The Impact of The COVID-19 Pandemic On Binge Eating Behaviors In Adolescents And Young Adults

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Abstract

Background: The COVID-19 pandemic and subsequent public health measures have resulted in a worsening of eating disorder symptoms and an increase in psychological distress. The present study examines the impact of the COVID-19 pandemic on adolescents and young adults with bingeing behaviors and binge eating disorder (BED). Additionally, the study explores if individuals with food insecurity experienced increased binge eating symptoms and negative feelings.

Method: Participants (n=39) were a convenience sample who participated between November 2020 to January 2021 in a weight and lifestyle management program at an urban New England pediatric hospital. Participants completed online surveys that assessed (1) exposure to and impact of COVID-19 on binge eating behaviors, (2) participants' and their families' ability to attain food and its association with bingeing behaviors, and (3) the relationship between food insecurity and negative emotions.

Results: Nearly half of all participants (48.7%) reported moderate to severe bingeing during the COVID-19 pandemic; those who experienced a higher impact of COVID-related stress reported more binge-eating behaviors ($p = 0.03$). There were no associations between indicators of food insecurity and binge eating nor between food insecurity and negative feelings

Conclusions: Higher levels of pandemic-related stress were associated with greater binge-eating behaviors. It is necessary for clinicians caring for adolescents and young adults with bingeing behaviors monitor symptoms and provide treatment for their patients despite barriers to care imposed by the COVID-19 pandemic.

Plain English Summary

Research shows that the COVID-19 pandemic continues to have far-reaching adverse effects on mental health. For adolescents and young adults, the COVID-19 pandemic has altered critical aspects of their daily lives. The objective of this study is to investigate the impact of the pandemic on binge eating behaviors in adolescents and young adults, and to examine if individuals in households with food insecurity experience greater increases in bingeing behaviors and negative emotions such as feelings of anxiety, worry, mood, and loneliness.

Thirty-nine adolescents and young adults previously assessed in an outpatient weight and lifestyle management program at an urban pediatric hospital were surveyed between November 2020 to January 2021. Almost half (48.7%) of these participants reported an increase in bingeing behaviors during the pandemic and shutdown. Participants experiencing a higher impact of COVID-related stress reported the highest level of binge-eating behaviors. There were no associations between food insecurity and binge eating nor between food insecurity and negative feelings. This study highlights the importance of assessing patients' perception of how they experience the myriad impacts of COVID-19 on their daily lives, and the critical need for increases in accessible mental health services and continued support during the on-going pandemic.

Background

The COVID-19 pandemic has profoundly affected the epidemiology of eating disorders (EDs), particularly for adolescents and young adults. The initial lockdown period of the COVID-19 pandemic interfered with the recovery trajectory of patients with EDs, as some recovered patients experienced a return of binge eating and compensatory exercise.¹ Additionally, adolescents and young adults with EDs experienced an increase in symptoms, and those with past EDs were at risk for relapse during the pandemic.^{2,3} In one study, almost half of the children and adolescents with EDs experienced a return of ED behaviors, and those with severe EDs experienced symptoms of self-harm and increased suicide risk.³

Binge eating disorder (BED) is the most prevalent ED with lifetime prevalence of 2.2% for adults⁴ and 1.32% for adolescents.⁵ When sub clinical binge behaviors are considered, the prevalence is estimated at 3%.⁵ There have been numerous studies examining disordered eating and binge eating behaviors in adults during the pandemic.^{2,6,7,8} Adults with BED reported increases in binge eating and urges to binge, and many binged on 'stockpiled' food.² Among adults with a history of BED, binge eating frequency increased during the pandemic, placing them at risk for relapse,⁶ while increases of binge eating have also been found among the general population.⁸ However, research on binge eating behaviors among adolescents and young adults during the COVID-19 pandemic is limited.

Additionally, the COVID-19 pandemic has generated an economic crisis and resulting food insecurity,⁹⁻¹¹ researchers are concerned that this may exacerbate EDs and binge eating symptoms.¹² Individuals with food insecurity are more likely to have a diagnosis of BED¹³ and experience more frequent binge eating than those without food insecurity.¹⁴ In a recent study of American university students during COVID-19, students with food insecurity experienced significantly greater binge eating and ED-related impairment than students without food insecurity.¹⁴

Accordingly, the purpose of this study was to investigate the associations between the impact of the COVID-19 pandemic on binge eating behaviors among treatment-seeking adolescents and young adults. This study also examined the associations between food insecurity and binge eating behaviors, as well as food insecurity and feelings of anxiety, worry, mood, and loneliness among adolescents and young adults during the COVID-19 pandemic.

