Literature screening report

The impact of the COVID-19 pandemic on eating disorders: Anorexia nervosa, Bulimia nervosa and Binge-Eating

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Responsible author:	Dr. Joyce Haddad
Affiliation:	Bern University of Applied Sciences, Insel Gruppe AG
Co-authors:	Ms. Natalie Bez, Prof. Dr. Klazine van der Horst
Acknowledgements:	Ms. Rachel Strahm, Ms. Franziska Geese, Ms. Melina Hasler, Prof. Dr. Dirk Richter, Prof. Dr. Kai-Uwe Schmitt

Coordination contact:	Jorgen Bauwens (SSPH+)

Abstract

In response to the spread of COVID-19 between 2020 and 2022, many international and European governments enacted public health measures to contain and mitigate the spread of the virus. The pandemic and its associated restrictions radically changed people's lives in Switzerland and the world, resulted in social isolation which may have increased the incidences or worsened pre-existing mental health illnesses, including eating disorders. Swiss news reports stated a 30% increase in eating disorder rates throughout 2020 and 2021. This narrative review was thus conducted to validate, or not, this reported figure. Population data on eating disorder rates in Switzerland are scarce, therefore, European and global studies were reviewed. No empirical data was found to validate eating disorder rates during COVID-19 in Switzerland. In Europe and worldwide, estimations support a significant increase in eating disorder incidence and treatment demands. The pandemic may have also exacerbated an already-increasing trend of eating disorder rates. Many stressful events, including COVID-19, contribute to the exacerbation of eating disorder symptoms. This review has highlighted the need for data on eating disorders, especially in Switzerland. In addition, it is recommended that eating disorder services are constantly easily accessible and provide support for helping patients and those at risk in responding to any stressful event that may occur.

Content

Preamble

A large number of scientific publications become available on a daily basis, reflecting the rapid development of knowledge and progress of science on COVID-19 related issues. Leading authorities should base decisions or policies on this knowledge; hence they need to master the actual state of this knowledge. Due to the large number of publications shared daily, decision makers heavily depend on accurate summaries of these publications, in the different public health domains. Therefore, the authors of this report were mandated by the Swiss School of Public Health plus (SSPH+), on request of the Federal Office of Public Health (FOPH), to inform the FOPH on recent findings from the literature.

Background

On the 11th of March 2020, the World Health Organization (WHO) declared the Corona Virus Disease 2019 (COVID-19) as a pandemic (1). In response to this declaration, many international and European governments enacted public health measures, periodically in parallel with increasing or decreasing infected cases. The measures included physical distancing, cancelling leisure time activities, mandating school and university closure, travel restrictions and obligatory quarantine to contain and mitigate the spread and impact of COVID-19 (2). The pandemic and its associated restrictions radically changed people's lives in Switzerland and the world, resulted in social isolation and may have worsened mental health in comparison to before the pandemic (3–7).

Lockdown restrictions disrupted daily routines, limited access to healthy coping mechanisms, and created uncertainty (8). These combined changes made the pandemic uniquely dangerous for individuals with eating disorders (EDs). The ability to cope with everyday stressors may have been weakened by a decrease in mental well-being, together with the new added stressors of the pandemic (9). Existing conflict in familial relationships, enforced confinement and lack of meaningful activity, may have disrupted eating patterns and increased obsessions with food, body image and weight. Increased exposure to social media and websites that promote EDs may have further encouraged disruptive behaviours (10). The negative impact of COVID-19 and the associated social isolation on mental health has been well-described in terms of heightened anxiety and depression (3, 11). As an example, an online Italian study on a general population (n = 602) found changes in dietary patterns to cope with the stress of the pandemic, such as increasing food intake and feeling anxious due to changed eating habits or activity levels (12). For these reasons, reviews have been recently published to understand the impact of COVID-19 on disordered eating in Europe and worldwide (13–15). However, no review has included a single study focused on the Swiss population, although in Switzerland, EDs are common (16) and Swiss media articles have reported significant increases in incidences during the pandemic (17–19).

For example, the *NZZ am Sonntag* newspaper reported that Zurich Children's Hospital saw a significant increase in the number of admissions of teenagers with psychosomatic disorders between November 2020 and March 2021 – corresponding roughly to the second wave of the pandemic in Switzerland – compared to the same period the previous year. Admissions for eating disorders were also rising at the time of the interview (19, 17). The president of the association of youth psychiatrists in Switzerland said that mental health problems were prevalent among children and teenagers due to

Covid-19, with girls being more prone to depression (18). However, in an aim to find Swiss empirical studies to back up these claims, no such study was found that has analysed the compounded impact of the pandemic's restrictions on individuals with EDs (8). Thus, this review aims to address this research gap, and find an answer to COVID-19's impact on ED rates in Switzerland.

The most recent figures of pre-pandemic ED rates in Switzerland are from an epidemiological study, with data collected in 2010. A nationally representative sample of Swiss residents (n = 10,038) aged 15–60 years across all three language regions of Switzerland were interviewed by phone. Data showed that the lifetime prevalence rates of the disorders, calculated by adding lifetime prevalence estimates for anorexia nervosa, bulimia nervosa, binge eating disorder[1], any eating disorder, sub-threshold binge eating disorder and any binge eating, were 17.5% for women and 7.8% for men (16). Similarly in Germany, a longitudinal study with more than 3000 subjects aged 14 to 24 followed over 10 years, found a lifetime prevalence of 11.5% for women and 1.8% for men with regard to symptoms related to an eating disorder (20). Similar trends have been reported throughout Northern Europe (21). In the case of limited Swiss empirical data to understand the impact of COVID-19 on ED rates, similar data from Europe may imply that Swiss ED rates are consistent with those of bordering countries. Exploring data from such countries could be a way to predict ED rates during COVID-19 in Switzerland while data remains scarce.

