

THE INFLUENCES OF COVID-19 PANDEMIC ON PATIENT WITH EATING DISORDERS - A LITERATURE REVIEW

ABSTRACT

Introduction: Physical consequences have garnered the greatest attention during the coronavirus pandemic lockdowns, and few studies have studied the link between the COVID-19 lockdown and pre-existing mental health difficulties such as eating disorders (ED). Our main goal was to assess the impact of the COVID-19 pandemic on individuals suffering from ED.

Method: We searched the online databases PubMed, ScienceDirect, and Springer for scientific articles published after September 2022 that studied the impact of coronavirus lockdowns on patients with ED. The authors analyzed 40 out of 76 publications that had the qualifying criteria. Most of these studies underline an increase in eating disorders prevalence and a list of associated behaviors related to the COVID-19 pandemic impact.

Results: Young adults are more prone to eating disorders during the COVID-19 pandemic, and the individuals in hospital are suffered more from disordered eating behaviors. Disruption of lifestyle routine, social isolation, restricted access to customary support networks, limited or no access to healthcare and mental health services, and social anxiety were all related to symptomatic worsening in ED patients during COVID-19 lockdowns. We identified a large increase in hospitalizations during the pandemic, as well as an increase in EDs symptoms and mental health concerns among ED patients.

Conclusion: This study identifies children and adolescents, as well as adults with a history of an eating disorder, as particularly sensitive populations to the COVID-19 pandemic's effects. More research in understudied and minority populations is needed, as well as an examination of the long-term effects of the COVID-19 pandemic on eating behaviors.

Keywords: Eating Disorders, anorexia nervosa, bulimia nervosa, COVID-19

1. INTRODUCTION

1.1 COVID 19 outbreak

Coronaviridae is a family of viruses containing positive-sense RNA which mainly causes respiratory disorders in humans, such as the common cold and pneumonia, as well as respiratory infections [1-3]. Almost a decade after the SARS pandemic in 2003, the MERS (Middle East respiratory illness) epidemic caused by the MERS-CoV started in China's Guangdong region in 2012 [4-7]. In December 2019, a new coronavirus (2019-nCoV) emerged in Wuhan, China, approximately seven years after the MERS 2012 pandemic [8-14]. On December 31, 2019, the World Health Organization (WHO) received some reports regarding some patients in Wuhan, China with pneumonia-related symptoms after that, the researchers found a new type of coronavirus named 2019-nCoV caused those symptoms, and WHO stated on 9 January 2020 that the patients affected by new virus should be kept in isolation from others [9, 10, 13, 15]. The World Health Organization claimed the outbreak to be a pandemic globally on 11th March, 2020 [10, 13, 14, 16].

1.2 COVID 19's limitations on our daily life

The COVID-19 pandemic introduced limitations on daily living and mostly it causes behavioral changes and mental trauma [17, 18]. Several protective measures were taken all over the world such as country wide lockdown, closing institutions, isolating affected individuals, quarantining suspected cases, then confining conventional movements to minimize viral transmission at the community level [19, 20]. This affected the mental health, change in daily and eating habits [9, 19-24].

1.3 Eating disorder (ED)

Eating disorders are psychological problems defined by significant and persistent disruption in eating patterns and painful thoughts and emotions [25, 26]. Types include binge consuming disorder, anorexia nervosa, bulimia nervosa, and pica which are frequently connected with food, weight, or shape preoccupations, as well as anxiety over consuming or the repercussions of eating specific foods [25]. Eating disorders are characterized by behaviors such as restrictive eating or avoidance of specific foods, binge eating, purging through vomiting or laxative abuse, and obsessive exercise [25]. Anxiety disorders, despair then matter abuse are common among humans together with eating disorders [27]. People fast journey comorbidity within an ingesting disorder then OCD which is estimated 20-60% regarding sufferers together with an ED bear a history over OCD [28].

