



Presentation of Patients with Eating Disorders to a Pediatric Quaternary-Level Care Emergency Department During the COVID-19 Pandemic

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Accepted: 4 August 2022 / Published online: 31 August 2022

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Abstract

Despite an overall decrease in utilization of emergency departments during COVID-19 (Hartnett et al. in *MMWR Morb Mortal Wkly Rep.* 69(23):699–704, 2020), US pediatric emergency departments experienced an increase in mental health visits for children and adolescents (Leeb et al. in *MMWR Morb Mortal Wkly Rep.* 69(45):1675–80, 2020). Simultaneously, individuals with eating disorders reported increasing symptomology (Termorshuizen et al. in *Int J Eat Disord.* 53(11):1780–90, 2020). This study compares Emergency Department utilization at a pediatric quaternary-level care center by patients with eating disorders during the pandemic (March–Dec 2020) vs March–Dec 2019. We hypothesize that there was an increase in presentation of patients with eating disorders. An Informatics for Integrating Biology and the Bedside query of the electronic medical record system identified patients with eating disorder diagnoses per ICD9/ICD10 codes aged 6–23 who presented to the Emergency Department between March 1st and December 31st of 2020 and 2019. Subsequent retrospective chart review was carried out. Patients were excluded from analysis if the presenting problem was not directly related to the eating disorder. During March–Dec 2019, 0.581% percent of all patients presented to the Emergency Department due to an eating disorder. During the same time frame in 2020, however, that percentage increased to 1.265%. Statistical significance was corrected using a Benjamini–Hochberg analysis. Despite a 66.5% decline in overall visits to the Emergency Department, the percentage of patients presenting with eating disorders doubled during the pandemic. During the pandemic, the total time spent awaiting placement significantly increased, and the number of patients identifying as transgender and/or nonbinary increased. Our data support the hypothesis that eating disorder presentation increased during the pandemic.

Keywords Eating disorders · Child and adolescent psychiatry · Emergency department · Boarding · 2SLGBTQIA+

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Background

Quarantine, lockdown, and social distancing due to the COVID 19 pandemic have significantly disrupted daily life routines. This may be especially difficult for children struggling with mental health issues, and is likely to precipitate mental health issues in children [4–6]. This disruption in daily routines may create more unstructured time and also lead to an increase in utilization of technology and social media [7]. A longitudinal ten-year study conducted before the pandemic found that high amounts of screen time followed by subsequent increase in screen time may be predictive of risk of suicide [8]. The disruption of support systems – from school, extracurricular activities, outpatient appointments, and social interactions – are also likely to have negative impacts on patients with disordered eating and/or eating disorders [9, 10]. Thus, the pandemic may be affecting children and adolescents not only as a stressful event [11], but also because of increased screen time and the inability to access previously supportive frameworks.

Despite an overall decrease in utilization of emergency departments during the COVID-19 pandemic [1], a survey of 73% of all US pediatric emergency department care saw a 24% increase in mental health visits for children ages 5–11, and a 31% increase for patients ages 12–17.² Simultaneously, individuals with eating disorders reported increasing symptomology [3], and data from inpatient units at Boston Children’s Hospital (BCH) demonstrated an increase in medical hospitalizations for patients with eating disorders during the pandemic [12]. This study compares utilization of the Emergency Department at a pediatric quaternary-level care center by patients with eating disorders during the pandemic, March–Dec 2020, compared to March–Dec 2019. We hypothesized that there was an increase in presentation of patients with eating disorders during the pandemic.

Methods

Sample and Measures

After obtaining IRB exemption, an Informatics for Integrating Biology and the Bedside (i2b2) query of the electronic medical record system identified patients with eating disorder diagnoses per ICD9/ICD10 codes between ages 6 and 23 who presented to the Emergency Department between March 1st and December 31st of 2020 and 2019. Subsequent retrospective chart review was carried out for each record. Patients and/or encounters were excluded from analysis if the presenting problem was not directly related to the eating disorder, or if their eating disorder was no longer an active problem.

Variables collected included demographic information, psychiatric history, and diagnostic variables; physical findings, assessments, and laboratory results; and utilization of care and disposition.

Analysis

Data from the 2020 cohort was then compared to the 2019 pre-pandemic cohort. Statistical analysis included t-tests, Chi square tests, and odds ratio/relative risk calculations. Statistical significance was corrected using a Benjamini–Hochberg analysis.

