COVID-19's Impact on Eating Disorder and Mental Health Concerns in Patients with Eating Disorders

Julia A. Vitagliano (✉ julia.vitagliano@childrens.harvard.edu)

Boston Children's Hospital <https://orcid.org/0000-0003-0316-9752>

Grace Jhe

Boston Children's Hospital

Carly Milliren

Boston Children's Hospital

Jessica A. Lin

Boston Children's Hospital

Rebecca Spigel

Boston Children's Hospital

Melissa Freizinger

Boston Children's Hospital

Elizabeth R. Woods

Boston Children's Hospital

Sara F. Forman

Boston Children's Hospital

Tracy K. Richmond

Boston Children's Hospital

Research Article

Keywords: COVID-19, Eating disorders, Mental health, Comorbidity, Mental health recovery, Adolescents

Posted Date: March 17th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-314541/v1>

License: This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Background

The Coronavirus (COVID-19) pandemic dramatically transformed daily life for adolescents and young adults, altering social and physical environments. Previous research has shown such shifts in daily life to be especially challenging for people living with eating disorders (ED). However, the extent of this environmental change on ED symptoms and mental health (MH) has been relatively unexplored in patients with EDs. This study examines the implications of the COVID-19 pandemic on ED and MH symptoms and motivation for ED recovery in adolescents/young adults.

Methods

Participants were enrollees in the Registry of Eating Disorders and their Co-morbidities OVER time in Youth (RECOVERY) who responded to an additional survey (n = 89) in July 2020 to assess the impact of the COVID-19 pandemic. Participants reported concerns of their ED worsening due to living in a “triggering environment” due to the pandemic as well as COVID-related changes in intrusive ED thoughts, depression, anxiety, isolation, and motivation to recover. Logistic regression models, adjusted for age and ED diagnosis, examined the association of triggering environment with MH and ED symptoms.

Results

The majority of respondents reported concern for “triggering environment” (63%), as well as increased ED thoughts (74%) and feelings of anxiety (77%), depression (73%), and isolation (80%) in response to the COVID-19 pandemic. Nearly one-third reported decrease in motivation to recover (29%). After adjusting for age and ED diagnosis, participants who reported triggering environment had nearly 18 times the odds of decreased motivation to recover (OR 18.1; 95% CI 3.37–97.4, $p = 0.003$) and nearly 24 times the odds of increased ED thoughts (OR 23.8; 95% CI 4.31–131.6, $p < 0.001$) compared to those who did not report a triggering environment.

Conclusions

Our findings demonstrate the negative impact the COVID-19 pandemic has had on the self-reported MH and ED symptoms in patients with EDs, particularly in those who report concern for a negative environmental change. These results underscore the need for heightened monitoring of patients with EDs during the pandemic.

Plain English Summary

The COVID-19 pandemic and subsequent stay-at-home orders implemented across the world dramatically altered daily life for people of all ages. Previous research has detailed the profound impact the pandemic has had on mental health (MH). Individuals with eating disorders (ED) represent a particularly vulnerable group during the COVID-19 pandemic due to the mental and physical complexity of EDs. This study explored how the COVID-19 pandemic has impacted the well-being and MH of individuals living with EDs.

Participants included adolescent/young adults (AYAs) with a diagnosed ED who were given a four-part survey on how the COVID-19 pandemic has impacted their ED symptoms and treatment and MH. AYAs in the study reported worsening of their ED symptoms and MH concerns due to the COVID-19 pandemic, with many reporting a decreased motivation to recover from their ED. Overall, individuals with EDs represent a particularly vulnerable group during the COVID-19 pandemic. Our results underscore the need for increased monitoring of patients with EDs during the pandemic.

Background

January 2020 marked the first confirmed case of the novel coronavirus (COVID-19) in the United States.¹ Consequently, daily life was dramatically transformed for people of all ages. Following rising cases throughout the U.S., many states implemented stay-at-home advisories and social distancing efforts, strongly recommending physical isolation and at-home quarantine for the health and safety of residents. School-aged children and young adults in 190 countries across the world experienced abrupt changes in their educational and social environments after school closures.²⁻⁴ Not surprisingly, early studies have demonstrated psychological consequences of the COVID-19 pandemic on children and young adults who have been quarantined and/or following stay-at-home recommendations. These consequences include post-traumatic stress symptoms, depression, anxiety, feelings of fear, isolation, and nervousness.⁵⁻⁷