1.4 COVID-19 pandemic's impact on eating behavior

It is assumed that eating disorders are increased due to many COVID-19 control actions namely, lockdown measures and social limitations [29]. According to a recent study, it has been found out that the COVID-19 pandemic has affected the eating habits of the general population. For

instance. **Variations** of food consumed, uncontrolled eating, and less organized meals have worsened than they were before the pandemic [30]. About 9% global population **is** said to be impacted by eating disorders and it is believed to be one of the most dangerous mental conditions [31]. According to eating disorder specialists, it is said that the intensity of symptoms and the extent of recurrence may be negatively affected in eating disorder patients because of **coronavirus** pandemic [32-35]. Again, the pandemic is also responsible for unexpected **effects on** eating disorder patients. For instance. Interruption in daily **routines** such as absence from school and work, a rise in social isolation from people, mental trauma, and family distress and anxiety are also elevated [30]. There are four different ways in which the COVID-19 lockdowns lead to the symptoms of eating disorder. Firstly, the change which occurs in life. Restrictions in accessing healthcare facilities, constraints in travel, and distance from grocery outlets may **change in the lifestyle** of people with eating disorders [36]. It has been advised in several countries to restrict grocery trips to induce social isolation in public places. For this reason, people who have eating disorders tend to buy excessive amounts of food [35]. Second of all, the usage of social media is increased. As there are limitations in outdoor activities and physical interactions, people depend on browsing the internet. Social media might affect eating disorders by exposing inaccurate body images, false stories and unpleasant news [37]. Additionally, irregular eating habits get worsened due to easy access to food [24]. According to a food survey conducted in Denmark, the eating habits of people have been **changed during** this pandemic and they started preferring foods that are heavy in sugar and fat [23]. Since the beginning of **the** pandemic, the average sales of frozen food, cakes, snacks, and other foods have rocketed whereas the amount of consuming fresh vegetables and fruits decreased [23]. Last but not the least, the sudden lockdown and the negativity of **the coronavirus** are responsible for making people with eating disorders more stressed and changes in their appetite [37]. Although there is a huge amount of evidence, no comprehensive assessment conducted on the topic called effects of **coronavirus** pandemic on eating disorder patients on the basis of symptoms, body mass index, and hospitalizations outcome [22]. A few numbers of studies which have been published on this topic and they are guided by particular inclusion and exclusion. As an example, these studies examine a particular eating disorder namely anorexia nervosa, and exclude people with disordered eating habits [38-40].

1.5 Aim of the study

This study aimed to find a correlation between the COVID-19 pandemic and eating disorders symptoms by systemically reviewing scientific literature findings and analyzing the factors responsible for changes in eating disorders. The results will help the hospital's management and government policy to prevent the ED patient's symptoms from worsening and assist in the upcoming pandemic monitoring procedure.

2. METHODOLOGY

2.1 Literature searching

The review started in September 2022 but persisted with similarly timed updates in November 2022. For the study, describing the incidence of ED during the COVID-19 pandemic was once beyond the reach of famous ternary databases like PubMed, ScienceDirect, and Springer. These databases were selected because they probably conform with the relevant effects because of the research subject and the determination criteria. The authors used synonyms and other related words of an eating disorder to search literature from those databases.

2.2 Literature screening and data referencing

The records from the databases were incorporated into an MS Excel sheet and assembled or examined in terms of the year of publication, authors, sample, country, and kind of study. The pattern sizes, lousy discipline parameters, study design, outcomes, and accomplishment findings for each lesson have been retrieved for review. Finally, EndNote 20.4 software was used for bibliographic referencing.

2.3 Literature selection for review

Electronic database searches recognized 850 records, and after eliminating repeated and irrelevant records, 76 articles were chosen based on the following criteria:

- 1) Published articles before September 2020 were not considered for review purposes to confirm the authenticity that the study was held during the COVID pandemic.
- 2) Same articles from different databases were eliminated.
- 3) The studies which were performed not only to assess ED but also many other health issues were tried to reject for this review.
- 4) The authors selected only those studies which assessed ED as well as mental behavior during the COVID pandemic.

Overall, 40 scientific articles from 76 were included in this systemic review, and the rest of them were kept for future studies purpose. The authors have a plan to review the prevalence of mental disorders among individuals who have suffered from ED during the COVID-19 pandemic.

