

Food Disorder during the SARS-COV-19 Pandemic: A Systematic Review

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ABSTRACT

Introduction: Eating disorders are not restricted to changes in eating habits, but also involve physical and emotional changes in individuals. These habits can lead to several consequences on health and quality of life. To point out the effects that the COVID-19 pandemic had on the lives of individuals with eating disorders and report its consequences on the quality of medical care, interpersonal relationships, and mental health in the context of social isolation.

Materials and Methods: A systematic review of scientific articles was carried out from August to December 2021. The target files for the study were written between the years 2019 to 2021. The modalities of articles included were cohort type, randomized clinical trials and non-randomized, and case reports. Finally, to evaluate the variables, the method "The GRADE approach" was used.

Results: A total of 43 articles were found. The notorious negative impact on the mental health of patients during the pandemic was observed, whether due to social, economic, and even media situations. The emergence of three major problems stands out: social restrictions, functional impairments, and limitations of access to professional support. Consequently, as a way of seeking comfort, many people used food as a method of relief, increasing the intensity and incidence of overweight/obesity and worsening emotional well-being. On the other hand, other individuals started to practice excessive physical activity, which also becomes harmful. Another unfavorable factor for the health of individuals was the commitment to medical care, due to the various safety protocols and restrictions imposed against the spread of the virus and the population's own fear.

Conclusion: The pandemic had a great impact on individual and collective quality of life, as evidenced by the studies found. However, its long-term consequences are still unclear. There was a proven accentuation in cases of psychiatric disorders (such as anxiety and depression) and in eating disorders, especially in the young adult population and, in general, individuals with a history of mental and eating disorders.

Keywords: Binge-eating disorder, Pandemic, Psychiatry, SARS-COV-19.

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I. INTRODUCTION

Eating disorders are characterized by changes in eating habits, body weight and psychological state - related to body dysmorphism¹. It is likely that these disorders have a great impact on the quality of life and mortality of affected patients, in addition to being closely linked to severe somatic and psychiatric complications [1].

These disorders can cause several consequences, such as dehydration, anemia, osteoporosis, hydroelectrolytic and endocrine alterations: in addition to having a strong relationship with psychiatric conditions, especially mood, personality, anxiety, and depression disorders [2], [3].

Treatment for eating disorders, in general, should be carried out by a multidisciplinary team composed of general practitioners and psychiatrists, nutritionists, and psychologists, as nutritional interventions are necessary, ranging from food selection to digestion, respecting each type of disorder. food, as well as the social, cultural, and emotional aspects of each patient [4]-[7].

In 2019, the COVID-19 pandemic began and with it, social distancing measures and lockdown were implemented [8]. Consequently, drastic changes in the population's routine have brought about changes in people's living habits [8]. For this reason, the objective of this research is to study the impact that the COVID-19 pandemic had on the incidence of eating disorders and its effects on the biopsychosocial aspects of individuals inserted in this reality. In addition, although there are other systematic reviews on the subject, none have the same purpose as this study, and this study is the only one that researched this specific subject [9]-[15].

II. METHODOLOGY

Systematic review, carried out between August and December 2021. It was researched in the PUBMED and Latin American and Caribbean Literature on Health Sciences (LILACS) databases. In this way, articles from the year 2019 to 2021 were selected, due to the relationship between work and the time of prevalence of the pandemic. The research ended on August 15, 2021, with the selection of all articles that made up this review.

In the search of the PUBMED database, the descriptors "feeding and eating disorders", "feeding" AND "eating" AND "disorders", "feeding and eating disorders", "feeding" AND "disorder" OR "feeding disorder" were used, in which the Boolean descriptor "OR" and "coronavirus", "coronavirus", "coronaviruses" was used, in which the Boolean descriptor "OR" was used, in addition, between these two variables, the Boolean descriptor "AND". In the description of the filters, the publication date of the year 2019 to 2021, human species and articles published in English were applied.

Differently, in the LILACS database, the descriptors "Binge-Eating Disorder" and "Binge Eating" were used, these combined by descriptor by the Boolean descriptor "OR", in addition, the descriptors "Coronavirus Infection" OR "COVID-19" OR "2019-nCoV", "Disease by the New Coronavirus", "New Coronavirus Disease", "Coronavirus Infections", "New Coronavirus pneumonia", "Pneumonia due to the new Coronavirus 2019-2020", "Outbreak by the new Coronavirus 2019-nCoV", "Outbreak by the new 2019-

nCoV", "Outbreak by 2019-nCoV", "Outbreak by the New Coronavirus 2019", these are also combined by Boolean descriptors "OR". These two combinations were agreed with the Boolean descriptor "AND". The time period of the year 2019 to 2021 was used, as described above, in addition to the English language.