Methods

Study Design

We recruited individuals from a multidisciplinary outpatient weight and lifestyle management program at an urban pediatric hospital in the northeastern United States. This clinic serves patients who are referred by a healthcare provider or independently present for evaluation and treatment for BED, emotional eating, or lifestyle counseling for weight concerns and/or preparation for bariatric surgery.

All individuals between the ages of 13-26 years who were evaluated and/or treated from March 2019 to March 2020 were eligible. Only patients seen in the year prior to the onset of the COVID-19 pandemic were eligible as the goal was to evaluate active patient symptomatology during the initial lockdown period of the COVID-19 pandemic. We identified 70 patients who would comprise the sampling frame for the current study.

Eligible participants ($n = 70$) received an email from the research team introducing the purpose of the study, staff contact information, and an option to continue in or opt out of the study. Participants who responded expressing interest ($n = 48$, 69%) were provided with a link to a one-time survey in RedCap, an online database used to distribute surveys. The survey was preceded by an information sheet describing study rationale, procedures, and potential risks. Continuing with the survey constituted informed consent. Upon survey completion, subjects received a \$15 Amazon gift card. Surveys were completed from November 2020 to January 2021; the final sample consisted of 39 respondents. The study was approved by the Hospital Institutional Review Board.

Survey measures

Binge Eating Scale (BES). Binge eating was assessed using the BES,¹⁴ a 16-item self-administered questionnaire containing eight items that describe behaviors (e.g., eating fast or consuming large amounts of food) and eight items on feelings and cognitions (e.g., fear of not stopping eating). Each item has a response range from 0 to 3 points (0 = no problem, 3 = serious problem). Overall scores can be classified into one of three categories: (a) no binge eating (≤ 17); (b) mild-moderate binge eating (18–26); and (c) severe binge eating (≥ 27).^{15,16}

COVID-19 Exposure and Family Impact Survey - Adolescent and Young Adult Version (CEFIS-AYA). CEFIS-AYA is a 44-item measure which asks participants to reflect on experiences related to the COVID-19 pandemic and is comprised of two scales assessing exposure and impact.¹⁸ The 28-item (yes/no) Exposure Scale is calculated by totaling the number of affirmative responses that measure “exposure” to COVID-19 related events, including disruption in day-to-day life, difficulty accessing resources, financial stressors, and family exposure to COVID-19. Cronbach’s alpha for the Exposure scale was excellent (a $\frac{1}{4}$.80). The 16-item Impact Scale assesses the impact of COVID-19 across numerous domains, including physical (e.g., eating and sleeping) and emotional wellbeing (e.g., anxiety, worry, mood and loneliness). Fifteen of the Impact Scale items use a four-point Likert scale assessing how the pandemic has affected various facets of daily life (1=Made it a lot better, 4=Made it a lot worse), and 1 item uses a 10-point distress scale, where higher scores denote higher distress. Total CEFIS-AYA scores range from 15 to 98. Cronbach’s alpha for the Impact scale was excellent (a $\frac{1}{4}$.92).

Demographic form. A brief form queried participants’ race, gender, education status (i.e., in-school full-time or part-time, on school break or summer vacation, not currently in school), and work status (i.e., working full or part-time, not currently working).

Food insecurity. An *ad hoc* food insecurity questionnaire was developed using three items from the demographic form and one item from the CEFIS-AYA. Using the demographic form, participants were questioned on difficulty affording groceries (yes/no/sometimes), food availability (same/more/less) and worry about not having enough food (yes/no) and from the CEFIS Exposure Scale, difficulty getting food (yes/no).

Patient record information

Patient information, age and DSM-5 diagnosis were retrieved from clinic data using medical record numbers based on the timeframe of treatment. Data were de-identified and stored in an electronic database for analysis.

Statistical analyses

Given the limited sample size, a power calculation was conducted prior to analyses. Using a two-sided 0.05 level analysis of variance (Kruskal-Wallis) test and assuming that 30 patients were to be enrolled and equally distributed across the three binge eating severity groups, this study had 83% power to detect an association between the binge eating and CEFIS-AYA impact and exposure scales if the mean CEFIS-AYA scores across the mild, moderate, severe BES groups were 20, 40, and 60, respectively, with a standard deviation of 25 points. In a linear regression model, this power was maintained to detect a change in the regression coefficient for COVID-related stress as a predictor of BES.

Demographics were characterized with descriptive statistics. Categorical data were compared using Fisher's exact tests for associations between each of the categorical four negative emotion outcomes (anxiety/worry, mood, loneliness, distress) and each of the four different categorical food insecurity measures (difficulty affording groceries, food available in the house, worried about not having enough food in the house, and difficulty getting food). Between group comparisons on continuous outcomes were assessed through the Kruskal-Wallis test, with post hoc pairwise comparison using the Wilcoxon test. If univariate associations were significant, backwards stepwise regression was used for multivariable model fitting with selection for entry into the possible model at the 2-sided 0.20 level; criteria to remain in the final model was a 2-sided $p < 0.10$.