Patients with eating disorders (ED) are at particular risk of the psychosocial implications of COVID-19 restrictions. The stay-at-home advisories and other safety recommendations⁸⁻¹⁰ surrounding the COVID-19 pandemic jeopardize ED treatment, potentially increasing ED symptomatology, social isolation, and stress/anxiety.⁸⁻¹⁰ Stress unrelated to COVID-19 has been shown to have serious consequences for patients with EDs, with stress possibly playing a role in ED onset¹¹⁻¹³ and relapse.¹⁴ Previous research suggests undergoing a negative stressful life event significantly predicted relapse for patients with EDs.¹⁴ Given the inherent stressful nature of the COVID-19 pandemic, these environmental stressors may negatively impact illness trajectory for many patients with EDs.

Motivation to recover from an ED is also critical for future ED-related treatment success. Higher levels of motivation for recovery plays a vital role in an individual's ED illness trajectory, such as positively influencing weight maintenance, treatment response, long-term maintenance of treatment gains, and improvement of ED pathology.¹⁵⁻¹⁹ Thus, identifying how to maintain motivation for recovery, despite the strain of the pandemic, is critical.

The COVID-19 pandemic and its related stressors have greatly influenced all aspects of young peoples' lives, however, the extent of this influence on patients with EDs is relatively unexplored. Closures of schools and other social distancing dramatically altered youths' environments and social dynamics, with many teens and young adults forced to abruptly leave school or living environments and return to their childhood homes. While this change in environment may be supportive for some, for others it is potentially distressing.^{20–21} Therefore, it is imperative to understand the role of these environmental disruptions on ED and mental health (MH)-related outcomes.

To address these gaps in research, we examined the implications of the COVID-19 pandemic on reported change in ED thoughts, feelings of anxiety, depression and isolation, as well as reported motivation to recover in a sample of adolescent and young adult patients with EDs. More specifically, we assessed whether environmental changes, particularly living in a “triggering environment” as a result of the pandemic, is associated with any reported changes in ED/MH symptoms and/or motivation to recover. Overall, we hypothesized the COVID-19 pandemic-related stressors (i.e. triggering environment) would be positively associated with an increase in ED intrusive thoughts, feelings of depression, anxiety, isolation, and low motivation to recover from an ED. Moreover, we hypothesized that individuals who expressed concern about a triggering living environment would report decreased motivation to recover and increased ED symptoms and feelings of depression, anxiety, as well as isolation.

Methods

Study sample

Our sample is the subset of participants (n = 89) in the Registry of Eating Disorders and their Co-morbidities OVER time in Youth (RECOVERY) who completed an optional survey to assess how the COVID-19 pandemic has affected their daily life. The RECOVERY Study is a longitudinal web-based registry of patients ages 10–27 (average age 17.1 years) seeking ED-related care in an outpatient ED program at Boston Children's Hospital. RECOVERY seeks to understand the longitudinal experience of youth with EDs, including their trajectories of illness relative to care. A convenience sample of patients with EDs presenting for subspecialty care (n = 161) were recruited between June 2017-August 2020 and asked to complete web-based surveys at regular intervals (every three months in year one of participation, every six months thereafter). In July 2020, three months after the onset of COVID-19 in the United States, we asked participants to complete an additional survey that was specifically COVID-related and was off-cycle relative to the regular survey schedule for participants. The COVID-19 survey asked about the impact of COVID-19 on their treatment, daily life, ED-related symptoms and behavior, and overall well-being. The study participants were not offered any remuneration for completing the optional survey in contrast to the other RECOVERY surveys; the response rate was 56%.

The RECOVERY study was approved by the Boston Children's Hospital Institutional Review Board.

Survey measures

Loading [MathJax]/jax/output/CommonHTML/jax.js

Survey measures were based on those used by colleagues for an adult sample⁹ and were adapted for an adolescent/young adult population. Likert scale, nominal, open-ended, and ordinal questions were asked in the four-part survey.

Outcome measures

ED/MH related concerns and motivation to recover from ED: Participants were asked “How has the COVID-19 pandemic affected each of the following:” “Feelings of anxiety,” “Feelings of depression,” “Feelings of isolation,” “Intrusive eating disorder thoughts,” and “Motivation to recover from an eating disorder.” A 5-point Likert scale was used with answers ranging from “increased significantly” to “decreased significantly.” Responses were classified into increased (increased significantly, increased somewhat), no effect, and decreased (decreased somewhat, decreased significantly).