Therefore, as eligibility criteria, completed articles published during the years 2019 and 2021, English language, cohort type, randomized and non-randomized clinical trials and case reports were included. Distinctively, research carried out on animals and those articles that did not fit the inclusion criteria were excluded. The selection of articles was performed by a pair of independent reviewers. Furthermore, for the synthesis of data, the authors formulated a literature diagram to group the essential information of the selected articles.

During the elaboration of the methodology, the PICOT strategy (acronym for P: population; I: intervention; C: control group; O: outcome; and T: time) was established to search for articles, as described in Table I.

TABLE I: PICOT DESCRIPTION

Population	Population with an eating disorder
Interventions	Increase of eating disorders during the COVID-19 pandemic
Control group	Patients who did not have an eating disorder prior to the COVID-19 pandemic
Outcomes	Increase in prevalence
Times	Since 2019 (beginning of the pandemic)

Other variables evaluated in this research were: number of participants, study method, follow-up time, age, gender, comorbidities, interventions, clinical parameters, loss to follow-up, intention-to-treat analysis, blind allocation, blind allocation scheme, randomization, early study discontinuation by benefit, outcomes, subgroups, applicability of evidence to other studies, and biases (selection, performance, detection, attrition, and reporting). And, to evaluate these variables, the "The GRADE approach" was used.

III. RESULTS

In the PUBMED database, 77 articles were found, and 11 articles were already discarded because they were repeated between the two bases. And, after analyzing titles and abstracts, 22 articles from PUBMED and 9 from LILACS were discarded because they did not fit the theme proposed by this review, leaving 46 articles. After analyzing the eligibility criteria, 8 articles were excluded. Remaining 38 works to compose the references of this systematic review (Fig. 1 and Appendix I).

With the COVID-19 pandemic, it was possible to observe negative effects on the mental health of the population, due to the excess of news about the pandemic, changes in routine, physical distance, and the economic, social, and political consequences of the current scenario, which has increased stress, anxiety, depression, use of psychoactive chemicals and eating disorders [16]-[21].

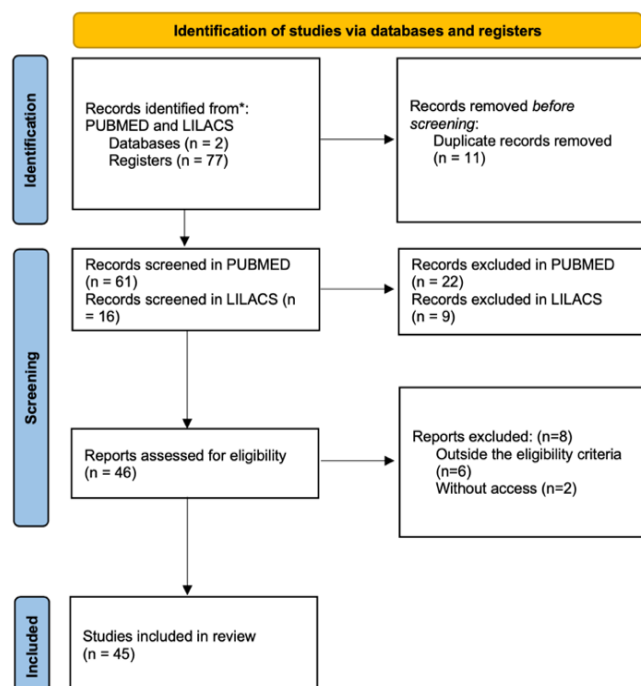


Fig. 1. Results.

Reference [22] reported three main problems during the pandemic: social and functional restrictions and access to professional support. Consequently, the act of eating has become a coping strategy, increasing the incidence of overweight/obesity cases [23], [24]. Young adults already suffered from social pressure to reach weight standards, before the pandemic, making them even more vulnerable to binge eating during these time [25].

In addition, the emotional stress generated by the pandemic favored an increase in the consumption of high-calorie salty foods, the use of electronic devices, the use of tobacco and cannabis, and the consumption of alcohol [26]. This is directly associated with reduced mental well-being [26]. The increase in these habits has been identified as more common in females and in people with current or previous psychiatric disorders [19], [21], [26]-[28].

Reference [17], when analyzing the variables depression, stress, and anxiety with eating disorders, found a significant increase in eating problems related to personal feelings during the context of the pandemic. Thus, an increase in the number of cases of binge eating, compensatory fasting and impairment related to erectile dysfunction has been reported in individuals with feelings of insecurity [29]-[33]. However, for some people, the sensations caused by the COVID-19 pandemic led to intense/excessive physical exercise [19], [20], [33], [34].

Reference [18] and [35], in their research, found that people already diagnosed with restrictive eating disorders started to use food control to regain the sense of regularity and management lost due to the absence of a routine, due to the isolation caused by the pandemic. This control occurs, in general, excessively and expresses damage to mental health [18], [35].