The diagnoses described in the current version of the Diagnostic and Statistical Manual of Mental Disorders (22) include three main disorders: 1) anorexia nervosa, which is characterised by severe dietary restriction and a weight below a healthy body mass index; 2) bulimia nervosa, which is characterised by episodes of compulsive eating and compensatory behaviours for weight control; and 3) binge eating disorder, which also includes compulsive eating episodes but without compensatory behaviours. Therefore, this review will focus on these three ED sub-types.

[1] As per the classification in ICD-11: 6B80 Anorexia Nervosa; 6B81 Bulimia Nervosa; 6B82 Binge Eating Disorder

Questions addressed

- 1. Did eating disorder incidences and treatment demand increase during the COVID-19 pandemic?
- 2. In which population did the incidence increase the most (female/male, children/teenagers/adults, other)?
- 3. Which diagnostic sub-types increased the most?
- 4. Did the COVID-19 pandemic impact individuals already diagnosed with an eating disorder?
- 5. What were the most important factors associated with COVID-19 that influenced the frequency of diagnosis or exacerbation of eating disorders?

Methodology

For this narrative literature review, all study types from 1 December 2019 to 1 June 2022 were reviewed. Search strategies included broad search terms such as anorexia or bulimia or binge eating disorder or eating disorder or orthorexia and their varying terms, together with all possible terms associated with COVID-19. No limits were set on countries to ensure no articles were missed. Ovid, PubMed, CINAHL databases and grey literature (such a letters to editors) were searched. The search produced 2,990 articles which were first screened for the topic of interest. Titles that were focused on obesity and did not mention eating disorders were excluded. Scarcity in research conducted on the Swiss population was noticed during the abstract screening (n=278), therefore, the research group decided to include studies from countries where the federal COVID-19 response was similar to Switzerland, or where the population was comparable to Switzerland, such as Europe and neighbouring countries (n=52), with some reports from Australia and New Zealand, the United States of America (USA), and Canada for broader comparability. Some review papers on the topic published in 2022, to capture the most recent pooled data, were also used to answer the research questions. Government websites, media articles, eating disorder associations and health insurance reports were also searched to find more data on eating disorder incidence during COVID-19.

Results and Findings

1. Did eating disorder incidences and treatment demand increase during the COVID-19 pandemic?

Summary:

Reports from Swiss health professionals, interviewed for news reports, reported a 30% increase in ED rates throughout 2020 and 2021, however, this arbitrary figure could not be supported by empirical evidence using Swiss population data. Nonetheless, international studies reported a wide range of new ED diagnoses during the pandemic, with figures varying from a 15 to 60% increase in new diagnoses for adults and between 4 and 15% for children. In Europe, studies showed a 50 to 60% increase in self-reported ED symptoms such as restrictive or binge-eating behaviour.

Some studies found improvements in ED symptoms.

Treatment demand increased during the pandemic, with a reported 20 to 25% increase in hospital admissions, and significantly higher rates, by up to 111% of adults and younger people seeking support in-person or using telephone or online helplines.

Results:

1. Eating disorder incidences

1.1. Adults (from 18 to 79 years old)

1.1.1. Switzerland

No published review has included a study using a Swiss population, and to the best of our knowledge, there is currently no study assessing the impact of COVID-19 on ED rates in Switzerland. The most recent national survey that estimates the prevalence of EDs in Switzerland was conducted in 2010. The survey was conducted on 10,038 people aged 15 to 60, and showed that eating disorders affect about 4% of the Swiss population at some point in their lives, with 1.1% suffering from one of the disorders (anorexia nervosa, bulimia nervosa or binge eating disorder) in 2012 (16). Empirical data on more recent figures or on eating disorder incidence in Switzerland during COVID-19 were not found, other than grey literature, such as news articles.

According to the news outlet “20 minuten Zürich”, Brigitte Rychen, Head of the Center for the Prevention of Eating Disorders Practical at the Inselspital (Fachstelle Prävention Essstörungen Praxisnah (PEP) am Inselspital) in Bern, had suggested that in 2020, there was 100 consultation requests regarding anorexia and bulimia nervosa, in comparison to 81 in 2019, resulting in a 30%

yearly increase (23). Mrs. Rychen was contacted directly by our research group and confirmed these findings, however no formal report has been published on the statistic. Furthermore, Sarah Stidwill, a consultant at the Working Group on Eating Disorders (Die Arbeitsgemeinschaft Ess-Störungen) suggested that the lockdown exacerbated the eating disorders of many of those affected. No substantiated figure of ED rates was found, however, the Arbeitsgemeinschaft Ess-Störungen reported that inquiries increased significantly during COVID-19 (24). No other interviewee or hospitals could provide empirical evidence; reasons were that ED rates are hard to extract on their own, as data are usually lumped with other mental health disorders. This was also raised in a recent Dutch news article, who reported that number of eating disorder patients are difficult to maintain, since no organisation keeps track of the figures nationwide (25).
Thus, since the authors of the most recent epidemiology study in 2012 (16) discussed that the prevalence in Switzerland was comparable to those of other westernized countries and even higher for bulimia nervosa (a pathology strongly influenced by culture), there is justification to focus on research conducted on populations similar to Switzerland in this report, for identifying the impact of COVID-19 on eating disorders.

