-15 would be 15 pounds lost instead of just working to not gain 15 pounds.

Social media is not screened to verify the legitimacy of the claims of those who share content and, by targeting users who view content relating to eating healthy, dieting, and exercise programs, often increasing the triggering content for viewers who already have eating disorders. Constantly being flooded with images of people who look camera ready can be harmful to someone's self-esteem and mental health, especially when in quarantine and have little in-person contact from your support system. Eating disorders are not always about weight loss and body image but can also be about control. An NPR interview highlighted the struggles of a 15-year-old Grand Rapids, Michigan resident who shared her story about how the pandemic contributed to her eating disorder. While managing her anorexia diagnosis during the ongoing pandemic,

Haywood stated “People are dying. Everyone is getting sick. You cannot see your friends. It was hard because I felt like I didn’t have any control over anything except what I ate and how I exercised” (Wells, 2021).

Methods

Since I was unable to get specific data on hospital admissions for eating disorder rates during the pandemic, my methodology is a review of the current literature surrounding the kinds and prevalence of eating disorders from 2018-2022. Initially, I started with a Google Scholar search using the terms “eating disorders” and “COVID-19 pandemic” which produced 67,000 peer-reviewed research articles. Next, I selected the date range for when the study was published to 2018 to 2022 which narrowed down the search to 150 articles. I continued to narrow down the results by using the search terms “eating disorders and COVID-19 pandemic and hospitalization rates” during the same period which resulted in 75 peer-reviewed articles to better explore how hospitalization rates changed during the pandemic. From the list of 75 articles, I individually reviewed each title and abstract for information relating to my purpose statement using the inclusion and exclusion criteria in Figure 1.

Figure 1

Literature Review Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Published study in peer-reviewed journal	Study is an evaluation of prior data
Focuses on eating disorders in relation to COVID	No mention of eating disorders
Focuses on eating disorders and the influences	Mention of telemedicine
Talked about hospitalization rates with eating disorders	Only covers mental health
Psychiatric trends including eating disorders	Countries outside of the U.S. and Canada
Isolation/quarantine	Suicide indications

Of the 75 search results, 12 articles were left which focused specifically on eating disorder prevalence and incidence during the pandemic and reported contributing causes such as

the isolation during the initial 2020 quarantine. The following literature review will describe what eating disorders are, what are some of the contributing factors such as various kinds of dieting, and how the COVID-19 pandemic contributed to the prevalence of eating disorders in the United States (U.S.) and Canada.

Literature Review

Overview of Eating Disorders

Eating disorders are extraordinarily complex illnesses which have numerous causes. The range of diagnoses categorized as eating disorders adds to the complexity of understanding and treating patients with such disorders. The three most common eating disorders are anorexia nervosa, bulimia nervosa, and eating disorders not otherwise specified (Fairburn & Bohn, 2005). Anorexia nervosa is characterized by an abnormally low body weight, as well as an immense fear of gaining weight (National Association of Anorexia Nervosa and Associated Disorders, 2022). Anorexia is often associated with a low-calorie diet or when a person does an excessive amount of exercise to “work off” the calories eaten. Using an excessive amount of exercise to control caloric expenditure and body image is called anorexia athletica (Sudi et al., 2004).

Bulimia nervosa is characterized as a person whose weight is normal, but they binge eat followed by purging what they ate to avoid weight gain. Eating disorders not otherwise specified or EDNOS is one of the most dangerous eating disorders and is also the most common, as about 70% of all eating disorders fall under EDNOS (Fairburn & Bohn, 2005). EDNOS is an eating disorder in which a person may display similar characteristics of other eating disorders, but the behaviors do not fit the full criteria of the Diagnostic and Statistical Manual of Mental Disorders Fifth Edition (DSM-5) classified eating disorders (Fairburn & Bohn, 2005). Since EDNOS is more of a catch-all diagnosis, individuals may not acknowledge EDNOS as life-threatening as other eating disorders such as anorexia and bulimia nervosa.

Eating disorders are often not well understood which has prompted awareness campaigns around educational materials. Education about eating disorders prior to the year 2020 focused on risk factors regarding environmental, family, and societal issues (Fairburn & Brownell, 2002). Certain personality traits may put someone more at risk of developing an eating disorder. For example, Fairburn and Brownell (2002) acknowledged individuals who have personality traits such as perfectionism, obsessionality, or extreme compliance tend to be more at risk for developing an eating disorder, specifically anorexia.

Fad Diets

Past eating disorder research focused on fad diets including Atkins, ketogenic (Keto), and Paleolithic (paleo) diets. Most fad diets promise unrealistic goals of extreme weight loss in an impractical time (Khawandanah & Tewfik, 2016). Unhealthy diets or weight loss goals can lead to someone developing an eating disorder. Khawandanah and Tewfik (2016) in their review of the literature on fad diets explained how the advertisement of these diets can cause eating disorders through unrealistic body transformations through unhealthy weight and body image goals. Fad diets are often unsustainable and can bring detrimental side effects to people who have other pre-existing or a history of certain medical conditions such as cardiovascular disease.