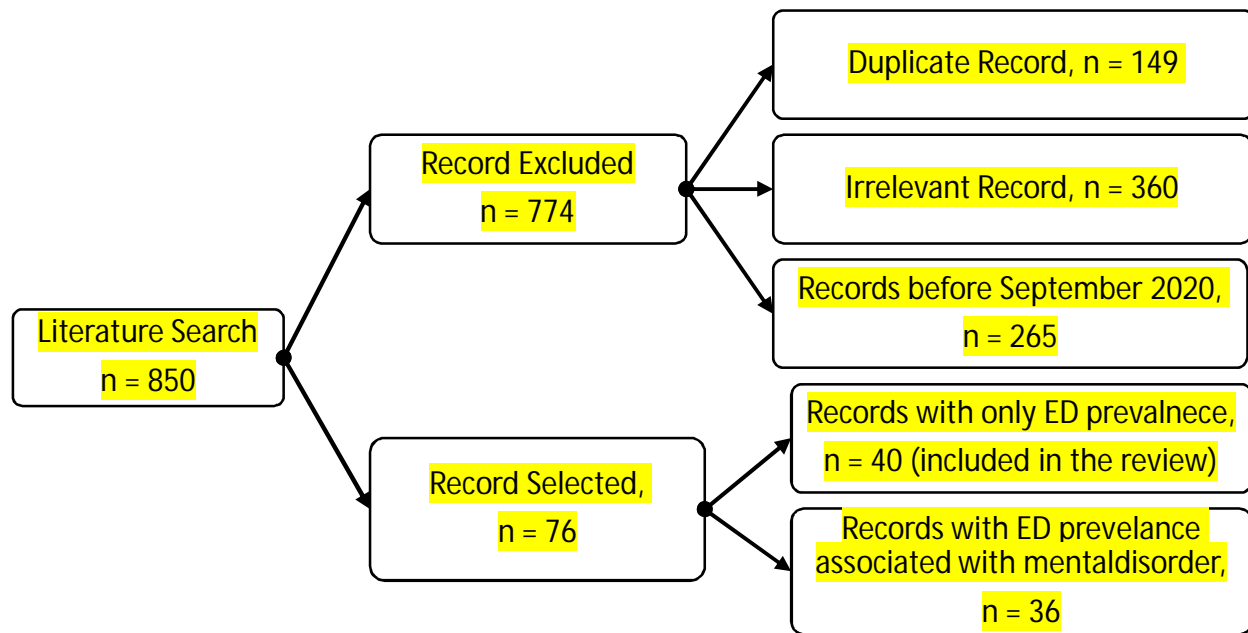


Figure 1: Literature selection flow chart

3. RESULT

3.1 Eating disorder assessment on general people

The Eating Attitude Test 26 (EAT-26) was used by Trott et al. (2021) to examine the alteration in eating disorders symptoms during the lockdown period, and they found that addiction to exercise was significantly lower, and the symptoms of eating disorder during the post-COVID-19 lockdowns were significantly increased [41]. Additionally, Pre-COVID-19 and post-first lockdown food and exercise habits were compared. After COVID-19, the average score increased greatly which indicates that lockdown quarantine could have a great effect on morbid eating behaviors [41].

The 7-Item Binge-Eating Disorder Screener was used by Cecchetto and his team to investigate ED psychopathology and the Dutch Eating Behavior Questionnaire was used to examine emotional eating during the lockdown of the pandemic and their findings showed that isolation and confinement have a detrimental impact on emotional well-being and, consequently, eating habits [42]. According to data from 365 Italian citizens analyzed by them, more emotional eating was predicted by higher sadness, anxiety, personal connection quality, and quality of life, whereas increased bingeing was indicated by higher stress [42]. Furthermore, they discovered that greater alexithymia scores were linked to increased emotional eating, whereas higher BMI scores were linked to both increased emotional eating and binge eating [42].