Percentage of patients presenting to the Emergency Department: Before and during the COVID-19 Pandemic

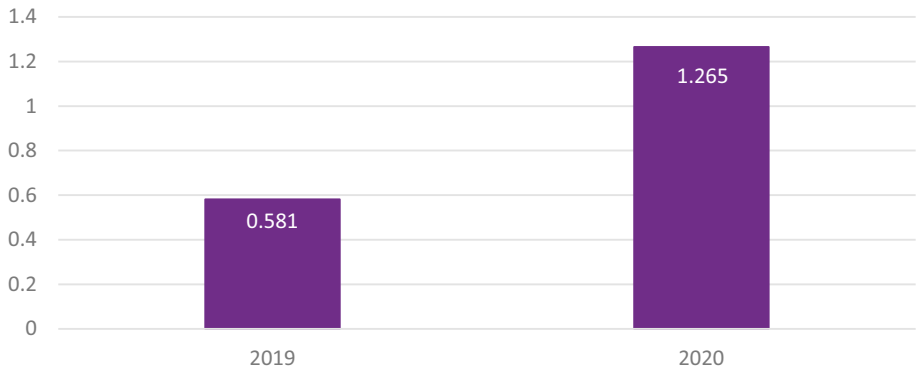


Fig. 1 Percentage of patients presenting to the Emergency Department: Before and during the COVID-19 Pandemic (This is a bar graph, where the X axis is the year of the cohort and the Y axis is the percentage of patients with eating disorders presenting to the Emergency Department. There is one column for each cohort for a total of two columns. The 2019 cohort bar is shorter than 2020 and has text that reads 0.581. The 2020 cohort bar has text that reads 1.265)

Results

The overall number of patients presenting to the emergency department from March through December decreased during the COVID pandemic. Prior to the pandemic, patients presenting to the Emergency Department due to an eating disorder comprised 0.581% percent of all patients. During the same time frame in the pandemic, however, that percentage increased to 1.265%. (OR = 2.191, 95% CI 1.687 to 2.845, $X^2(1, N = 27,504) = 36.401$, $p < 0.001$) (Fig 1). Additional patient characteristics are presented in Table 1.

We identified 96 patients who met inclusion criteria in 2019, of whom 15 identified as male and 81 identified as female; two patients identified as transgender, while no patients identified as nonbinary. In 2020, of 139 patients who met inclusion criteria, 11 identified as male, 123 as female, 6 as nonbinary, and 5 as transgender (Fig 2).

Presentation

The most common presenting problem as documented by the emergency room medical team across both cohorts was suicidal ideation/suicidal risk. In 2020, 31 encounters (15%) documented suicidality as the major presenting problem; overall 66 encounters (32%) involved patients who endorsed suicidality. Of the patients who endorsed suicidality at presentation, 41 (62%) patients endorsed active suicidality while 25 endorsed passive suicidality (37.9%).

In the pre-pandemic cohort, 20 encounters documented suicidality as the major presenting problem (14.2%) while 45 patient encounters overall endorsed suicidality

Table 1 Patient Characteristics

	2019	2020	<i>P</i> value
Unique patients presenting to Emergency Department (ED) 01 Mar – 31 Dec	16,515	10,989	
Unique patients presenting to ED due to eating disorder (%) *	96 (0.581)	139 (1.265)	0.009
ED encounters due to eating disorder	140	206	
Patients with > 1 visit to ED (%)	30 (31.25)	46 (33.1)	
Patient overlap between cohorts	8		
Demographics			
Patients identifying as male	15	11	
Patients identifying as female	81	123	
Patients identifying as nonbinary	0	6	
Patients identifying as transgender	2	5	
Age range, years (average ± SD)	9–20 (15.88 ± 2.4)	6–23 (15.73 ± 2.6)	
Private Insurance (%)	64 (66.67)	110 (79.14)	0.378
Public Insurance (%)	34 (35.42)	37 (26.62)	
Presentation			
Most common presenting problem (%)	Suicidal ideation/ Risk (14.2)	Suicidal ideation/ Risk (15)	
Number of encounters with suicidal patients (%)	45 (31.9)	66 (32)	
Patients endorsing active suicidality	28 (62.2)	41 (62)	
Patients endorsing passive suicidality	17 (37.7)	25 (37.9)	
Encounters with patients with abnormal vital signs (%)	44 (31.4)	78 (37.9)	0.39
Encounters with patients with abnormal EKG (%)	39 (27.9)	67 (32.8)	0.54
Encounters with patients with abnormal electrolytes (%)	14 (10.0)	41 (19.9)	0.378
Boarding			
Encounters resulting in boarding in ED (%)	38 (27.14)	57 (27.67)	0.991
Hours boarded in the ED* range, (mean ± SD)	6–96 (32.92 ± 23.68)	10–196.5 (52.83 ± 46.74)	0.102

Table 1 (continued)

	2019	2020	P value
Encounters resulting in boarding on medical floor (%)	5 (3.57)	8 (3.88)	
Days spent boarding on medical floor (mean ± SD)	1–7 (2.8 ± 2.39)	3–19 (8.125 ± 6.728)	
Total boarding hours* range, (mean ± SD)	6–199.5 (40.49 ± 39.87)	10–558.5 (77.37 ± 99.48)	0.006984
Assessment			
CGAS average score ± SD (valid assessments)	40.35 ± 13.993 (51)	39.62 ± 11.902 (65)	0.912
CGI average score ± SD (valid assessments)	4.60 ± 0.968 (53)	4.70 ± 0.835 (67)	0.707
Disposition			
Incoming from program (%) / returning to program (%)	22 (15.7) / 12 (8.6)	44 (21.4) / 26 (12.6)	0.39 / 0.4266
Discharge to inpatient (%)	54 (38.6)	89 (43.2)	0.54
Discharge to residential (%)	11 (7.9)	27 (13.1)	0.378
Discharge to partial hospitalization (%)	6 (4.3)	5 (2.4)	0.54
Discharge to outpatient (%)	68 (48.6)	85 (41.3)	0.39