Primary predictor variable

Triggering Environment: All participants were asked to rate their level of concern to the statement “I have been concerned about worsening of my eating disorder due to increased time living in a triggering environment.” “Triggering environment” was not further defined so responses were based on participants’ own definition. A 4-point Likert scale was used, with answers ranging from “not at all concerned” to “very concerned.” Triggering environment was dichotomized into “*any* concern” over ED worsening due to living in a triggering environment (slightly concerned, somewhat concerned, very concerned) vs. “not concerned” (not at all concerned).

Covariate Variables

ED diagnosis: Self-reported by patients from a list of eight options (e.g., anorexia nervosa (AN), atypical AN, avoidant restrictive food intake disorder (ARFID), bulimia nervosa, binge-eating disorder, purging disorder, other eating issue(s)/disorder(s), and I don’t know/unsure), allowing patients to choose all diagnoses they felt applied to them. For the purpose of analyses, ED diagnosis was dichotomized into any variant of AN (i.e., AN, atypical AN) vs. other ED.

Length of ED treatment: Calculated from date of patient’s ED clinic intake appointment to date of COVID-19 survey completion.

Age: Age at COVID-19 survey completion. A dichotomous variable was constructed comparing participants 18 years or older to those under 18 years.

Statistical analysis

We examined frequencies (percent) for categorical variables and means (standard deviation) for continuous variables. We compared responders to the COVID-19 survey to non-responders from the RECOVERY cohort by demographic factors (age, race/ethnicity and sex) and ED diagnosis using *t*-tests for continuous variables and χ^2 -tests for categorical variables. We examined bivariate associations between concern for triggering environment with self-reported changes in: intrusive ED thoughts; feelings of isolation; and motivation to recover using χ^2 -tests.

Multinomial logit regression analyses were used to examine the association between concern for triggering environment with self-reported changes in: motivation to recover, feelings of depression, feelings of anxiety, feelings of isolation, and intrusive ED thoughts, adjusting for age and ED diagnosis. All analyses were conducted using SAS (v9.4; Cary, NC) and *p*-value was considered statistically significant.

Results

Study Sample Demographics

Table 1 presents the demographic characteristics of our sample. The 89 RECOVERY participants who completed the COVID-19 survey (n=89 representing 56% response rate), did not differ from the overall RECOVERY participants (N=162) on age at enrollment, race/ethnicity, or sex. However, RECOVERY participants with a restrictive ED were more likely to respond to the COVID-19 survey compared to those with other diagnoses (61% of those with restrictive ED responded compared to 35% of those with other diagnoses, $p=0.004$). The large majority (84%) of COVID-19 survey respondents self-reported having a restrictive ED. The average age of patients at survey completion was 18.9 and 63% were over 18 (age range of survey participants was 13-27 years). Our study sample was majority female (89%) and White, non-Hispanic (78%). The majority of participants had been in ED treatment for at least one year, with more than half of participants (53%) reporting involvement with treatment for 2 years or more.

Impact of the COVID-19 pandemic on ED/MH symptoms and motivation to recover

A large majority of participants reported experiencing increased ED/MH symptoms due to the COVID-19 pandemic (see table 2): 73% of participants reported increase in depression, 77% increase in anxiety, 80% increase in isolation, and 74% increase in intrusive ED thoughts.

Nearly one-third of participants (29%) reported a decrease in their motivation to recover while 45% reported no effect of the pandemic on their motivation to recover.

Bivariate associations of concerns over triggering environment and ED/MH-related concerns

Many participants reported worrying about their ED worsening due to living in a triggering environment (63%). Such concerns were found to be associated with ED/MH symptoms and participants' reported motivation to recover (see Table 2). Motivation to recover from the ED, feelings of depression and intrusive ED thoughts were associated with living in a triggering environment ($p<0.001$, $p=0.03$, $p<0.001$, respectively) while feelings of anxiety and isolation were not ($p=0.23$, $p=0.71$, respectively).

Adjusted associations between reported concern for living in a triggering environment and change in ED/MH concerns

Table 3 presents the unadjusted and adjusted associations of concern for ED worsening due to living in a triggering environment with change in ED/MH-related concerns. Individuals who reported

concern for ED worsening due to living in a triggering environment had 18 times the odds of reporting a decrease in their motivation to recover (95% CI 3.37-97.4, $p=0.003$) compared to those who denied concerns of ED worsening due to living in a triggering environment. Those who reported concerns about their ED worsening due to living in a triggering environment had nearly 24 times the odds of reporting an increase in intrusive ED thoughts (95% CI 4.31-131.6, $p<0.001$) compared to those not concerned. Finally, those who reported concern for their ED worsening due to living in a triggering environment had increased odds of reporting worsening feelings of depression; this association, however, was attenuated after adjusting for age and diagnosis. Associations between triggering environment and feelings of isolation and anxiety were not significant.