Again, Machado and his fellow colleagues conducted a study during lockdown in Portugal on 2,028 female students to assess ED symptoms by using "Eating Disorder Examination-

Questionnaire” and also, they arranged an oral examination on this assessment [43]. Machado and his team mates found that 3.06% of young females were prevalent in all ED, 0.39% for anorexia nervosa, 0.30% for bulimia nervosa, and 2.37% for ED not otherwise specified (EDNOS) [43].

According to the findings of Branley-Bell, the epidemic was having a profoundly harmful influence on those who have experienced ED which was assessed by a 5-point Likert Scale survey questions [44]. Participants in five trials emphasized the theme of isolation, and they indicated that loneliness, anxiety, and despair caused by remaining at home led to the exacerbation of ED symptoms [44-48].

3.2 Eating behavioral change after hospital admission

Eleven research evaluated admittance discrepancies before and after the pandemic, with unique findings ranging from 0% to 123% [49-59]. Though the aggregated hospital admissions from the trials revealed a 48% increase in ED admissions during the pandemic compared to earlier time points, when comparing pediatric admissions to adult admissions, there was an average rise of 83% in pediatric admissions and only a 16% increase in adult admissions [50, 51, 55, 57]. According to Parsons and his colleagues, COVID-19 has had an influence on three major areas: the experience of persons with eating disorders, the experience of service providers, and the impact on the family situation [58]. Another researcher Gabriella Springall raise voice on COVID-19 restrictions and reported that it triggered eating disorder symptoms in 40.4% of patients who were diagnosed with anorexia nervosa in 2020 [59]. Ayton and his teammates conducted a study on 351 referrals for admission, of which 97% were female and 95% were diagnosed with anorexia nervosa. Interestingly, the number of referrals with eating disorders has increased by 21% after the pandemic, which may indicate the relationship between COVID-19 and eating disorders [54]. Miss Sara J Hansen also performed a study on referrals for admission and hospitably admitted individuals (n=106) in New Zealand, by which she found that ED patients significantly increased during countrywide lockdown [56]. Richardson et al. conducted a thematic analysis of instant chat communications with the National Eating Disorder Information Centre during the pandemic year and highlighted lack of access to treatment, increasing symptoms, feeling out of control, and a desire for support as major themes [60].

Individuals with EDs had both positive and negative attitudes toward telemedicine during the pandemic; the majority indicated satisfaction with telehealth/remote therapy, but others pointed out its limitations, such as technological obstacles or difficulty monitoring one's own weight [61-63].

3.3 COVID-19 exacerbation of eating disorder behavioral symptoms on adolescent

Many scientific studies and systematic reviews among adults and adolescents have been conducted from 2021 to date on eating disorder exacerbations during the coronavirus disease pandemic of 2019, and the authors found mixed results from these studies. Five studies conducted an investigation through retrospective analysis to examine eating disorder conditions

in hospitals or inpatient units where the COVID-19 pandemic was found to be connected with an increasing number of young individuals immediately requiring medical attention [50-53, 64].

Touyz and his friends found that those who were unable to go to the gym due to the COVID pandemic had heightened concerns about gaining weight and anorexia nervosa (AN) [34]. Similarly, many athletes stayed at home for more time due to the quarantine period and consumed more food, which imbalanced the calorie level and caused weight gain because of less exercise, which resulted in bulimia nervosa (BN) for them [34]. Buckley et al. found an increase in disordered eating in their sample of current and past adult athletes, including 21.1% of those with a diagnosable eating disorder and 32.8% with self-reported worsened food interactions at this early stage of the pandemic [65]. The researchers also analyzed the data and concluded that inhibitory food control and binge eating were the primary causes of disordered eating [65]. In November 2021, Linardon and his colleagues performed a subsequent scoping review on some studies executed on some adult individuals in an at-risk population, including athletes with proven ED who were more vulnerable to pandemic symptom escalation [66]. COVID-19 had a rapid influence on adolescents with ED, causing an increase in symptoms and impairment and the need for prompt therapy. A study was conducted by Graell and his colleagues, who reported that the emergence of eating disorder symptoms in adolescents was higher than in children as of March 2020 [49]. They found that anorexia nervosa and restrictive eating disorders predominated among adolescent and school-age patients, and about 41.9% of participants reported the recurrence of eating disorder symptoms during the lockdown period [49].