Currently, intermittent fasting has been gaining more traction as a diet plan. Intermittent fasting limits food intake during a specific time schedule. For example, periodic fasting occurs when individuals eat a normal diet for 5 days of the week, then pick 2 days of fasting which involves minimal calories or none. Another example is the 16:8 diet, fasting for 16 hours and eating for 8, normally starting at 12pm and having the last meal before 8 pm (Cuccolo et al., 2021). While fasting is sometimes associated with certain religious practices such as Ramadan, fasting can be dangerous if not done properly as it limits a person's energy intake through food and may contribute to dehydration if also limiting water intake. In a survey about how people

implement intermittent fasting, Cuccolo et al. (2021) found intermittent fasting as a diet plan has been associated with binge eating disorder (BED) and bulimia nervosa based on the responses of 176 participants. Fasting can lead to an increase in the stress hormone cortisol, which can lead to more food cravings resulting in overeating and binge eating (Cuccolo et al., 2021).

Neurobiology and Neuroscience of Eating Disorders

While most people believe eating disorders solely stem from culture and environment, there is a neurobiological influence in the causes and thoughts of someone with an eating disorder. Bulik et al. (2019) reviewed the current literature regarding the genetics of eating disorders and found some of the research on eating disorders has shifted the focus away from external causes such as environment to potential internal factors such as genetic risk factors by discussing psychiatric genetics and family studies done on eating disorder genetics. de Jorge Martínez et al. (2022) provided an overview of genome studies related to anorexia nervosa in which relatives of anorexia nervosa patients are 11-times more likely to develop an eating disorder than individuals related to a healthy individual. As it has become easier to share information, educational campaigns have been utilized to inform individuals on the lasting effect of eating disorders and related health complications.

Building off this, research regarding neuroscience and neurobiology relative to eating disorders has become more common. For example, Frank et al.'s (2020) literature review on the neurobiology of eating disorders discussed how individuals with anorexia nervosa showed altered cognition and reward circuits in relation to food in fMRI scans. The alterations in cognition related to a person's neural pathways and neurotransmitters. For example, the hypothalamus, where the brain's rewards system is located, communicates using the neurotransmitter dopamine (Kodali et al., 2020).

Kodali et al. (2020) described how an increase in dopamine was found in patients with anorexia nervosa and a decrease of dopamine in patients with bulimia nervosa. Understanding how eating disorders impact dopamine levels in the brain is important since these levels can also be negatively impacted by social isolation (Mumtaz et al., 2018). Connecting this to the impact of the pandemic, the social isolation of quarantine during 2020 would have caused a decrease in dopamine and the rewards individuals get by having control or boosting their mood through social interactions. Since their mood was already negatively affected through decreased dopamine levels, individuals looking to gain back control or who had a history of disordered eating were more at risk for developing an eating disorder.

Along with alterations of neurotransmitters in patients with eating disorders, Bulik et al. (2019) found genetic heritability can contribute up to 50-80% of a person's risk for developing an eating disorder. Kodali et al. (2020) summarized the recent literature regarding a genetic predisposition to developing an eating disorder. For example, genes on several chromosomes may contribute to anorexia nervosa as these relate to the dysregulation of metabolism, hunger regulatory systems, and reward pathways (Kodali et al., 2020). Additionally, multiple regions on chromosomes 2 and 13 have been linked to obsessive tendencies and a drive for thinness as well as 128 polymorphisms in 43 genes which have been associated to an onset of anorexia nervosa (Kodali et al., 2020). This is also important as an individual's brain chemistry changes when they are in social isolation (Mumtaz et al., 2018) and having a genetic predisposition can make an individual more vulnerable to an eating disorder.

Prevalence of Eating Disorders During the COVID-19 Pandemic

COVID-19 has had serious mental health consequences for all individuals, specifically those with previous conditions such as eating disorders. Otto et al. (2021) performed a chart review of admitted patients to a local hospital in Ann Arbor, Michigan between April 2020

through March 2021 which showed a drastic increase in admissions for eating disorders. Between those years, admissions more than doubled from the years previous going from 54 to 123. Temorshuizen et al. (2020) conducted a study of 511 participants from the United States and 510 participants from the Netherlands who completed an online survey regarding eating disorder symptoms in relation to eating disorders. This study found individuals with previous diagnosis stated their symptoms worsened throughout the pandemic (Temorshuizen et al., 2020).