Notably, in a study with women, most of those considered obese lost a large amount of weight compared to those with weight considered normal for their height, however, this fact may be due to the lower intake of caloric foods and macronutrients [36]. Differently, another study, carried out in

Italy, showed that patients had better results in lower body mass index (BMI) when undergoing specific treatment for obesity [34].

Reference [27] identified psychological discomfort, sedentary lifestyle, sleep disorders, difficulty in maintaining a daily routine and inadequate eating habits as risk factors for the development of psychological disorders, resulting in depressive mood associated with meals rich in fat and energy. Reference [28] concluded that excess weight is associated with body dissatisfaction and with the development of eating disorders. However, a study carried out in France infers that concern about the pandemic was not associated with eating disorders [37].

Despite research showing that there was a considerable increase in cases of depression and anxiety during the pandemic, [21] showed that patients with eating disorders were able to maintain or gain weight, showing that, even under unfavorable conditions, the treatment for anorexia nervosa had a favorable outcome.

In women who had COVID-19 during pregnancy, there was no evidence of risk of mother-to-child vertical transmission; however, the postpartum period can compromise the emotional state of women, leaving them anxious and subject to stress and the development of eating disorders [38].

As soon as measures were initiated to combat COVID-19, researchers began to carry out studies on the incidence and worsening of eating and sleep disorders, in a way that resulted in proof that the pandemic had a negative impact on sleep quality, and well-being of the population [39], [40].

Meanwhile, it was identified weight gain, worsening of the quality of food and reduction of the practice of physical exercises, on the part of the students and evidenced that sexual relations, physical activity and healthy eating had a positive impact in the reduction of stress [41]. In contrast, a study by [37] showed that the pandemic did not bring about changes in the eating behavior of this population.

The deterioration of the individual's mental health is correlated with the recurrence of eating disorders [42]. In view of this, it is necessary to emphasize the need to implement therapeutic self-help strategies in the treatment of patients with eating disorders, in person or through telemedicine, a tool that is showing effectiveness in several psychiatric treatments [22], [32], [43]. However, many patients report the feeling of "abandonment" by the health services [32].

As part of the solution to this situation, a Hospital in Singapore has successfully helped patients with eating disorders using technology as a communication tool [44]. Reference [45] refer that the use of telemedicine can be used to help patients during this restrictive period, however, it still needs further development because many patients do not have access to the necessary technology or a private place to carry out the medical consultation.

According to [46], the clinical improvement of patients with eating disorders is linked to the reduction of triggering factors for anguish, such as living with other people and their high flow in the environment during meals.

Although research at that time was mainly directed towards the health of patients, [47] demonstrated that scientific production was significantly affected, not only by the high

number of studies that were interrupted, but also by the fact that a large part of the research had to change data collection to online versions, significantly reducing the rigor of the methodology of their studies [47].

In addition, [37] reported that there is a strong relationship between the development or exacerbation of eating disorders and confinement at home associated with excessive media exposure related to COVID-19. In contrast, the pandemic has also brought positive consequences for adolescents and young adults, such as improved family relationships, reduced daily stress and longer self-care time, facilitating the treatment of these disorders, such as Bulimia and Anorexia Nervosa, however, this fact varies for each patient [48].

Thus, [49] sought to analyze the benefits of the reward re-training protocol (RRT) reward imbalance method (describe this method) compared to the supportive therapy already used and provide a better therapeutic solution for the patient, in this way, it shows the importance of reward imbalance in controlling binge eating symptoms. A survey conducted in the United Kingdom with a population of caregivers and their patients, found it difficult to live in confinement added to the responsibility for the well-being of loved ones and, otherwise, found benefits in supporting each other [50]. Despite this [51] infer that the effect of the pandemic on eating disorders still has no answer. Otherwise, [52] and [53] report that the pandemic resulted in a lasting negative effect on health behaviors like depressive, anxiety and eating disorders symptoms.

Furthermore, the authors benefited from the Cochrane tool for the analysis of the risk of bias in the selected articles, and in the selection of articles, the generation of the random sequence and allocation concealment were analyzed; in the performance and detection bias, blinding of participants, professionals and outcome evaluators was observed; with regard to attrition bias, the presence of incomplete outcomes was verified; as for reporting bias, the occurrence of a selective outcome and the presence of other variables were considered [54]. In addition, the certainty of the evidence was analyzed using The GRADE approach tool, which defines the article in no serious limitations; serious limitations; and very serious limitations [55] (Appendix II).

IV. DISCUSSION

Anxiety is a disproportionate feeling of intense and persistent fear, natural to human beings; however, when present constantly, it is considered pathological and interferes with the quality of life of those who present it. A study with the Chinese population showed that there was an improvement in sleep during the period of social isolation, which ended up reducing the incidence of anxiety and stress [56].

However, this fact does not agree with the results found in this study, since many authors inferred that the pandemic and social isolation brought an increase in the incidence and/or worsening of mental disorders [12], [19], [20], [51]. Do Likewise, [57] argue that children faced problems that directly influenced their mental health like adults.