Discussion

Our findings demonstrate the urgent implication of the COVID-19 pandemic on youth with EDs. The large majority of participants reported worsening of MH and ED symptoms and many reported declining motivation to recover as a result of the pandemic. Individuals also reported high degree of environmental disruption, with well over half of participants expressing concern that their ED would worsen due to living in a triggering environment. The report of living in a triggering environment was further associated with marked increased risk of reporting worsening MH/ED symptoms relative to no report of concern for a triggering environment. More specifically, concerns for their ED worsening due to living in a triggering environment were associated with increased intrusive ED thoughts and decreased motivation to recover.

As hypothesized, the majority (over 70%) of adolescent and young adult patients with EDs reported increases in intrusive ED thoughts, anxiety, depressive symptoms, and social isolation due to the COVID-19 pandemic. This is consistent with other studies of the impact of COVID-19 on patients with EDs. Rates of ED symptoms (e.g., dieting, excessive exercise, purging), anxiety, and depression among adolescent and adult populations with EDs have been consistently higher during the pandemic compared to other years, as evidenced by a significant increase in the number of helpline calls and online instant chats with their National ED Centre in Canada.²² Termorshuizen et al. (2020) found that adolescent and young adult participants with AN reported increased restrictive eating and fear about finding foods to follow their meal plans while those with bulimia nervosa and binge eating disorder reported increased binge-eating behaviors.⁹ Another study found that more adolescents and adults with AN agreed rather than disagreed that their ED symptoms and sadness had worsened.¹⁰ Research suggests that individuals with EDs may be experiencing worsening ED symptoms due to feelings of social isolation, which leads to loneliness, fewer distractions, more time to think about food, and increased opportunity to engage in disordered behaviors.^{21, 23}

Regarding individuals' motivation for recovery in the context of COVID-19, rates of reporting a decrease versus an increase in their motivation were similar (29% and 26%, respectively). Recent studies have identified potential factors that contribute to an increase in motivation for recovery, including increase in social support that challenges ED behaviors,⁹ positive influence from others (e.g., recovered role models,

advocacy groups, mentors), support for pro-recovery beliefs and lifestyle changes, and non-judgmental comments around weight or eating.²⁰ There is limited understanding of what contributes to decreased motivation during the COVID-19 pandemic. It is possible that the worsening quality of the parent-adolescent relationship or avoidance of negative or distressing emotions may be associated with decreased motivation to recover among adolescents with EDs.^{18, 24}

The present study found that more than a half of the participants reported feeling concerned that their ED would worsen due to living in a triggering environment. This finding is consistent with Termorshuizen et al.'s (2020) study on COVID-19-related concerns and EDs, which showed that about 58% of their participants reported concerns about worsening of ED symptoms due to living in a triggering environment.⁹ While "triggering environment" was not defined in the survey measure we adapted from colleagues,⁹ some examples included social media content on weight gain during quarantine, a lack of structure, and being at home all day.⁹ Given the age range of our population, with many college-aged participants, the worry about a triggering environment could also be related to an abrupt return to one's childhood home after being away at a university/college or living independently. Other COVID-19-related stressors that may further exacerbate ED symptoms include changes in daily schedule or routines^{21, 25} increase in financial stress,⁵ food insecurity,²⁶ as well as family conflicts.^{10, 27} Living and spending a large amount of time at home may be triggering, as some adults who had recovered from an ED had felt judged by family at home.²⁰ Family dynamics are important to consider given the age of the present study's participants, as many returned home or were required to spend more time at home during the lockdown.