Agostino et al. (2021) described how the COVID-19 pandemic has been attributed to a rise in new-onset anorexia nervosa and atypical anorexia cases in Canada with a sample of 1,883 patients. The incidence of anorexia increased from 24.5 to 40.6 cases per month with hospitalizations increasing from 7.5 to 20 per month in children and adolescents in Canada (Agostino et al., 2021). Whereas Asch et al.'s (2021) cross-sectional study with 3,281,366 patients focused on adults in the United States with a reported eating disorder where an upward trend of outpatient care for eating disorders increased by about four more patients a month. Additionally, there was an even larger upsurge of people seeking inpatient treatment with these numbers doubling after May 2020 (Asch et al., 2021). Not only did the number of patients increase, but the length of stay/treatment increased as well. Prior to the pandemic, the average inpatient stay from June to December 2018 was nine days. Whereas, during the same period in 2020, the average length of inpatient treatment increased to 12 days (Asch et al., 2021).

Eating Disorder Prevalence in the U.S. and Canada

There have been many studies that have shown a correlation between COVID and eating disorder rates in many different countries; however, the United States and Canada have shown a tremendous uprising in hospitalization rates with eating disorders. Both studies have shown rates from pre and post vaccination pandemic, and the comparison of the two are similar in the sense that both had shown an increase in inpatient and outpatient treatments for eating disorders.

However, comparing the increase in numbers is difficult due to the large variation in sample sizes collected. While the Canadian study had 1,883 patients (Agostino et al., 2021), the United States study had 3,281,366 patients with only around 20,000 of the 3.2 million patients being diagnosed with an eating disorder (Asch et al., 2021).

Agostino et al.'s (2021) Canadian study focused on eating disorder metrics from six different hospitals across the country: Montreal Children's Hospital; Alberta Children Hospital; British Columbia Children's Hospital; McMasters Children's Hospital; Sainte Justine Hospital; and Janeway Children's Hospital. While Asch et al.'s (2021) U.S. study focused on eating disorders, additional information regarding other behavioral disorders such as depression/anxiety, bipolar, and alcohol/substance abuse were also collected which increased the overall sample size of the study.

Reported Eating Disorders in the United Kingdom and Australia

Eating disorder cases rose in other countries besides the United States and Canada during the pandemic. Phillipou et al. (2020) surveyed 5,469 Australian participants, where 150 participants reported a previous eating disorder diagnosis. Participants answered questions about changes to their eating patterns as part of the COVID-19 and you: mental health in Australia now survey (COLLATE) project. Both groups, the previously diagnosed and not previously diagnosed, reported an increase in food restriction, bingeing, purging, and overeating during the COVID-19 pandemic (Phillipou et al., 2020). In Branley-Bell and Talbot (2020) mixed methods study in the United Kingdom, participants described how their symptoms got worse when the pandemic hit. The 129 respondents were either currently battling an eating disorder or were in recovery from one. Isolation caused by the initial COVID-19 quarantine period in 2020 negatively affected people who struggling with eating disorders (Brandley-Bell & Talbot, 2020).

Discussion

This paper discussed a connection between the COVID-19 pandemic and a rise in reported eating disorder cases. The drastic increase of 123% hospitalizations per month reported in Agostino et al. (2021) connects to my purpose statement regarding how the pandemic may have impacted eating disorder prevalence. Additionally, Agostino et al. (2021) found the pandemic to have a severe impact on individuals previously diagnosed, newly diagnosed, or undiagnosed with an eating disorder. Asch et al. (2021) not only discussed the increased number of patients with a diagnosed eating disorder or hospitalization for one, but also highlighted how inpatient hospital stays for eating disorders increased from nine days to 12 days. Overall, my review of the literature confirmed and supported my suspicion that the COVID-19 pandemic contributed to a rise in eating disorders due to the isolation, stress, and lack of control felt by individuals during the on-going pandemic with those already struggling with disordered eating and eating disorders to be at higher risk for hospitalization.

Conclusion

There were several limitations to this study. First and foremost was the challenge of accessing secondary data regarding hospitalization rates of patients diagnosed or treated with an eating disorder from 2018-2022. Due to the Health Insurance Portability and Accountability Act (HIPAA), hospitals and clinics could not share data or information to protect patients' privacy. Researchers who had gained access to similar data were also unable or unwilling to share their data. As a result, my study became a literature review which allowed me to utilize the information I had collected regarding eating disorders and expand on it.

Although there is a significant amount of research about eating disorders, there is still aspects about eating disorders that are unknown or just starting to be researched. For example, we need to know more about the recovery process such as what it looks like, where to go, and the relapse occurrence of eating disorders. Another aspect that is extremely important to know is

how to help someone struggling with an eating disorder since both the disorders and individuals struggling with them are so complex. Finding the best way to communicate with someone about their eating disorder can be difficult as creating a safe and trusting environment can be hard. Individuals with an eating disorder may not always know what they are doing is wrong, so finding the proper way to encourage and help them without being too overbearing or controlling can also be difficult. Hopefully, as we learn more about causes and contributing factors to the prevalence of eating disorders more preventative measures can be implemented along with early recognition of eating disorders which could help decrease hospitalization rates and the length of stays required of individuals who struggle with eating disorders.

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