Spettigue and his fellow team members executed a comparison study from April 2020 to October 2020 on some teenage participants who reported an ED prior to the COVID pandemic and those who resented during the COVID pandemic [53]. From this study, Spettigue and his fellow team members found that the adolescents who were reported with ED symptoms during the pandemic had lower percentages of target weights, greater rates of self-reported impairment, and were much more likely to be medically unstable and require hospitalization [53].

Haghshomar et al., in a meta-analysis of adolescent subjects with ages ranging from 13 to 70, found that 59.65% of the 7848 samples had a prevalence of binge eating exacerbation, food restriction, purging behaviors, and anxiety about food intake [67]. To the best of these authors' knowledge, no investigations on COVID-19 teenage athletes' worsening of ED behavioral symptoms have been done. Nonetheless, the available evidence implies that their symptoms will intensify as the pandemic persists. Guanghai Wang and Hatice Ünver observed that, when youngsters stay at home and restrict their outside activities, they may become less physically active; socially isolated from their customary surroundings and bereft of peer relationships; spend significantly more time viewing screens; have erratic sleep patterns and eating behavior [68, 69].

3.4 Impact of COVID-19 factors associated on eating behaviors

The majority of the researchers reported that there is a connection between factors associated with the COVID-19 pandemic and the rising in eating disorder symptoms in which the main

themes behind COVID-19 pandemic were uncontrolled **overeating**, restrictions to receiving professional treatment, recovery, and worsening of symptoms, efforts to self-manage treatment, **an** increase of anxiety and stress, benefits of lockdown such as less social pressure [70]. A common factor revealed by five studies that corresponded to negative experiences of patients with **ED** during the pandemic was disruptions in routine or a lack of structure, as well as a loss of control [44-48]. Three studies found that triggering messages in the media were a factor in the worsening of eating disorder symptoms [44, 47, 48]. According to them, social media and mainstream media messaging typically focused on the general worry of gaining weight; topics such as exercising and eating healthily during the epidemic, as well as diet discourse, were identified as stressful and triggering for people with eating disorders [44, 47, 48].

In **another** study, it was revealed by the participants, particularly the eating disorder patients, that the lockdown and quarantine procedures led to alterations in daily activities, surroundings, and social context [71, 72]. Additionally, these extreme variations in daily life made the patients more sensitive to side effects namely, increased binge eating frequency [72]. The findings were confirmed by Machado et al., where **the** majority of the participants thought that lockdown had a moderately significantly detrimental effect on their daily lives including problems with emotional regulation, restrictions in accessing healthcare services, and worsening of eating disorder symptoms [43].

3.5 Impacts on eating disordered patients

It was found in a study that patients with Anorexia Nervosa gradually gained weight as well as their eating disorder symptoms improved during the lockdown period [73]. The study illustrated the key ideas regarding COVID-19 pandemic in adolescent anorexic nervosa patients which showed both the worsening and **improvement** of **ED** symptoms in patients [73]. For instance, patients experienced an increase in anorexia nervosa-related cognitions and behaviors when they felt isolated at home and accompanied by family members [73]. In addition, it also highlighted how patients provided greater consideration to their “personal needs” because of less stress from attending school and socializing [62]. Moreover, bulimia nervosa patients contained **fewer** episodes of binge-eating during lockdown period which is found in a survey [74].

3.6 Improvement in eating disorder symptoms

In a study, **the** majority **of** participants (86.7%) experienced an increase in eating disorder symptoms, whereas only two patients claimed that their symptoms showed slight improvement during the lockdown while 25.7% said their symptoms got worsened [44]. There are four studies found that focused on the positive sides of COVID-19 pandemic, which allowed participants to consider and control their symptoms of **ED** leading to improving their state [46, 48, 62, 63]. Graell et al. investigated that 80% **of** children and adolescents of the total participants claimed that their family relationships have enhanced during the eight weeks of confinement stage and that is because of the reduction in the symptoms of anorexia nervosa [49]. There are six studies that showed positive outcomes **where** the individuals claimed that lockdown restrictions

protected them from past trauma or triggers and they got time to take care of themselves and increased social support sometimes [44, 46, 48, 61-63]. According to two studies, there were no variations in eating disorders or disordered eating behaviors connected to COVID-19 pandemic [70, 75]. In a study, the symptoms of eating disorder patients were the same for all participants during the pandemic [70]. Again, as per two investigations, there were not any differences in the disordered eating behaviors namely, binge eating, purging, or exercising during COVID-19 pandemic [75, 76].