Our study highlights the impact of environmental stressors on individuals' ED symptoms and motivation for recovery. We found that individuals who were concerned that their ED would worsen due to living in a triggering environment were 18 times more likely to report a decrease in their motivation to recover and nearly 24 times more likely to experience an increase in intrusive ED thoughts compared to those who denied any concerns about ED due to their environment. This is consistent with recent findings that lockdown restrictions, disrupted routines, increased time spent in a triggering environment, and decreased ability to engage in activities (including exercise) may lead to individuals' frustration and feelings of restlessness.^{9, 25} These individuals may also experience beliefs that they do not need to eat as much as they did pre-COVID, which may further be reinforced by media attention to weight gain during lockdown for the general public.^{25, 28} Individuals with EDs may also experience loneliness, social isolation, decreased social support, and a lack of distractions related to COVID-19, which can lead to greater focus or rumination on food and disordered eating behaviors^{21, 23} and greater difficulty with coping with ED cognitions.²⁹

These findings suggest that stressful environments—such as one brought upon by the current COVID-19 pandemic—may affect motivation to recover and ED/MH symptoms. The literature on COVID-19 has demonstrated the negative impact of COVID-19 on MH concerns (anxiety, depression, etc.). Our study

Loading [MathJax]/jax/output/CommonHTML/jax.js d to the pandemic and their unique effects on ED/MH

symptoms and motivation for recovery. To our knowledge, the present study is one of the first to look at COVID-19's impact on MH/ED symptoms and motivation to recover among an adolescent/young adult population with an ED.

Despite its aforementioned strengths, the present study is not without limitations. Though it was made clear to patients that this additional survey was to assess the effects of COVID-19 on their ED, we cannot make a definite conclusion that the many changes related to COVID-19 pandemic caused these MH and ED changes. Additionally, "triggering environment" was not defined in the survey measure used. Participants were asked if they had concerns about their ED worsening due to living in a triggering environment and thus, respondents may have retrospectively chosen this as a reason to explain why their ED has worsened. Although the majority of patients from our full sample responded to the survey (56%), it is still unclear how the remaining participants would have influenced our results. Our moderate response rate was likely partially due to these being additional surveys sent off-cycle in order for data to be collected in a timely manner. However, reassuringly, the responders only differed from the non-responders on ED diagnosis. Additionally, the majority of our patients were white and/or had a restrictive ED diagnosis and thus, our findings can't be interpreted for patients with other ED diagnoses (e.g. binge-eating disorder, bulimia nervosa) and other self-identified races and ethnicities. Due to small sample size, we carefully considered which variables to adjust for to avoid overfitting the model. Despite wide confidence intervals due to sample size, odds ratios were very large, indicating a compelling effect of the extent the COVID-19 pandemic has impacted patients living with EDs. Additionally, a sensitivity analysis collapsing "triggering environment" into "slightly concerned"/"no concern" vs. "somewhat concerned"/"very concerned" yielded similar overall results in adjusted analyses to the findings of the primary analysis reported in the results and tables. In order to provide a broader picture of how the COVID-19 pandemic impacted patients with EDs, future research should focus on the perspective of caregivers, as caregiver burden and stress may indirectly affect the MH and ED concerns of patients with EDs. Our findings illustrate the significant negative psychological impact COVID-19 has had on our patients with EDs and offers a potential explanation in environments impacted by the pandemic.

Conclusions

As the present study showed, the impact of the COVID-19 pandemic on ED-and MH-related concerns is significant. Understanding the COVID-19-related, deleterious environmental effects on ED symptoms and motivation for recovery is crucial in order for providers to support patients in coping with the sudden disruptions to their daily living with uncertain timeframe.

Abbreviations

ED- Eating disorder

MH- Mental health

AYA- Adolescent/Young adult

AN - Anorexia nervosa

ARFID - Avoidant restrictive food intake disorder

Declarations

Ethics approval and consent to participate

The RECOVERY study was approved by the Boston Children's Hospital Institutional Review Board. All participants completed informed consent in order to participate.

Consent for publication

Not applicable.

Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available due to patient confidentiality and the commitment given to all participants in protecting their identity. Data are available de-identified from the corresponding author on reasonable request and IRB approval.

Competing interests

The authors declare that they have no competing interests.

Funding

This work was supported in part by the Appleby Family Charitable Fund [95259]; Children's Hospital – Boston PPSQ [96204]; The McCarthy Family Fund; and by the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS) as part of a MCHP T71MC00009 LEAH training grant annual award totaling \$437,915 with 95% financed with non-governmental sources. The contents are those of the authors and do not necessarily represent the official views of, nor an endorsement by, HRSA, HHS, or the U.S. Government. For more information, please visit [HRSA.gov](https://www.hrsa.gov).