1.1.2 Worldwide

Worldwide, reviews are continuously showing increases in ED rates during the pandemic. One systematic review reported that 19 studies documented increases in eating disorder symptoms for anorexia nervosa, bulimia nervosa, binge eating disorder, and “other specified feeding and eating disorders” patients (14). A more recent review confirms these findings, with eleven studies published from the European region suggesting that confinement was closely related to increased eating disorders and anxiety symptoms among the general population (15). In a meta-analysis of 13 studies with an amount of 7,848 participants, the overall pooled prevalence of exacerbation of binge eating, food restriction, purging behaviours, and concerns about food intake was nearly 60% (26). In Canada, a report suggested that **newly diagnosed anorexia nervosa cases rose by about 60%** during the first wave of the COVID-19 pandemic, with cases reported being more severe, with greater mean weight loss and more “profound” bradycardia (27). In New Zealand, ED inpatient incidence were reported to increase from n=24 to n=53 from 2019 to 2020, respectively, however, outpatient referrals did not change (28). These findings are consistent with concerns expressed by researchers and clinicians in Switzerland mentioned above, that the incidence of eating disorders, particularly in paediatric populations, might have increased during this period (18, 24, 23). However, it is important to acknowledge that the intensity and duration of COVId-19 measures and the

lockdown were different between continents and countries. Children and adolescent ED rates are discussed in the next section.

1.1.3 Europe

In Europe and other countries, many studies showed the possible negative impact COVID-19 had on ED symptoms and rates. A study of 254 adults without EDs in Portugal, reported **an increase in a variety of disordered eating behaviours** during the COVID-19 lockdown, such as **skipping meals (52.8%), grazing eating behaviour (80.9%), overeating (81.0%), loss of control over eating (47.2%), and binge eating episodes (39.2%)** (29). Similarly, an online survey conducted on 365 adults without self-reported EDs showed that the initial phase of the lockdown (10th of March until the 3rd of May 2020) predicted higher emotional eating and more frequent binge-eating, especially among those with higher BMI, higher anxiety and depressive symptoms, in comparison to the 4th of May onwards (30). Among German people without a history of EDs *(n* = 5,289), approximately **27.6% reported increased food restriction and 34.6% reported increased binge-eating behaviours** (31). Another German study of university students, although included a small sample (n= 127, 3%) who were diagnosed with an ED in the past, found that, a large number of the sample (n = 1,130, or **33%) reported binge eating at least once per week**, 117 (**3.5%) reported vomiting** as compensatory behaviour minimum once per week, 34 (0.1%) used a laxative minimum once per week. Further, 1,548 (45.8%) reported weight changes during the COVID-19 lockdown, 885 (26.2%) reported weight gain, 663 (19.6%) weight loss, with these weight changes being attributed to the lockdown (32).

1.2. Children and adolescents (up to 18 years old)

An independent psychotherapist in Zürich, reported a 30 – 40% increase in inquiries in 2020, while a senior physician at the Clinic for Consultant Psychiatry and Psychosomatics at the University Hospital Zurich and a therapist at the Competence Center for Eating Disorders and Obesity in Zurich observed the same incidence increases, specifically in 12 – 18 year olds (33). However, no empirical evidence could be found to support these figures. An analysis of a large dataset of electronic health records (81 million patients) was conducted in 2020, where >93% of the sample resided in the USA and the remainder were from India, Australia, Malaysia, Taiwan, Spain, UK, and Bulgaria. In the dataset, 8,471 patients had been diagnosed with an ED in the pandemic period (78.1% female, with a mean age of 16.2 years) (34). The study found that **15.3% more patients were diagnosed with an ED during the pandemic** (January 2020 to 2021) than in 2019 (34).

A cross-sectional study from Canada looked at new eating disorder assessments given to patients aged from 9 to 18 years between January 1, 2015 and November 30, 2020. The researchers used data from 6 of the 10 Canadian paediatric hospitals with ED programs. The study cohort included 1, 883 children, with a median age of 15.9 years, with most (91%) being girls. **Monthly hospitalizations nearly tripled (from 7.5 to 20%)** compared with pre-pandemic rates (27). In multiple regions in England, 62 paediatricians were asked about estimates of ED numbers during January to March 2021. Thirty-two paediatricians reported an increase in children and young people admitted with a primary mental health disorder compared with the same period in 2020. About 21% of the paediatricians reported that up to 50% of their patients had an ED, and up to 25% of their patients with mental health disorders also had an ED (35).

A children's hospital in Palermo, Italy, showed that baseline **anorexia nervosa hospitalization of child and adolescent patients** under 17 years old per year was between 1% and 1.7% from 2016 to 2019, however, there was a significant rise in 2020 to 4%, therefore **increasing by up to 3%** immediately during the imposition of more modest restrictions in September 2020 (36). Grey literature supports the empirical findings. According to the DAK-Gesundheit 2020 report, anonymized hospital data from almost 800,000 children and young people aged under 17 years, insured with DAK-Gesundheit in Germany, were examined. The number of **severely underweight children and adolescents increased by 35% in 2020**. **Inpatient eating disorders** such as bulimia and anorexia **increased significantly** during the lockdowns, by **10%** (37). One systematic review of using pooled hospital admission rates from 10 studies, demonstrated on average a 48% (range 0 to 123%) increase (from 591 people to 876) in admissions during the pandemic compared to the previous year, with studies conducted mostly in Europe, Turkey, and the USA. However, there was an average increase of 16% in adult admission (n=2 studies) but a much larger 83% in paediatric admissions (n = 8 studies) (13).

Although most reviewed studies found increased rates of EDs, some studies did not (38), such as a study on adolescents in Germany (39), and one study in Belgium (40).

2. Increase in treatment demand

2.1. Adults

Data from the National Health Foundation Trusts in South-East England between 2018 and April 2021 found that referrals for **admission for an ED increased by 20%**, and for the 351 referrals, the percentage of **admissions went from 63.6% before, to 65% after the COVID-19 pandemic**. No significant differences before or since the COVID-19 pandemic were found in mean age, gender, ED diagnosis or need for compulsory admissions. Waiting times for admission were long even before the COVID-19 pandemic, and <50% of the patients could be admitted close to home. Of those admitted during COVID-19, approximately a third had to be placed far from their home (41). Although telehealth was available, there are some reports of individuals with EDs having difficulties getting access to healthcare centres, using telemedicine, or communicating via online sessions (26). Specifically, a study in Germany demonstrated that only 20% of their sample of 91 former inpatients used the telehealth services (42), while 45% of patients in the Netherlands transitioned to online/tele-health care (43). Reduced access to services was also reported by anorexia nervosa patients in the UK (44). These findings are further supported by a qualitative study of 12 anorexia nervosa patients in the UK, Greece and the USA (45).