The primary analyses included all registered patients who completed the surveys ($N = 39$). No adjustments were made for multiple comparisons and all p -values are 2-sided. Data were analyzed with R, version 3.6.1.¹⁷

Results

Study Sample Demographics

Sample demographics are summarized in **Table 1**.

The Impact of COVID-19 on Binge Eating Symptoms

CEFIS-AYA Impact scores significantly differed by BES groups (Kruskal-Wallis chi-squared = 6.76, df = 2, $p=0.03$). The median of impact scores was 52.9 (range = 17-69) among non-binge eaters ($n=20$), 57 (range = 44.7-70) among moderate binge eaters ($n=12$), and 63 (range = 59-69) among severe binge eaters ($n=7$). A multivariable linear regression model was fitted to try to ascertain whether the association between (continuous) BES and impact scores was maintained after adjusting for other prognostic factors. Impact scores were significantly associated with higher BES scores ($F(2, 36)$ $R^2= 0.23$; beta (SE) = 0.27 (0.13), $p=0.04$; see **Table 2**), suggesting that greater COVID-related stress was associated with more binge eating behaviors. **Figure 1** illustrates the differences in CEFIS-IMPACT score by BES group.

There was no association between CEFIS-AYA Exposure Score and BES score in a linear regression model of continuous BES ($F(1, 37)$ $p=0.33$; $R^2= 0.03$; beta (SE) = 0.37 (0.37)).

Food Insecurity, Binge Eating Behaviors, and Negative Emotions

There was no association between the level of food insecurity and binge eating behaviors. Although there was a moderate univariate association between difficulty affording groceries and BES total score, this was not maintained in a multivariable model after attempting to adjust for age, race, and gender ($F(1, 37)$ $p=0.098$; $R^2= 0.07$; beta (SE) = -5.31(3.13)). There was also no association between food availability in the home ($F(1,37)$ $p=0.97$; $R^2= <0.001$; beta (SE) = -0.18 (4.12), worriedness about having sufficient food in the home ($F(1, 37)$ $p=0.40$; $R^2=0.02$; beta (SE) = -2.87 (3.39), nor difficulty getting food ($F(1,37)$ $p=0.84$; $R^2= 0.001$; beta (SE) = -0.92 (4.37)) and BES total score. Lastly, we did not observe association between negative feelings (emotional well-being, depression, loneliness, distress) and food insecurity.

Discussion

The COVID-19 pandemic appears to have had significant impact on adolescents and young adults with bingeing behaviors and BED. Nearly half of the participants with BED (48.7%) reported an increase in bingeing behaviors during the COVID-19 pandemic. Of note, those individuals who felt a higher impact from the COVID-19 pandemic were positively associated with binge eating symptoms, while COVID-19 pandemic exposures were not. The findings indicate that the perception of how the pandemic has affected various domains of life (e.g., physical and emotional well-being) contributed to binge eating behaviors, not merely the presence of stressors (e.g., financial stressors, limited access to resources).

The association between the impact of COVID-19 and an increase of binge eating symptoms in this study is consistent with literature.^{1,2,6} Many individuals experienced increased binge eating, overeating, and using food to cope during the COVID-19 pandemic.⁸ This occurrence is likely due to the relationship between higher psychological distress and a subsequent higher risk of eating disturbances.¹⁹ It is further possible that the pandemic has exacerbated individuals' experiences of stress and isolation, which are related to increases in emotional eating and overeating.²⁰ In fact, the social isolation of the COVID-19 pandemic may not only exacerbate ED symptoms, but also increase anxiety and stress for those with EDs.²¹ Difficulties with emotion regulation and a lack of coping skills during times of heightened stress

are known to trigger binge eating episodes.²² Our findings suggest that those patients who feel the COVID-19 pandemic has negatively impacted their lives across multiple areas and report the pandemic has made their daily life worse are at risk of exhibiting greater binge eating symptoms. Future research is needed to further examine the role of the COVID-19 pandemic and increased binge eating in the context of stress levels and pre-existing coping skills.

A secondary aim of this study was to examine if adolescents and young adults who had food insecurity during the COVID-19 pandemic experienced increased binge eating behaviors. Our data showed no associations between indicators of food insecurity and binge eating symptoms. This finding is inconsistent with previous research that found the COVID-19 pandemic contributed to an increase in bingeing behavior due to factors such as increased food insecurity and shortages.^{23,24} Although individuals may have experienced increased food insecurity, the current finding suggests that the experience of food insecurity alone in our population may not be associated with increased binge eating behaviors. It may be that our sample was too small to show effects, or participants were unaware of food insecurity in their households. Additionally, this study used single items for food insecurity rather than a validated measure.