With the rapid spread of COVID-19, many individuals stored more food at home, due to the fear of going out and being contaminated [58]. At the same time, this confinement

left people vulnerable to developing psychosocial disorders, such as binge eating, anorexia or bulimia [58]. Another fact found in this research was the influence of reports and weight loss challenges and training at home through social networks, which had a great impact on the development of eating disorders [58].

Proving the information found here, most studies show that the triggers for these disorders were social distancing and lack of emotional support, whether professional or not [59]-[61].

Culturally, "the individual shapes his actions according to what is normal, in the incessant search to fulfill the requirements demanded by the culture to which he belongs", so that the person seeks to be perfect in society [62]. Thus, women are already considered a population at risk for the development of eating disorders [7], [62], as mentioned by studies evaluated by this review [7], [19], [21], [26], [28]. This fact can be explained by the greater concern of women with their health compared to the opposite sex [63]-[65].

The etiology of eating disorders is considered multifactorial, that is, it can develop due to several factors such as genetic, sociocultural, biological, or social [66]. It is noteworthy that puberty is a predisposing factor for the development of these disorders [66]. The noradrenergic and serotonergic pathways influence the control of mood and impulses, in addition to the regulation of hunger and satiety [66]. Thus, lack of leisure, social restriction, anxiety, stress and even the feeling of boredom were associated with increased incidence of binge eating [67], as seen in this work.

Not least, erectile dysfunction was cited as a symptom in people with eating disorders, however, no other articles were found that addressed this problem [65].

According to [68] the attitudes assumed by the body represent the patient's mental state, so that "the body speaks" what the person is going through. There are several factors that can be considered triggers for the development of eating disorders, such as the social conception of the beauty-youth-health and ugliness-old age-disease triads [69].

Social isolation highlighted two polarities of eating disorders, represented by increased consumption of high-calorie foods and reduced consumption of foods in general, or anorexia [26], [29]. This indicates that different disorders were developed, without there being any determination of the specific trigger that leads to one and not the other [35]. However, it was found that personal and family history foster the basis for binge eating and anorexia [35]. In addition, restrictive diets favor the onset of compulsive eating disorder [70].

It is evident that an eating disorder is difficult to install without other joint psychological changes, such as depression and anxiety, among others [23]-[24], [33], which are considered serious, chronic diseases with different etiologies: psychological, biological, genetic, sociocultural, and family members [71].

According to Moreira, LMCP and collaborators, social networks were presented as a pro-anorexia and bulimia movement, so these data corroborate the findings of this research [72]. Despite this, patients who present these eating disorders have the habit of being discreet, without exposing their problems to the next ones [73].

The treatment of eating disorders involves a drug approach for the treatment of binge eating and anorexia, and for the

treatment of psychiatric comorbidities associated with or triggered during the pandemic⁴⁴. However, this isolated pharmacological therapy, without biopsychosocial work that addresses all aspects of the pathology, does not bring as effective a result as a multiprofessional approach [44]. This is due to the fact that food, in the context of the pandemic, is linked to the emotions that were shaken as a result of COVID-19 and social isolation [16].

The reduction in the movement of people limited access to face-to-face medical and psychological care, so telemedicine gained space for the treatment and follow-up of patients with eating disorders [43]. However, telemedicine is not accessible to all patients and still has limits regarding its therapeutic performance [45].

In this way, the research carried out evaluated different aspects of the development and treatment of eating disorders developed or intensified by the COVID-19 pandemic. This shows the multifaceted nature of these disorders.

V. CONCLUSION

Several researchers discussed the mental and behavioral impacts of the entire population in the face of the COVID-19 pandemic, which had an impact on individual quality of life, as well as negative impacts on the collective.

With the sudden and sudden change in routine, there was an accentuation of anxiety and depression linked to the increase in the incidence of eating disorders, especially in the adult/young population.

Thus, there is a clear need for biopsychosocial support for all those who have a history of mental disorders or who are more vulnerable to the development of mental disorders, such as eating disorders, during the current period of pandemic, aiming at reducing stress and building tools for maintaining the population's mental health.

APPENDIX

Table II is related to the results. Table III is related to the bias risk of the articles analyzed.

CONFLICT OF INTEREST

Authors declare that they do not have any conflict of interest.