Information from Dublin, Ireland showed, using unpublished data, **a 25% increase in patient admissions** between March and September 2020, compared to the same timeframe in 2019 (46). The eating disorders association of Ireland (Bodywhys) reported similar results, with significant increases in demand for all their services between March to December 2020 compared to the same timeframe in 2019: **online support groups found a 111% increase**, **support email contacts had an increase by 45%**, and **helpline calls increased by 54%** (47). Likewise, in Washington, USA, the National Eating Disorders Association, reported that calls, texts and **online chats to their helpline increased by 58%** from March 2020 to October 2021 (48).

In Italy, 76 health care professionals reported that they had 453 ED patients referred to them between March 9th and May 18th 2020. Among them, 439 were followed online by telemedicine, while 54 were met in person in walk-in clinics. Of the patients, 42 with anorexia, 24 with bulimia and 27 with binge-eating disorder increased the frequency of the visits with their health care professionals and **10% started therapy for the first time** (49). In a small University Hospital in Lleida, Spain, visits for adults with **eating disorders increased from 1.7% before 15th March 2020, to 3.1%** (50). A sample of university students in Normandy, France reported that those with

an ED **consulted a healthcare professional twice more** (21.7%) than students with no ED (11.3%) during the COVID-19 pandemic (51).

2.2. Children and adolescents

In New Zealand, child and adolescent **outpatient services saw an average 60% increase** in referrals per month following lockdown, but no change was seen for adults (28). In addition, data of a sample pooled from 80 healthcare organizations, at which 22,152 paediatric patients had diagnoses related to EDs were analysed as shown in Figure 1 (38). No data was found on where and which organizations were used for the pooling analysis. **The rates of ED-related hospital admissions increased by 25%** overall for patients ages 12-18 as compared to predicted pre-pandemic trends in 2018 to 2020 (Figure 1) (38).

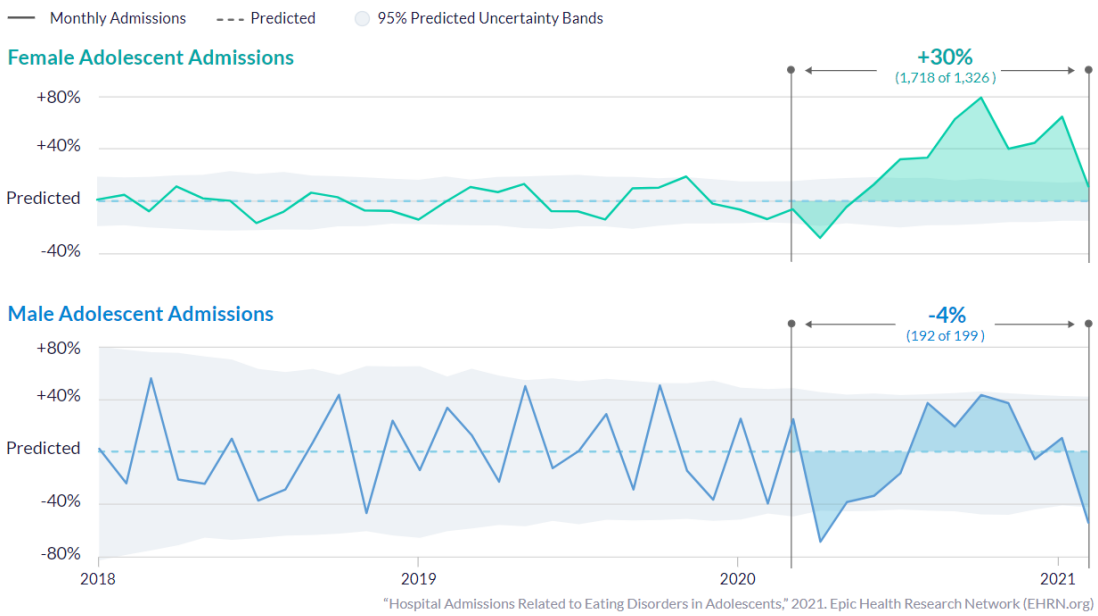

Figure 1: Data of a sample pooled from 80 healthcare organizations. No data was found on where and which organizations were used for the pooling analysis. Hospital admissions for patients 12-18 years old from January 2018 through February 2021. The dashed line indicates the pre-pandemic trend. The green and blue shaded areas indicate the percent change from predicted. Figure from epicresearch.org (38)

In terms of individual countries or regions, similar results were found. A report focused on mental illness rates in Germany between 2019 and 2022 found that **adolescents (aged 15 to 17 years) with an inpatient ED increased by 17%** in 2021 compared to 2020 and by 40% compared to

2019. The average hospitalization rate in 2020 was 181 cases per 100,000, and 213 cases per 100,000 in 2021. The proportion of school children (10-14 years) with an inpatient ED increased by 21% in 2021 compared to 2020. The average hospitalization rate in 2020 was 58 cases per 100,000, and 70 cases per 100,000 in the following year (52). Reduced access to services was also reported by carers of children and adolescents in Dublin, Ireland (53) and Liverpool, UK (54).