Authors' contributions

JV conceptualized the study, analyzed and interpreted the data, and was a major contributor in drafting the manuscript. JL and GJ made substantial contributions to the drafting of the manuscript and assisted with study design and data interpretation. CM assisted with study design, analyzed and interpreted the data, and MF assisted with data review and data interpretation, both substantially contributing to the manuscript. RS played a large role in RECOVERY study participant recruitment, helping lead data

Loading [MathJax]/jax/output/CommonHTML/jax.js iting the manuscript. EW and SF played major roles in study

design, data review, and made extensive revisions to the manuscript, substantially contributing to the manuscript. TR was a major contributor in RECOVERY study design, data analysis, interpretation and review, and writing and revising the manuscript. All authors reviewed and approved the manuscript.

Acknowledgements

The authors would like to thank all participants of the RECOVERY Study for their vital contribution to this study.

Authors' information (optional)

Address Correspondence to: Julia Vitagliano, Division of Adolescent and Young Adult Medicine, Boston Children's Hospital, Boston, MA. *Email Address:* Julia.vitagliano@childrens.harvard.edu; 617-355-4191

References

1. Holshue ML, DeBolt C, Lindquist S, Lofy KH, Wiesman J, Bruce H, Spitters C, Ericson K, Wilkerson S, Tural A, Diaz G, Cohn A, Fox L, Patel A, Gerber SI, Kim L, Tong S, Lu X, Lindstrom S, Pallansch MA, Weldon WC, Biggs HM, Uyeki TM, Pillai SK. First Case of 2019 Novel Coronavirus in the United States. *N Engl J Med.* 2020; doi:10.1056/NEJMoa2001191.
2. Singh S, Roy D, Sinha K, Parveen S, Sharma G, Joshi G. Impact of COVID-19 and lockdown on mental health of children and adolescents: A narrative review with recommendations. *Psychiatry Res.* 2020; doi:10.1016/j.psychres.2020.113429.
3. Shah K, Mann S, Singh R, Bangar R, Kulkarni R. Impact of COVID-19 on the Mental Health of Children and Adolescents. *Cureus.* 2020; doi:10.7759/cureus.10051.
4. United Nations Educational, Scientific and Cultural Organization. Learning never stops – tell UNESCO how you are coping with COVID-19 school closures. September 2020 [cited 2020 October 15], Available from: <https://en.unesco.org/news/learning-never-stops-tell-unesco-how-you-are-coping-covid-19-school-closures-0>.
5. Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N, Rubin GJ. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet.* 2020; doi:10.1016/S0140-6736(20)30460-8.
6. Zhao SZ, Wong JYH, Wu Y, Choi EPH, Wang MP, Lam TH. Social Distancing Compliance under COVID-19 Pandemic and Mental Health Impacts: A Population-Based Study. *Int J Environ Res Public Health.* 2020; doi:10.3390/ijerph17186692.
7. Jiao WY, Wang LN, Liu J, Fang SF, Jiao FY, Pettoello-Mantovani M, Somekh E. Behavioral and Emotional Disorders in Children during the COVID-19 Epidemic. *J Pediatr.* 2020; doi:10.1016/j.jpeds.2020.03.013.
8. Fernández-Aranda F, Casas M, Claes L, Bryan DC, Favaro A, Granero R, Gudiol C, Jiménez-Murcia S, Karwautz A, Le Grange D, Menchón JM, Tchanturia K, Treasure J. COVID-19 and implications for