The present study also did not find any significant association between COVID-19 pandemic-related food insecurity and negative feelings. As noted, it may be that our sample was not directly impacted by or aware of food insecurity in their household. Additionally, some data suggest that not all individuals experienced the pandemic as negative.²⁵⁻²⁸ In one study, participants identified that social distancing reduced social comparison, where others found increased time with family a deterrent to ED behaviors.²⁴ In another study, some participants reported that the COVID-19 lockdown was a 'catalyst' for increased motivation for recovery.²⁵ Perhaps some of our participants experienced increased support and less social anxiety by being at home which did not negatively impact mood despite being impacted by the COVID-19 pandemic and other stressors. The role of COVID-19 related negative feelings and food insecurity in adolescents and young adults and potential protective factors need to be further examined in a larger sample.

To our knowledge, this is one of the few studies to examine associations among the impact of the pandemic, binge eating, and food insecurity during COVID-19 in a cohort of adolescents and young adults, many of whom were diagnosed with BED. Limitations of this study should be noted. This was a small sample, though sample size calculations did allow for extrapolating findings from our analyses. Given the small sample size, we were not able to include pair wise comparisons; post-hoc tests were not performed. Additionally, surveys were self-reported and thus subject to reporting bias. Due to the self-selective nature of participation, the generalizability of findings may be limited. Surveys were completed from November 2020 to January 2021, eight months after the initial stay at home order, consequently, recall bias may have impacted responses to items inquiring about the start of the pandemic.

Overall, research with larger samples is needed to understand how adolescents and young adults with bingeing behaviors and BED are impacted during times of extreme stress. Due to the changing nature of

the pandemic and the increased demand for mental health services, this study suggests that close clinical attention must be given to these individuals.

Conclusions

The Covid-19 pandemic and subsequent public health measures have adversely impacted almost half of our sample of adolescents and young adults. Our study reinforces the importance of not only recognizing our patients' exposure to COVID-19 but assessing and understanding the impact of the pandemic on multiple domains of their lives. It is critical that medical institutions provide more extensive psychological support for patients who are exhibiting binge eating behaviors and help them develop adaptive coping strategies.

List Of Abbreviations

ED- Eating disorders

BED- Binge eating disorder

BES - Binge Eating Scale

CEFIS-AYA -COVID-19 Exposure and Family Impact Survey - Adolescent and Young Adult Version

Declarations

Ethics approval and consent to participate

The study was approved by the Boston Children's Hospital Institutional Review Board IRB-AR00035870-1. All participants completed informed consent to participate.

Consent for publication

The manuscript has not been simultaneously submitted or published elsewhere.

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.

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Authors' contributions

MF conceptualized the study, interpreted the data, and was a major contributor in writing and revising the manuscript. GJ made substantial contributions to data interpretation, and the drafting and revision of the manuscript. SD made substantial contributions to the study design, analyzed, and interpreted the data, and was a major contributor in creating the tables and figures, and the writing and revision of the manuscript. EP made substantial contributions to the study design and writing and revision of the manuscript. AR had a major role in data review, and made extensive revisions to the manuscript, substantially contributing to the manuscript. WS assisted with database management, data review and substantially contributed to the manuscript. LS made substantial contributions to the study design, data interpretation, and writing and revision of the manuscript. All authors reviewed and approved the manuscript.

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Tables

Table 1. Sociodemographic characteristics of adolescents and young adults (N =39)

Age	Mean (SD)	19.3 (3.2)
Race/ethnicity		
	Asian	1 (2.6)
	Black or African American	11 (28.2)
	Hispanic or Latinx	9 (23.1)
	White	18 (46.2)
Gender		
	Female	31 (79.5)
	Male	6 (15.4)
	Non-binary	1 (2.6)
	Prefer to self-describe	1 (2.6)
Diagnosis		
	Binge eating disorder	22 (56.4)
	Emotional or mindless eating	8 (20.5)
	Evaluation for bariatric surgery	6 (15.8)
	Other	3 (7.6)
Education		
	Graduated school	2 (5.1)
	In school full-time	16 (41.0)
	In school part-time	6 (15.4)
	Not currently in school	11 (28.2)
	On school break	4 (10.3)

Table 2. Linear Regression Summary Table: Association between COVID-related stress and binge-eating behaviors.

Variable	β	SE (β)	<i>p</i> -value
CEFIS IMPACT	0.2740	0.1318	0.04
Age	-1.0660	0.4407	0.02

Figures

Figure 1

CEFIS-IMPACT score by BES group