3. Potential positive impacts of COVID-19 on eating disorder rates

Conversely to the above-mentioned research, there were also positive aspects to the COVID-19 pandemic. The main positive consequences included more emotional support from the family, less pressure to engage in social activities, and more flexible meal planning. A systematic review found the overall prevalence of improved symptoms of ED was 9% from the pooled sample of 7,848 individuals (26). These results were also found in a more recent study from Turkey demonstrating that 42% of 38 participants experiencing improved ED symptomatology, while 21% experienced negative impacts (55). A systematic review of mostly European studies somewhat supports this (44 studies of 74), reporting positive outcomes of the lockdown, including making time for self-care, reduced in-person appearance comparisons and reduced weight monitoring. Patients with EDs specifically reported a reduction in ED symptomatology, increased motivation and attempts at self-management in recovery (56). These results are also echoed by researchers in Austria, finding that positive consequences of COVID-19 included improved family relationships, being less stressed, and having more time for self-care (57). Further, in Portugal, 42% of a sample of 26 patients in treatment at the time, reported improved clinical impairment assessment while 27% deteriorated; the majority of this cohort (over 60%) reported that the lockdown had no or mild changes on family income/employment, food access, family or friend support, stress in the family environment, which may indicate why more patients improved than deteriorated (58). Finally, in a 161 sample of Spanish adults, a study analysed risk of developing ED between March and May 2020. The study found that the lockdown did not have an impact on the sample's ED risk, eluding that it was because of the low prevalence of ED in the sample at baseline (59). This may be explained by Touyz et. al (2020), who speculate that those who already showed eating disorder behaviours before the pandemic are the ones that are particularly at risk of being affected by the lockdown (60). This explanation was concurred by Flaudias et al. (2020) (61).

2. In which population did the incidence increase the most (female/male, children/teenagers/adults, other)?

Summary:

The most commonly reported population to have increased ED diagnoses and treatment needs were female, younger ages and particularly adolescents.

Results:

In the pooled sample from 80 healthcare organizations using 22,152 paediatric patients mentioned above, it was found that **admission rates for females increased by 30%** from 2020 to 2021 (1,326 admissions were predicted and 1,718 occurred), as shown in Figure 1 (38). **Admissions for males did not increase** (199 admissions were predicted and 192 occurred) Whether the increase in hospital admissions was partly due to an overall increase in new diagnoses of EDs was also examined. There was a considerable difference in total number of visits between males and females as shown in Figure 2. In females aged 12-18, ED diagnoses increased by 15% compared to the previous years' predicted rates (38). In Washington, USA, the National Eating Disorders Association, reported **a 25% increase in eating disorder-related hospitalizations for 12-18 year olds** overall. **Girls 12-18 years old were hospitalized for eating disorders 30% more during** the pandemic (48). Similar findings were shown in a systematic review, which reported that **women and young people had greater concern** about their body image and appearance, faced more difficulties in regulating eating, and had a greater risk of worsening eating disorder symptoms during the lockdown (15).

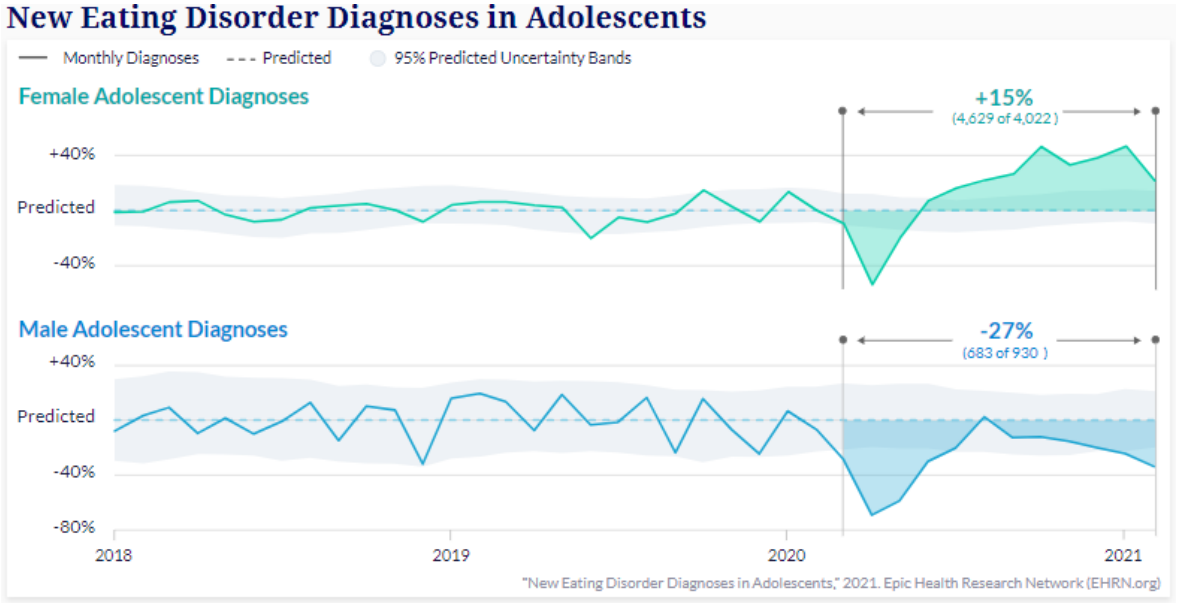

Figure 2: Data of a sample pooled from 80 healthcare organization. New eating disorder diagnoses from January 2018 to February 2021. The dashed lines indicate the pre-pandemic trend. The green and blue shaded areas show the percent change from predicted. Figure from epicresearch.org (38)

Single studies confirm the pooled findings above. A report focused on mental illness rates in Germany between 2019 and 2022 found that **girls aged 15 to 17 years old (424/100,000) were treated in hospital about 32.5 times as often as boys** (13/100,000). In 2021, **girls aged 10 to 14 years old (138/100,000) were treated in hospital about 23 times as often as boys** (6/100,000) (52). Two large cross-sectional and anonymous online surveys among university students (n=5642) were conducted in 2020 and 2021 in Germany with 20.5% (n = 226) who reported having anorexia nervosa. The analysis found that younger age, being female or reporting an 'other' gender, being single, having once or twice direct contact in comparison to having more direct contacts in a week, lower resilience and self-efficacy, higher loneliness and stress were all positive and significant predictors for more symptoms of anorexia nervosa (62). Similarly, in France, a large study of 5,738 university students (where 38% were at risk of an ED) found that **self-reported dietary restriction was significantly higher for women and for younger students**. Regarding BMI, compared to normal weight students, students with underweight and students with obesity reported more restriction. Binge eating episodes were significantly higher for women and those with overweight

and obesity. Lockdown related stress was also associated with a higher likelihood of dietary restriction in those with and without a probable existing ED (61).