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TABLE II: RESULTS

Reference	Type of study	Number of patients	Country	Eating Disorder	Symptoms or Comorbidities	Mean age (years)	Findings
Reference [51]	Pilot research	32	Spain	Eating disorders symptomatology (n=12 / 38%)	Anxiety (n=18 / 56.2%) Stress (n=4/ 12.5%)	29.2	The effect of the pandemic on eating disorders has yet to be answered. However, it demonstrates precipitating factors for the development of these disorders.
Reference [19]	Transversal research	8.014	Australia	Anorexia Nervosa (n=88 / 48.89%) Bulimia Nervosa (n=23 / 12,78%) Binge eating disorder (n=6 / 7,5%) EDNOS or OSFED (n=4 / 5.0%)	Anxiety/anxiety disorder (60%) Depression/depression disorder (50.6%) Obsessive compulsive disorder (8.3%) Bipolar disorder (5.0%) Borderline personality disorder (5.0%) Body dysmorphic disorder (1.7%) Attention deficit hyperactivity disorder (1.7%) Dissociative identity disorder (1.7%) Autism spectrum disorder (1.7%) Psychosis (1.1%)	40.62	There was an exacerbation of eating disorders during the pandemic.
Reference [44]	Clinical observation	960	Singapore	Not mentioned	Anxiety Chronophobia	13.9	The patients with eating disorders assisted by a multidisciplinary team were successful in the prognosis of patients.
Reference [37]	Transversal research	72.781	France	Dietary restriction Body dissatisfaction Impulse control	Binge Eating (OR = 1.01, P = 0.707) Dietary restriction (OR = 0.93, P = 0.036)	21.2	A relationship was found between confinement during the COVID-19 pandemic with the development of stress and, consequently, eating disorders. Otherwise, exposure to ongoing COVID-19 news via the internet has made this situation worse.
Reference [45]	Observational research	337	United States of America	Not mentioned	Depression Anxiety Headaches Dermatologic issues Musculoskeletal Complaints	Not mentioned	Telemedicine was an important factor in the monitoring of patients with eating disorders, however this technology needs better protocols to maintain the confidentiality of the doctor-patient relationship.
Reference [27]	Observational and transversal research	638	Saudi Arabia	EE-anxiety (n=172) EE-depression (n=273) EE-stress (n=80)	Low EE (n = 335) Moderate EE (n = 202) High EE (n = 101) Obesity (n = 58) Smoking (n = 14)	22.0	A psychological predictor of the development of eating disorders was identified, as the majority of the population analyzed adopted a negative mood associated with high-fat and energy-dense diets.
Reference [33]	Transversal research	295	United States of America	Not mentioned	Asthma (n = 56/ 19%) Autoimmune disease (n = 12/ 4.1%) Cancer - current (n = 2/ 0.7%) Cancer - past (n = 1/0.3%) Chronic Lung Disease (n = 2/0.7%) Diabetes (n = 4/ 1.4%) Heart condition (n = 7/ 2.4) Immune deficiency (n = 7/ 2.4) Liver disease (n = 2/ 0.4%)	19.7	With the advent of the pandemic, many students have developed eating disorders due to anxiety and stress. In some cases, the patient may present intense or even excessive practice of physical exercises.
Reference [26]	Transversal research	20.235	France	Not mentioned	Psychiatric history – Current (n = 2275) Psychiatric history - Past (n = 3254) Psychiatric history – Never (n = 22116) Change in caloric/salty food intake (n = 9486) Change in screen use (n = 15533) Change in tobacco use (n = 3519) Change in alcohol use (n = 6389) Change in cannabis use (n = 835)	47.47	There was an increase in emotional stress during the pandemic, resulting in increased consumption of high-calorie foods along with increased use of electronic devices, cannabis and consumption of alcoholic beverages. In addition, some risks for the development of eating disorders were defined: living in a small space and current or previous psychiatric treatment.

TABLE III: RESULTS (CONT.)