- eating disorders. *Eur Eat Disord Rev.* 2020; doi:10.1002/erv.2738.
9. Termorshuizen JD, Watson HJ, Thornton LM, Borg S, Flatt RE, MacDermid CM, Harper LE, van Furth EF, Peat CM, Bulik CM. Early impact of COVID-19 on individuals with self-reported eating disorders: A survey of ~1,000 individuals in the United States and the Netherlands. *Int J Eat Disord.* 2020; doi:10.1002/eat.23353.
 10. Schlegl S, Maier J, Meule A, Voderholzer U. Eating disorders in times of the COVID-19 pandemic—Results from an online survey of patients with anorexia nervosa. *Int J Eat Disord.* 2020; doi:10.1002/eat.23374.
 11. Polivy J, Herman CP. Causes of eating disorders. *Annu Rev Psychol.* 2002; doi:10.1146/annurev.psych.53.100901.135103.
 12. Rojo L, Conesa L, Bermudez O, Livianos L. Influence of stress in the onset of eating disorders: Data from a two-stage epidemiologic controlled study. *Psychosom Med.* 2006; doi:10.1097/01.psy.0000227749.58726.41.68:628-35.
 13. Sassaroli S, Ruggiero GM. The role of stress in the association between low self-esteem, perfectionism, and worry, and eating disorders. *Int J Eat Disord.* 2005; doi:10.1002/eat.20079.
 14. Grilo CM, Pagano ME, Stout RL, Markowitz JC, Ansell EB, Pinto A, Zinarini MC, Yen S, Skodol AE. Stressful life events predict eating disorder relapse following remission: Six-year prospective outcomes. *Int J Eat Disord.* 2012; doi:10.1002/eat.20909.
 15. Castro-Fornieles J, Casulà V, Saura B, Martínez E, Lazaro L, Vila M, Plana MT, Toro J. Predictors of weight maintenance after hospital discharge in adolescent anorexia nervosa. *Int J Eat Disord.* 2007; doi:10.1002/eat.20340.
 16. Knowles L, Anokhina A, Serpell L. Motivational interventions in the eating disorders: What is the evidence? *Int J Eat Disord.* 2013; doi:10.1002/eat.22053.
 17. Carter JC, Kelly AC. Autonomous and controlled motivation for eating disorders treatment: Baseline predictors and relationship to treatment outcome. *Br J Clin Psychol.* 2015; doi:10.1111/bjc.12062.
 18. Espel HM, Goldstein SP, Manasse SM, Juarascio AS. Experiential acceptance, motivation for recovery, and treatment outcome in eating disorders. *Eat Weight Disord.* 2016; doi:10.1007/s40519-015-0235-7.
 19. Wade TD, Frayne A, Edwards SA, Robertson T, Gilchrist P. Motivational change in an inpatient anorexia nervosa population and implications for treatment. *Aust N Z J Psychiatry.* 2009; doi:10.1080/00048670802653356.
 20. Venturo-Conerly KE, Wasil AR, Dreier MJ, Lipson SM, Shingleton RM, Weisz JR. . Why I recovered: A qualitative investigation of factors promoting motivation for eating disorder recovery. *Int J Eat Disord.* 2020; doi:10.1002/eat.23331.
 21. Brown SM, Opitz MC, Peebles AI, Sharpe H, Duffy F, Newman E. A qualitative exploration of the impact of COVID-19 on individuals with eating disorders in the UK. *Appetite.* 2021; doi:10.1016/j.appet.2020.104977.

22. Richardson C, Patton M, Phillips S, Paslakis G. The impact of the COVID-19 pandemic on help-seeking behaviors in individuals suffering from eating disorders and their caregivers. *Gen Hosp Psychiatry*. 2020; doi:10.1016/j.genhosppsy.2020.10.006.
23. Branley-Bell D, Talbot CV. Exploring the impact of the COVID-19 pandemic and UK lockdown on individuals with experience of eating disorders. *J Eat Disord*. 2020; doi:10.1186/s40337-020-00319-y.
24. Zaitsoff SL, Taylor A. Factors related to motivation for change in adolescents with eating disorders. *Eur Eat Disord Rev*. 2009; doi:10.1002/erv.915.
25. Clark Bryan D, Macdonald P, Ambwani S, Cardi V, Rowlands K, Willmott D, Treasure J. Exploring the ways in which COVID-19 and lockdown has affected the lives of adult patients with anorexia nervosa and their carers. *Eur Eat Disord Rev*. 2020; doi:10.1002/erv.2762.
26. Gundersen C, Hake M, Dewey A, Engelhard E Food Insecurity during COVID-19. *Appl Econ Perspect Policy*. 2020; doi:10.1002/aep.13100.
27. Graell M, Morón-Nozaleda MG, Camarneiro R, Villaseñor A, Y áñez S, Muñoz R, Martínez-Núñez B, Miguélez-Fernández C, Muñoz M, Faya M. Children and adolescents with eating disorders during COVID-19 confinement: Difficulties and future challenges. *Eur Eat Disord Rev*. 2020; doi:10.1002/erv.2763.
28. Rodgers RF, Lombardo C, Cerolini S, Franko DL, Omori M, Fuller-Tyszkiewicz M, Linardon J, Courtet P, Guillaume S. The impact of the COVID-19 pandemic on eating disorder risk and symptoms. *Int J Eat Disord*. 2020; doi:10.1002/eat.23318.
29. McCombie C, Austin A, Dalton B, Lawrence V, Schmidt U. “Now It’s Just Old Habits and Misery” – Understanding the Impact of the Covid-19 Pandemic on People With Current or Life-Time Eating Disorders: A Qualitative Study. *Front Psychiatry*. 2020; doi:10.3389/fpsy.2020.589225.