From a sample of 3357 university students in Normandy, France, it was found that ED rates among women were stable between 30.6% and 31.8% in 2009 and 2018, respectively, however, **in 2021, rates increased rapidly to 51.8%.** A similar trend of ED was observed among men, from 11.3% in 2009 (with stability until 2018), to 31.3% in 2021 (63). Therefore, **one in three women and one in seven men had an ED** (63). Unpublished data from Dublin also reported an increased rate of males with EDs, by 40% (46). In-line with a later study conducted by the same research team in Normandy, **ED diagnoses were found in 51.6% of women in the sample and 31.9% in men** (51). Other studies also found **females were more at risk of developing an ED** or having their ED symptoms worsening during the lockdown (64). A dataset of 8471 patients from multiple countries found that the **increased risk of eating disorders during the pandemic period was limited to females, was greatest for 10- to 19-year-olds**, and mostly affected anorexia nervosa diagnoses (34). Only one multi-centre study showed dissimilar results, with adults being less resilient during the lockdown compared to younger people, as they showed worsened ED symptoms (65).

3. Which diagnostic sub-types increased the most?

Summary:

There was no consistency of reported worsening of symptoms for different ED sub-types, therefore, no conclusion could be made about which ED sub-type symptoms increased the most.

Results:

Studies showing high impact on binge-eating disorder

A multicentre international study collected between August 2020 and January 2021, from eight European and surrounding countries (Spain, n = 300; Austria, n = 43; Germany, n = 103; Russia, n = 119; Portugal, n = 28; Lithuania, n = 23; Czech Republic, n = 50; Ukraine, n = 10) (65). After adjusting by sex and age, patients with anorexia nervosa reported a significant worsening of over-consumption of certain palatable foods (eating style) and alcohol use. Patients with bulimia nervosa had an increase in weight, and a decrease in ED symptoms, but emotion dysregulation and alcohol use were increased. Individuals with binge-eating disorder reported increased weight, an impaired eating style and had an increase in anxiety-depression symptoms. Adult patients with binge-eating disorder were characterized by the highest increase in weight, BMI, and ED symptoms. They also reported increased anxiety-depression symptoms, decreased eating style, and the likelihood of

alcohol and other illegal drug use. Thus, findings from this study showed those with binge-eating disorder had more reported worsening of eating symptoms and change in weight during lockdown than those from other ED subtypes (65). Of a sample of Italian adults who filled in an online survey reporting binge eating episodes, there was no significant change in behaviours except for participants who reported binge eating both prior and during lockdown, where 92 (40.7%) reported an increase in binge eating disorder severity symptoms, and 134 (59.3%) did not (66).

Studies showing highest impact on bulimia nervosa

In a German sample, the impact theCOVID-19 pandemic had on former inpatients with anorexia nervosa with 42% reporting a worsening of their ED symptomatology and 52% a worsening of their quality of life (67) — the impact on ED symptoms seemed stronger in patients with bulimia nervosa (42). Almost twice as many patients with bulimia than those with anorexia nervosa reported a significant impairment of recovery and the development of new symptoms (42). Findings from Florence, Italy, concur, demonstrating that for bulimia nervosa patients, the COVID-19 period significantly interfered with recovery, exacerbating binge eating and compensatory physical exercise (68). Health care professionals in Italy reported that frequency of compensatory behaviours such as purging, vomiting, starvation and excess of exercise was increased in 41% of anorexia patients and 49.5% of bulimia nervosa patients but decreased in 14.6% and 21.8% respectively (total n = 453). A significant association between ED type and compensatory behaviours was seen for patients with bulimia nervosa (49). A sample of university students in Normandy, France reported that the most frequent type of ED to consult a health professional was bulimic ED (51). Similarly, in the same town, bulimia nervosa the most frequent ED regardless of gender and the year of the study, with a prevalence in 2021 of 29.8% among women and 15.7% among men. All types of EDs increased significantly between 2009 and 2021 except for restrictive EDs among men (63). Similar results were reported in Dublin (51).

Studies showing highest impact on anorexia nervosa

Conversely, a study from Spain found that anorexia and bulimia nervosa patients did not present significant changes in weight or BMI, and those with anorexia nervosa actually reported a significant decrease in ED symptomatology and in emotion dysregulation after confinement (69). However, another Spanish study showed that 25% of 74 patients experienced worsening ED symptoms during the lockdown, with symptom deterioration being greater among anorexia nervosa patients (70). Further, of a sample of nearly 2000 children in Canada, where hospitalizations nearly tripled,

the highest numbers of monthly cases was of newly diagnosed anorexia nervosa or atypical anorexia nervosa, with rates increasing by more than 60% (27).

4. Did the COVID-19 pandemic impact individuals already diagnosed with an eating disorder?

Summary:

Observational studies using global data found that between 38% and 87% of ED patients reported worsening symptoms. One Australian study demonstrated an increase of worsening anorexia nervosa symptoms that needed hospital admission by 104%.