4. DISCUSSION

Eating disorders are defined as the disturbance of eating behavior associated with extreme concern about body weight which harms one's physical or psychological health [77]. Anorexia nervosa, bulimia nervosa, and atypical eating disorders are the three diagnostic classifications of eating disorders [78, 79]. As the characteristics of these disorders are similar, patients often switch between the disorders. The factors behind eating disorders are sophisticated and poorly understood [78]. The restriction of nutritional intake in comparison to needs which leads to significantly low body weight is known as anorexia nervosa [79]. The characteristics of this eating disorder include distorted body image, phobia of gaining weight, and an inability to understand the severity of the disease [79]. Eating disorders may have detrimental impacts on many stages of life such as physical, mental, and social difficulties that can degrade quality of life (QOL) [80]. The effects of lockdown measures are correlated with the coronavirus pandemic and the purpose of our study to investigate the connection between eating disorders and the lockdown of the COVID-19 pandemic. This study particularly aimed to examine whether the eating disorder symptoms worsened during COVID-19 lockdown period. The study indicates that patients with eating disorders experienced worsening symptoms during the lockdown period of COVID-19 as well as disordered eating behavior exacerbated. Among these patients, the probability of recurrence or worsening of symptoms was increased due to changes in social and home environment, self-isolation, and disturbance in accessing healthcare facilities [81]. Many people might find it hard to manage compensatory activities such as physical exercise because of lockdown measures and it has made their preoccupation with weight and shape worse and raised the symptoms of eating disorders [81].

Most importantly, we observed a positive effect on the increase in hospitalizations due to EDs after the epidemic began. The pooled average of 11 studies indicated a 48% increase in hospital admissions during the pandemic compared to the same time period the previous year, with pediatric and adult admissions increasing by 83% and 16%, respectively. This is very definitely an underestimation; for example, one study only looked at hospital admissions two months after the lockdown and found no difference when compared to the same period the previous year [49]. This little duration of follow-up may not have provided enough time to detect worsening ED symptoms. Other qualitative research cited factors such as limited access to health care and treatment transitions from in-person to virtual care as contributing to the considerable rise in hospitalizations [6, 44-47, 60-62, 71]. These barriers and gaps in care, along with

"coronophobia," or dread of contracting the virus, may have resulted in further deterioration and admission for medical instability [55]. Changes in physical activity rates, restricted access to healthcare services, disturbance to routine and perceived control, changes in connection with food, greater exposure to triggering messages, and good results were highlighted as eight major themes by D. Branley-Bell and C. V. Talbot [44]. Their findings hint at negative impacts on psychological well-being, such as decreased feelings of control, greater social isolation, increased rumination over disordered eating, and low feelings of social support [44].

The COVID-19 epidemic intensified body and eating issues in transgender and non-binary people [45]. While participants experienced a loss of affirming venues during the COVID-19 epidemic, few identified new supportive spaces online, such as transgender and non-binary online eating disorder support groups [45].

Another research discovered regional disparities in video treatment uptake, with patients with BN in the United States and the Netherlands using more video therapy than those in Germany [61]. Many patients indicated pleasure with telehealth and remote therapy in qualitative research; nonetheless, other patients noted frustration with technical challenges or that self-monitoring one's symptoms and weight was unpleasant [61-63]. As virtual care is expected to play a role in patient care in the future, more study is needed to understand how to reduce obstacles and enhance its utilization.