Reference	Type of study	Number of patients	Country	Eating Disorder	Symptoms or Comorbidities	Mean age (years)	Findings
Reference [20]	Transversal research	1021	United States of America and Netherlands	Anorexia Nervosa (n=665/ 65,13%) Bulimia Nervosa (n=293/ 28,69%) Binge-eating disorder (n=216/ 21,16%) Atypical Anorexia Nervosa (n=203/ 19,88%) Other eating disorder (n=192/ 18,80%) Purging disorder (n=47/ 4,6%) ARFID (n=36/ 3,5%) Night-eating syndrome (n= 25/ 2,45%)	COVID-19 diagnosis (n=16/ 1,57%) COVID-19 exposures (n=69/ 6,75%)	30.61	There was an increase in the prevalence of eating disorders. The major concern of patients with anorexia was to maintain their eating plan. Those with binge eating reported an increase in this symptom.
Reference [18]	Observational and transversal research	171	Italy	Anorexia Nervosa (n=37/ 50%) Bulimia Nervosa (n=37/ 50%)	AN BMI (mean=18.18) BN BMI (mean=25.82) AN Compensatory physical exercise (mean=3.32) BN Compensatory physical exercise (mean=3.73)	31.74	In relation to the control group, there was an increase in the prevalence of eating disorders
Reference [21]	Quantitative and qualitative research	159	Germany	Worsening of eating disorder symptomatology (adults=42%; adolescents=40.2%) New symptoms (adults=21.4%; adolescents=17.0%)	Eating disorder cognitions Eating disorder behaviors Exercise behaviors Weight change Depressive symptoms Anxiety symptoms Worries Interpersonal conflicts Stress (n=183)	22.42	With the pandemic, there was a worsening in the participants' quality of life, and most patients diagnosed with anorexia maintaining or gaining weight, but the minority reported worsening of their treatment.
Reference [47]	Retrospective observational research	121	United States of America	Not mentioned		Not mentioned	The COVID-19 quarantine has brought about a worsening in eating habits, a decrease in the practice of physical exercises, an increase in the consumption of caloric foods and excessive weight gain.
Reference [39]	Quantitative and qualitative research	187	Italy	Not mentioned	Overweight (n=30/ 24.8%) Grade I Obesity (n=40/ 33.1%) Grade II Obesity (n=25/ 20.7%) Grade III Obesity (n=19/ 15.7%) Physical activity (n=39/ 32.2%)	44.9	With the pandemic, there was a change in people's life habits and in relation to the development of research, about 30% had to be interrupted and there was a decrease in methodological rigor. Thus, the COVID-19 pandemic has brought about several changes in the field of eating disorder research.
Reference [38]	Cohort and longitudinal research	72	China	Minor postpartum depression (n=4/ 6.3%) Major postpartum depression (n=4/ 11.1%)	PTSD (n=24) Full PTSD diagnosis (n=5/ 7.9%) EPDS (n=3)	31	COVID-19 infection in pregnant women can bring difficulties to the family. However, with the amount of the sample analyzed and without a control group, there is a lack of evidence.
Reference [30]	Transversal research	1012	Turkey	Not mentioned	Chronic disease (n=104/ 10.3%) Anxiety	28.3	Anxiety during COVID-19 has increased dairy intake in addition to increased food intake during lunch.
Reference [40]	Longitudinal research	693	Japan	Eating disorders	Physical activity Sleep problems Well-being	-	During the COVID-19 pandemic there was a decrease in activity and a negative impact on sleep quality.

TABLE III: RESULTS (CONT.)

Reference	Type of study	Number of patients	Country	Eating Disorder	Symptoms or Comorbidities	Mean age (years)	Findings
Reference [23]	Cohort and longitudinal research	584	United States of America	Not mentioned	Depressive symptoms Stress Binge eating Eating to cope Physical activity	24.6	With the COVID-19 pandemic, there was an increase in stress levels associated with depressive symptoms and binge eating.
Reference [16]	Retrospective cohort research	1036	Turkey	Not mentioned	Increased uncontrolled eating behavior (n=199/ 22%) No change in diet (n=151/ 16%) Increased of consumption of certain types of food (n=145/ 22%) Developing healthy eating behavior (n=136/ 15%) Change of the diet (n=124/ 13%) Developing restrictive nutritional behavior (n=82/ 9%) Change in ready meals/home food (n=51/ 5%) Starting to consume foods that were not consumed before (n=11/ 1%)	30.05	During the pandemic, most participants had increased eating related to emotional factors, in addition to uncontrolled eating behaviors.
Reference [50]	Randomized clinical trial	49	England	Anorexia nervosa Eating disorder	Not mentioned	Not mentioned	Health professionals and patients have the experience of facing great difficulties and lack of preparation for new technologies in health care. Furthermore, patients reported exacerbations of their distress after promises of remote support were not fulfilled.
Reference [32]	Qualitative research	44	United Kingdom	Not mentioned	Not mentioned	29.5	This study identified three underlying forms of blocking: social restrictions (changes in the way people were socializing), functional restrictions (changes in daily routines around work, shopping, etc.) and restrictions on access to professional support.
Reference [22]	Longitudinal research	59	Portugal	Bulimia Nervosa (n=14/ 32.6%) Anorexia Nervosa (n=20/ 46.5%) BED (n=2/ 4.7%) OSFED (n=7/ 16.3%)	Gained weight (n=13/ 31%) Lost weight (n=8/ 19%) Routine change (n=33/ 76.7%) Stress related to coronavirus pandemic (n=25/ 58.1) Stress and discord in the family (n=7/ 16.3%) Physical exercise (n=25/ 58.1) Feeding (n=26/ 60.5)	27.6	Most participants in this survey reported moderate or severe change in their routine. And the COVID-19 lockdown has been shown to be related to the development of eating disorders
Reference [24]	Transversal research	139	Italy	Not mentioned	Overweight (n=3/ 4.8%) Obesity class I (n=8/ 12.7%) Obesity class II (n=26/ 41.3%) Obesity class III (n=26/ 41.3%) BED (80%)	47.24	The results reveal an increase in the incidence of overweight/obesity cases with weight gain in the Covid-19 lockdown. And a greater relationship in psychiatric diagnoses than without psychiatric diagnosis.
Reference [43]	Transversal research	4	China	OCD MDD SE-AN	Not mentioned	Not mentioned	Telemedicine was effective as a tool for monitoring psychiatric treatments. In addition, patients who performed treatment correctly, without interruption of pharmacological treatment, showed improvement in symptoms.