Results:

It was rather difficult to differentiate new incidence of ED diagnoses in comparison to pre-existing ED diagnoses which worsened, as it was likely that COVID-19 made pre-existing ED symptoms more obvious (61). Two systematic reviews reported that social restrictions negatively impacted the psychological health, daily routines, and physical activity of individuals with EDs. More specifically, symptoms of anxiety and depression related to EDs were increased significantly over the period of COVID-19 (26, 14).

To date, most observational studies describe 38% - 87% of ED patients reporting worsening symptoms (71, 70, 67, 43, 72–74). A meta-analysis of 13 studies with a total sample of 3056 ED patients, published before August 2021, showed a pooled prevalence of **worsening ED symptoms for 57%, specifically: anxiety for 64%, and depression for 55%,** during the pandemic (75). A systematic review conducted on 11 papers from European populations (n= 4 from England, n=3 from Italy, n=2 from Spain, n=1 from Portugal and n=1 from Belgium) found an **overall worsening of ED symptoms, due to limited access to healthcare, dietary restriction and control, and emotion control leading to anxiety and depression** (15). Another systematic review reported a pooled prevalence of symptomatic deterioration in EDs to be 65% with **at least 75% of the individuals with EDs reporting shape and eating concerns, and increased thought about exercising** (74). In single studies, such as in the UK, found that of 129 patients already diagnosed with EDs, **86% reported slightly or moderately worsened symptoms, while over 30% reported that their symptoms were *much* worse** (72). Further studies from England, Spain and Germany reported an overall increase in symptomology in patients with active ED (72, 76–78, 69), with one study showing that this was due to facing challenges in controlling eating behaviour (77). In an Italian university sample (n=358), eating behaviour did not change except for students who reported

a history of EDs (79). In two further Italian studies, findings showed that psychopathology worsened during the pandemic due to heightened isolation and fear of contagion (80) and persisted in the re-opening period (81).

An analysis was conducted on a sample of 91 former inpatients with bulimia nervosa in Germany, where **nearly half (49%) reported a worsening of their ED symptoms and 61.8% a worsening of their quality of life** (42). Furthermore, **46% expressed a significant impairment of current psychotherapy and 40% reported that they developed new symptoms** such as self-induced vomiting, laxative use and diuretic abuse, as well as a higher drive for exercise (42); similarly, **66% of 331 participants in the Netherlands** (43) **reported increased severity of symptoms**.

Many studies reported ED relapse. A German study on intervention participants (n=34) who had reduced their ED symptoms pre-COVID-19, found **a significant increase in binge eating episodes after the lockdown, suggesting relapse** (82). In Italy, previously remitted patients experienced relapse and re-exacerbation of binge eating after lockdown (68). For example, out of 74 ED patients, 10 obtained full remission and 19 partial remission pre-lockdown. However, of these remitted individuals, **8 patients who had anorexia nervosa pre-lockdown relapsed to bulimia nervosa during lockdown**, while 11 participants reported full remission, 17 partial, but 21 still reported a diagnosis of anorexia nervosa and 25 of bulimia nervosa (68). A pilot study in Spain, including 13 participants with anorexia nervosa and 10 with bulimia nervosa, found that after only 2 weeks of quarantine, **almost 38% (12 out of 32) reported impairments in their ED symptomatology and 56.2% (18 out of 32) reported additional anxiety symptoms**, of whom, four patients noted that stress made it difficult for them to control their grazing behaviour and emotional eating (13). Another Spanish study showed that **42% of 365 participants experienced reactivation of ED symptoms** during the lockdown period however 80% of child and adolescent participants report their family relationship had improved during the 8-week confinement period, which was associated with alleviating anorexia nervosa symptoms (83). While the other study showed that **symptom evolution worsened in 19 patients (25.7%)** but became **less dominant in 38 (51%)** (70) and this was similarly reported in an international multicentre study (69).

Outside of Europe, ED day hospital closures occurred across Canada, Spain, Austria, USA, and the UK, thus the most severely ill ED patients were left without the intensive treatment they required (13). In the USA and the Netherlands (43), and Australia (73), adults with anorexia nervosa reported increased restriction and fears about not being able to find foods consistent with their meal plan;

those with bulimia nervosa and binge eating disorder reported increases in binge eating and urges to binge; all respondents with EDs noted greater concerns about COVID-19 on their mental health than physical health, as well as concerns of ED relapse related to confinement. In an online survey of Australians, **64.5% of ED respondents reported a little or a lot more food restriction, 35.5% reported increased binge eating behaviours, whereas 18.9% reported increased purging behaviours.** This study also showed that **34.6% - 48.9%** of ED patients **reported an increase in physical activity**. For those who did report a decrease in activity, the same anxieties around weight gain provided a driver for engaging in increasingly restrictive eating behaviours (73). Results from the Australian COLLATE survey indicated that many of the 180 respondents with self-reported EDs reported an **increase in binge eating (35.5%), purging (18.9%), restriction (64.5%),** and **compulsive exercise (47.3%)** (73). From the Perth Children's Hospital, it was reported that admissions for children under 16 years with anorexia nervosa (admitted for somatic stabilization: severe undernutrition, risk of cardiovascular distress) increased 104% in Australia between January and May 2020 (84).

5. What were the most important factors associated with COVID-19 that influenced the frequency of diagnosis or exacerbation of eating disorders?

Summary:

The most common reasons that EDs worsened during COVID-19 were reported as increased and decreased food access, more exposure to media and messaging, exercise limitations, restricted health care access, stress, anxiety, social isolation, trauma and abuse.

Results:

An Italian study, specifically looking at children with EDs with also a history of early traumatic experiences, found that the COVID-19 lockdown may have contributed to the vulnerability and impact of the pandemic, due to perceived **social isolation, forced cohabitation and heightened family conflict**, **disruption in routine activities and everyday life, heightened exposure to social media messages, and fear of contagion** (85). A change in food accessibility, with some patients reporting it as '**food security issues' may have exacerbated binge-eating symptoms** (65). An online cross-sectional survey of mental health disordered patients in Wales showed that younger age, difficulty accessing mental health services, low income, income affected by the pandemic 19, worry about COVID-19, reduced sleep and increased alcohol/drug use were associated with increased depression and anxiety symptoms and reduced well-being (86).