Tables

Table 1. Demographic characteristics and eating disorder diagnosis among COVID-19 survey respondents from the RECOVERY study (N=89)

	n (%)		p-value	
	Overall (N=89)	Concern of ED worsening due to triggering environment		
		Yes (n=56)		No (n=33)
Age at survey completion (years), mean (SD)	18.9 (2.9)	19.2 (2.8)	18.4 (3.2)	0.20
Age 18 or above at survey completion	56 (63%)	40 (71%)	16 (48%)	0.03
Female at birth	80 (89%)	51 (91%)	29 (88%)	0.72
Race/Ethnicity				0.20
White, non-Hispanic	69 (78%)	41 (73%)	28 (85%)	
Other race/ethnicity ^a	20 (22%)	15 (27%)	5 (15%)	
Restrictive Eating Disorder Diagnosis	75 (84%)	52 (93%)	23 (70%)	0.004
Length of ED Treatment				0.49
<1 year	8 (9%)	6 (11%)	2 (6%)	
1-2 years	34 (38%)	23 (41%)	11 (33%)	
2 years or more	47 (53%)	27 (48%)	20 (61%)	

^aOther race comprised of n=7 Asian, n=6 Multiracial, n=4 Hispanic, n=2 Other race and n=1 Black
SD = standard deviation

Table 2. Change in ED/MH concerns due to COVID-19 and concern of ED worsening due to triggering environment

	n (%)		p-value
	Overall (N=89)	Concern of ED worsening due to triggering environment	
		Yes (n=56)	No (n=33)
Change in motivation to recover from ED			<0.001
Decreased	26 (29%)	24 (43%) 2 (6%)	
No effect	40 (45%)	17 (30%) 23 (70%)	
Increased	23 (26%)	15 (27%) 8 (24%)	
Change in feelings of depression			0.03
Decreased	4 (5%)	1 (2%) 3 (9%)	
No effect	20 (22%)	9 (17%) 11 (33%)	
Increased	65 (73%)	46 (82%) 19 (58%)	
Change in feelings of anxiety			0.23
Decreased	2 (2%)	1 (2%) 1 (3%)	
No effect	19 (21%)	9 (16%) 10 (30%)	
Increased	68 (77%)	46 (82%) 22 (67%)	
Change in feelings of isolation			0.71
Decreased	2 (2%)	1 (2%) 1 (3%)	
No effect	16 (18%)	9 (16%) 7 (21%)	
Increased	71 (80%)	46 (82%) 25 (76%)	
Change in intrusive ED thoughts			<0.001
Decreased	6 (7%)	2 (4%) 4 (12%)	
No effect	17 (19%)	2 (4%) 15 (45%)	
Increased	66 (74%)	52 (93%) 14 (42%)	

Table 3. Unadjusted and adjusted odds of change in ED/MH symptoms due to reported triggering environment (N=89)

Outcome	Unadjusted			Adjusted ^b		
	Odds Ratio (95% CI) ^a		p-value	Odds Ratio (95% CI) ^a		p-value
	Decreased vs.	Increased vs.		Decreased vs.	Increased vs.	
	No Change	No Change		No Change	No Change	
Change in motivation to recover from ED	16.2 (3.37, 78.3)	2.54 (0.88, 7.34)	0.002	18.1 (3.37, 97.4)	2.39 (0.78, 7.35)	0.003
Change in feelings of depression	0.41 (0.04, 4.62)	2.96 (1.06, 8.29)	0.043	0.35 (0.03, 4.28)	1.89 (0.61, 5.90)	0.25
Change in feelings of anxiety	1.11 (0.06, 20.5)	2.32 (0.83, 6.53)	0.26	0.62 (0.03, 12.6)	1.31 (0.39, 4.34)	0.81
Change in feelings of isolation	0.78 (0.04, 14.8)	1.43 (0.48, 4.31)	0.76	0.32 (0.01, 7.04)	0.68 (0.18, 2.59)	0.73
Change in intrusive ED thoughts	3.75 (0.40, 35.5)	27.8 (5.69, 136.4)	<0.001	3.74 (0.38, 37.2)	23.8 (4.31, 131.6)	<0.001

^aOdds ratios reported are for the primary predictor “concern of ED worsening due to living in a triggering environment” (yes vs. no) predicting each outcome.

^bAdjusted for age and restrictive diagnosis.