TABLE IVI: RESULTS (CONT.)

Reference	Type of study	Number of patients	Country	Eating Disorder	Symptoms or Comorbidities	Mean age (years)	Findings
Reference [46]	Qualitative research	116	England	Not mentioned	Obesity class I (n=16/ 20%) Obesity class II (n=24/ 30%) Obesity class III (n=40/ 50%)	46.24	Patients who underwent bariatric surgery during the COVID-19 pandemic showed greater agility and effectiveness in eating habits at lunch, having the meal in less time. Denied the change in the clinical picture in the pre-lunch and post-lunch moments and habits
Reference [53]	Retrospective research	783	United States of America	Stress (n=41/ 71.9%) Anxiety (n=37/ 64.9%) Depression (n=23/ 40.4%)	Active cancer treatment (n=18/ 3.1%) Asthma (n=122/ 20.7%) Diabetes (n=167/ 28.4%) Heart disease (n=53/ 9%) High blood pressure (n=258/ 43.8%) High cholesterol/hyperlipidaemia (n=193/ 32.8%) Sleep apnea (n=169/ 28.7%) Test positive for COVID-19 (n=17/ 2.9%)	53.6	The COVID-19 pandemic has a lasting negative effect on the health behaviors and mental health of people with obesity. This group reports significant substance use, increased anxiety, depression, and difficulty sleeping, associated with inappropriate eating and physical activity behaviors.
Reference [41]	Transversal observacional research	406	Morocco	Stress	Menace of stress (n=369/ 90.87%) Low physical activity (n=284/ 69.95%) Balanced diet (n=49/ 12.07%) Sleep duration 7h to 8h (n=230/ 56.65%)	20.10	The pandemic had a negative impact on the health of students in both the nutritional and psychological spheres.
Reference [34]	Retrospective cohort research	129	Italy	Eating disorder	Not mentioned	57	Severely obese patients exposed to the COVID-19 lockdown lost less weight than those not exposed to the lockdown treated with the same intensive residential CBT-OB, and the control patients were psychologically better.
Reference [42]	Randomized clinical trial	42	Germany	Binge eating disorder (n=100)	Comorbid mental disorder (23.5%)	41.1	Increase in eating disorders may be due to the ongoing pandemic and the outbreak of COVID-19 may be associated with the risk of relapse into mental disorders.
Reference [29]	Analytic trial research	723	United States of America	Anorexia nervosa (n=3/ 0.9%) Bulimia nervosa (n=45/ 12.8%) Binge-eating disorder (n=8/ 2.3%) Other specified feeding or eating disorder (n=90/ 26.5%)	Household food insecurity (n=38/ 6.6%) Individual food insecurity (n=235/ 40.6%)	21.8	Through the analytical tests, it was noticed an increase in binge eating, compensatory fasting and impairment of erectile dysfunction in students with food insecurity.
Reference [49]	Randomized controlled research	60	United States of America	Depression	Weight loss	-	This research is a pilot study that seeks to prove the effectiveness of binge eating treatment with a retraining protocol.
Reference [28]	Quantitative and qualitative research	671	England	Stress Anxiety	Not mentioned	33.29	This research showed a partial increase in cases of stress, anxiety and eating disorders. Furthermore, the proportion of cases of women who already had risk factors for these categories was higher than that of women considered healthy.
Reference [17]	Explored research	720	United States of America	Binge eating (n=100/ 14.1%)	UWCB	-	During the COVID-19 outbreak, most participants reported many problems with unhealthy weight management behaviors.

TABLE VI: RESULTS (CONT.)