In an adult cohort, it was found that fear of COVID-19 was associated with **increased social media use, which in relation impacted dysfunctional eating behaviour** (87). While another study found that **household arguments and fear for the safety of loved ones** predicted increased symptoms during the lockdown (68). A study on a UK-based birth cohort of 2,657 young adults (aged 25 years in 2019) with **a previous history of either disordered eating, self-harm**, or comorbid disordered eating and self-harm, found that they were at **increased risk for poor mental health and wellbeing** during the COVID-19 pandemic (88). In Milan, patients with EDs in comparison to healthy controls, scored significantly higher on **stress, anxiety and depression** measures. Furthermore, patients with EDs reported higher levels of losing control in the presence of food, with increased thoughts about food and their body (89).

When lockdown measures eased for a while in 2020 and then again in 2021, the **fear of returning to 'normal'** was described in a study. ED patients reported the challenges of transitioning from a controlled environment (lockdown, at home) over their eating and/or exercise behaviours, to 'normality' where they typically have less control – even if this is a positive and necessary factor in their long-term ED recovery (90). One patient said: "I'm terrified at the thought of having to socialise over food again, and lose that aspect of total control I have over my life." (90). In a qualitative study conducted on ED patients in England and Scotland, similar themes were described. The findings highlighted the structures of social (social isolation, changes in accountability to others, and increased responsibility for self and others) and functional restrictions (lack of routine and structure, a need to intentionally plan activity, a desire for secrecy particularly around food shopping), as well as restrictions in accessibility to professional support, to be crucial determinants of mental well-being in this group. Personal experiences of disordered eating during lockdown were seen as a catalyst for either increased disordered eating behaviours or for a drive for recovery, depending on individual circumstances going into these restrictions, for example, **having no accountability if living alone, or having increased accountability if living with family or a partner** (91).

Conversely, one Lithuanian study of 1,850 university students found that the sample coped well during lockdown, with no body image or disordered eating changes found. However, **body appearance evaluation and media pressure increased in women** (small effect sizes), and **the internalization of thin/low body fat beauty ideals** (moderate effect sizes) were observed during the lockdown when compared to before COVID-19 (92). In Wales, reports that **feeling socially supported by friends/family/services was associated with better mental health** and well-being (86).

Discussion and Conclusion

Discussion:

This review was conducted to clarify whether eating disorder incidences and treatment demands increased in Switzerland as a result of the COVID-19 pandemic and related public health measures. Reports from health professionals who were interviewed for news reports reported a 30% increase in ED rates throughout 2020 and 2021, however, no empirical evidence using Swiss population data was found to support this.

It should be acknowledged that EDs relatively arise after a drastic event, in this case, COVID-19, however, ED rates are often estimated as not many organizations keep track of these figures, especially in Switzerland and other European countries. Therefore, monitoring and surveillance methods should be improved to capture true ED trends in the future.

Many stressful events, including COVID-19, contribute to the exacerbation of ED psychopathology and this highlights the relevance of internalizing symptoms in EDs (93, 26, 94). Thus, it could be proposed that since countries that did not implement prolonged and restrictive COVID-19 measures and still saw increases in ED rates (such as Australia and New Zealand), the stress associated with the pandemic alone could have been the burden. Therefore, it has been recommended that in the future, ED interventions focus on interpersonal and emotion regulation difficulties to improve ED patients and those at risk, with their subjective response to stressful events (93).

Limitations of this review should be acknowledged. First, lockdown measures were different across countries within Europe and internationally, thus the impact on ED patients might have differed. Furthermore, many of the systematic reviews already published reported that the quality of studies on this topic was predominantly poor. For example, the qualitative and mixed methods studies had mixed samples regarding age and diagnosis, and many lacked standardized questionnaires to assess symptoms, but drawing qualitative themes from interviews or survey responses. Studies currently have many heterogeneous features (e.g., the length of time under study for the analysis of hospital admissions), making them difficult to interpret (14). Finally, since most available data is from online questionnaires, this may result in biased samples of individuals who have access to technology and bias the results more negatively, as individuals experiencing worse symptoms tend to engage more in questionnaires (26). Due to these limitations, studies must be interpreted with caution, while more high-quality data should be collected, analysed and systematically reviewed.

Conclusion:

There have been reports of increased eating disorder rates in Switzerland, however, no empirical data were found to confirm such reports. In Europe and worldwide, estimations support a significant increase in ED incidence during the pandemic. The pandemic may have exacerbated the rate of already-increasing ED trends and treatment demands, as populations adjusted to COVID-19 and its related measures. However, current data need to be interpreted with caution as many studies reported predictions of ED rates, with reasons being that data on EDs are difficult to acquire and maintain. Since EDs are serious, often lethal illnesses with high costs for health care, we recommend the following for improving detection, monitoring and treatment of EDs. Developing health promotion measures, establishing and expanding effective prevention and de-stigmatization measures, and evidence-based early interventions could promote the early recognition of EDs by allowing patients to seek help early and several professional groups to detect EDs more rapidly. In addition, to improve early detection, monitoring and surveillance, Swiss education and other training organisations, companies, hospitals and private clinics could promote topic-specific education and optimize multi-professional collaboration through stakeholder networking and development of platforms or expert committees. Experts should continue to establish ways to improve the interfaces in the care of affected people and develop effective tools to strengthen the involvement of family and other support systems. Actioning these recommendations could be crucial for the physical and mental health of ED patients if another health crisis or pandemic were to occur.

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