Patients with eating disorders frequently reported worsening mental health symptoms such as sadness, anxiety, stress, and emotional dysregulation during the pandemic compared to prior time periods [50]. The COVID-19 pandemic has had a substantial influence on the general population's mental health, including mood swings amid tougher lockdown measures, increased suicide ideation, self-harm, and emergency department visits and hospitalizations for the same [50]. This supports the findings of one study, which found that those with BN had more severe COVID-19-related posttraumatic symptoms than healthy controls [73]. As a result, it's not surprising that the pandemic's additional stress and uncertainty, along with a loss of activities and social engagements, may be hurting the mental health of this vulnerable cohort, creating or aggravating an ED in some.

Only 8 of the 40 publications in this systematic review were about pediatric populations. As a result, it's unclear if the review's findings apply to the pediatric population with eating disorders. Nevertheless, Graell et al. discovered that over half of the pediatric participants had deteriorating ED and emotional symptoms, and a quarter had suicidal ideation [49]. Additional pediatric research found increasing eating behavior and depression/anxiety during the pandemic [62, 68]. In a case series of juvenile patients, all three patients lost large amounts of weight. This may reflect a broader pattern in which the pandemic's impacts on mental health appear to have been more severe in young individuals [68, 69]. This may reflect a broader pattern in which the pandemic's impacts on mental health appear to have been more severe in young individuals.

Although some individuals reported an improvement in their ED symptoms [43, 44, 62, 63, 82], the majority of the research found that those with eating disorders were more likely to have their symptoms deteriorate during the COVID-19 epidemic. Changes in social and home

environments, as well as self-isolation and disruptions in access to healthcare, may have raised the likelihood of recurrence or exacerbation of symptoms for these populations. Individuals may have struggled to sustain compensatory activities such as excessive physical activity as a result of lockdown demands, aggravating weight and form concern and so intensifying eating disorder symptoms. The COVID-19 measure demonstrates a positive link with disordered eating behaviors in the general population, according to the majority of cross-sectional and longitudinal research reviewed. Our findings suggest that disordered eating patterns, such as binge eating, body image concerns, and uncontrollable eating, may have played an important part in coping during this time.

Our study also showed that lockdown and quarantine restrictions during the COVID-19 pandemic made alterations in the daily activities of eating disorder patients, including increased eating binge frequency, worsening of eating disorder symptoms, depression, and anxiety. In the case of adolescents, the eating disorder symptoms raised, which was linked to the lockdown activities during the pandemic. However, some of the studies found no significant difference in the eating disorder symptoms pre- or post-lockdown period.

Hunter and Gibson define this period as a "mixed bag" of pleasant and negative events for those suffering from an eating problem [46].

5. CONCLUSION

The authors' main objective was to identify a correlation between the COVID-19 pandemic and eating disorders, and they found a substantial increase in hospitalizations during the pandemic with ED symptoms and BMI alterations. This systematic review highlighted adolescents and adults with a history of ED as potentially vulnerable populations to the impacts of the COVID-19 pandemic. In addition, many qualitative studies observed increased eating disorder symptoms due to less availability of treatment and therapy, changes in routine and lack of structure, adverse media effects, and social isolation. However, the studies included in this review may not be up to the mark, so the authors suggest high-quality research in the future to determine the long-term impact of the COVID-19 pandemic on eating disorders and disordered eating behaviors.

6. LIMITATIONS OF THE STUDY

Although the current study is a systematic analysis of scientific studies results, it has certain drawbacks. To begin with, our risk of bias evaluation revealed that the quality of significant studies included in our review could have been a bit better. In particular, most cross-sectional studies were assessed may need to be better, but all qualitative studies were ranked as high quality. The qualitative and mixed methods studies likewise featured varied populations in terms of age and diagnosis, and many lacked standardized questionnaires to measure symptoms, instead relying on qualitative themes gleaned from interviews or survey answers. Second, there needed to be more pediatric data. More pediatric data would thus benefit academics and clinicians in understanding the unique challenges children with eating disorders encountered

during the pandemic. Finally, additional long-term study is needed to better understand the roots and connections that lead to pandemic fear, which will assist in guiding future epidemics and preparing for emergency circumstances; this is critical for future success. Follow-up research might help characterize future changes in a population eating patterns.

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