Reference	Type of study	Number of patients	Country	Eating Disorder	Symptoms or Comorbidities	Mean age (years)	Findings
Reference [31]	Qualitative research	201	United States of America	Anorexia Nervosa Binge eating disorder	Anxiety Loneliness Boredom ED symptoms Negative body image Exercise routine Change routine/environment	-	There was an increase in the prevalence of erectile dysfunction, change in exercise routine and emotional well-being during the COVID-19 pandemic. Furthermore, most participants reported worsening of their mental health during this period.
Reference [35]	Transversal research	153	England	Anorexia nervosa (n=28/ 48.3%) Bulimia nervosa (n=7/ 12.1%) Other specified feeding and eating disorder (n=3/ 5.3%) Binge eating disorder (n=1/ 1.7%)	Symptoms of multiple EDs (n=12/ 20.7%)	30.86	The pandemic produced a change in the participants' routine, with this people developing eating disorders, such as bulimia, anorexia and binge eating.
Reference [25]	Observational research	17715	Germany	Not mentioned	Positive emotion Negative emotion Anxiety Sadness	-	In this research, there was a reduction in discussions about erectile dysfunction symptoms, an increase in mental health and treatment-related topics.
Reference [48]	Qualitative research	13	Austria	Anorexia nervosa Bulimia nervosa	Restrictions of personal freedom Interruption of the treatment routine Changes in the eating disorder and other psychopathology Opportunities of the COVID-19 period	15.9	This study identified some risks such as self-monitored weight or parental monitoring, reduced motivation to work on recovery, restrictive ward visiting regulations, and partially neglected therapist-parent communication.
Reference [53]	Transversal research	3937	United States of America	Depression Anxiety disorder Eating disorder	Depressive symptoms Anxiety symptoms Eating disorder symptoms General stress 2019-nCoV stress	30	The postpartum period is a window of vulnerability for OCD-like symptoms associated with COVID-19 distress and this symptom is associated with a variety of anxiety-related symptoms among adult women.
Reference [36]	Prospective Cohort research	297	Saudi Arabia				Protective factors for weight gain were evidenced: increase in the total number of reals hours of sleep, physical activity and coffee consumption. Furthermore, it was shown that among participants who lost weight, those with obesity lost the most weight compared to those with normal weight.

TABLE III: BIAS RISK OF THE ARTICLES ANALYZED

Article	Selection Bias	Performance Bias	Detection Bias	Friction Bias	Report Bias	Certainly of the evidence (GRADE)
Reference [51]	HIGH	HIGH	HIGH	LOW	LOW	Serious limitations
Reference [19]	LOW	LOW	LOW	LOW	LOW	No serious limitations
Reference [44]	LOW	LOW	LOW	LOW	LOW	No serious limitations
Reference [37]	LOW	LOW	LOW	LOW	LOW	No serious limitations
Reference [45]	LOW	HIGH	LOW	LOW	LOW	No serious limitations
Reference [27]	HIGH	LOW	HIGH	LOW	LOW	No serious limitations
Reference [33]	LOW	HIGH	HIGH	LOW	HIGH	Serious limitations
Reference [26]	LOW	LOW	HIGH	LOW	LOW	No serious limitations
Reference [20]	LOW	LOW	HIGH	LOW	LOW	No serious limitations
Reference [18]	LOW	LOW	HIGH	LOW	HIGH	No serious limitations
Reference [21]	HIGH	LOW	LOW	LOW	HIGH	No serious limitations
Reference [47]	LOW	HIGH	HIGH	HIGH	LOW	Serious limitations
Reference [39]	LOW	HIGH	HIGH	LOW	HIGH	Serious limitations
Reference [38]	LOW	HIGH	HIGH	LOW	HIGH	Serious limitations
Reference [30]	LOW	LOW	LOW	LOW	HIGH	No serious limitations
Reference [40]	LOW	LOW	LOW	LOW	HIGH	No serious limitations
Reference [23]	HIGH	HIGH	HIGH	LOW	LOW	Serious limitations
Reference [16]	LOW	LOW	LOW	LOW	LOW	No serious limitations
Reference [50]	LOW	LOW	LOW	LOW	LOW	No serious limitations
Reference [32]	LOW	HIGH	HIGH	LOW	HIGH	Serious limitations
Reference [22]	LOW	HIGH	HIGH	HIGH	HIGH	Serious limitations
Reference [24]	LOW	HIGH	HIGH	LOW	LOW	No serious limitations
Reference [43]	LOW	HIGH	HIGH	LOW	HIGH	Serious limitations
Reference [46]	LOW	HIGH	HIGH	LOW	LOW	No serious limitations
Reference [53]	LOW	LOW	LOW	LOW	HIGH	No serious limitations
Reference [41]	LOW	LOW	LOW	HIGH	LOW	No serious limitations
Reference [34]	HIGH	HIGH	HIGH	HIGH	HIGH	Very serious limitations
Reference [42]	LOW	LOW	HIGH	LOW	LOW	No serious limitations
Reference [29]	HIGH	HIGH	HIGH	LOW	LOW	Serious limitations
Reference [49]	HIGH	HIGH	HIGH	HIGH	HIGH	Very serious limitations
Reference [28]	LOW	LOW	LOW	LOW	LOW	No serious limitations
Reference [17]	LOW	LOW	HIGH	LOW	LOW	No serious limitations
Reference [31]	HIGH	HIGH	HIGH	LOW	HIGH	Serious limitations
Reference [35]	LOW	LOW	LOW	LOW	LOW	No serious limitations
Reference [25]	LOW	LOW	LOW	HIGH	HIGH	No serious limitations
Reference [48]	HIGH	LOW	LOW	LOW	LOW	No serious limitations
Reference [53]	HIGH	LOW	LOW	LOW	LOW	No serious limitations
Reference [36]	HIGH	LOW	LOW	HIGH	LOW	No serious limitations