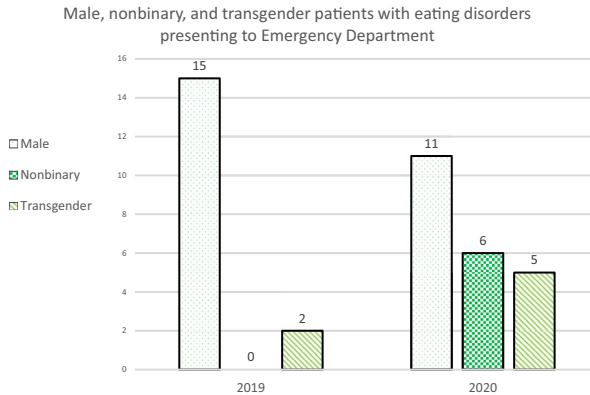


Fig. 2 Male, Nonbinary, and Transgender Patients with Eating Disorders Presenting to the Emergency Department (This is a bar graph where the X axis is the year of the cohort and the Y axis is the number of patients. 2019 has two bars, one representing the 15 male patients in the cohort. The second and final column in the 2019 cohort represents the two transgender patients in the cohort. There is no nonbinary column in the 2019 cohort in accordance with the data. To the right, the 2020 cohort has three bars: the first representing the 11 male patients in the cohort, followed by a bar representing the 6 nonbinary patients in the cohort, and the third representing the 5 transgender patients in the cohort)

(31.9%). Of those 45 patients, 28 endorsed active suicidality (62.2%) whereas 17 patients endorsed passive suicidality (37.7%). Chi square analysis confirms that there is no statistical significance between these cohorts regarding suicidality. ($p = 0.991$).

Boarding in the ED and Medical Floors

In addition to an increase in patient encounters, boarding time in the ED and on inpatient medical floors while awaiting psychiatric placement also greatly increased during the pandemic.

Prior to the pandemic, 38 encounters resulted in boarding in the Emergency Department, while only five encounters resulted in boarding on a medical floor pending psychiatric placement. The shortest boarding time in the ED was 6 h, and the longest was 96 h, with a mean of 32.92 ± 23.68 h. The shortest stay on a medical floor was 1 day and the longest was 7 days, for an average of 2.8 ± 2.39 days. Total hours spent boarding (by summation of ED boarding and inpatient boarding) ranged from 6 to 199.5, with a mean of 40.49 ± 39.87 h.

During the pandemic, 57 encounters resulted in patients boarding in the ED pending a psychiatric placement and 8 visits resulted in boarding on a medical floor as well. The shortest board time in the ED was 10 h, and the longest was 196.5 h; average length of stay was 52.83 ± 46.74 h. Inpatient boarding time ranged from 3 to 19 days, and total boarding hours (ED and inpatient combined) ranged from 10 h to 558.5 h, with an average of 77.37 ± 99.48 h.

The average total boarding time for patients with eating disorders significantly increased during the pandemic ($t(82.211) = -2.554$, $p = .012$, 95% CI -65.61 to -8.160) (Fig 3).

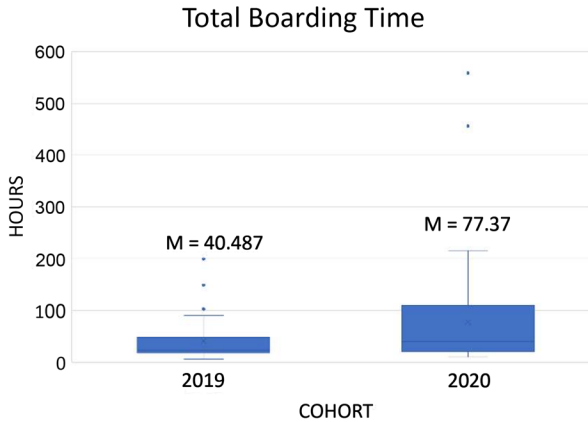


Fig. 3 This is a box and whiskers plot where the X axis is the cohort and the Y axis is the total boarding time in hours. There is one box for each cohort, for a total of two boxes within the plot. The 2019 cohort has a thinner box, with text that says $M = 40.487$ above the plot. The lower whisker lies above 0 on the Y axis while the top whisker lies below 100 on the Y axis. There are three dots above the top whisker, the top-most of which reach 199.5 on the Y axis. The 2020 cohort has a thicker, taller bar with text that says $M = 77.37$. The lower whisker lies above 0 on the Y axis, while the top whisker reaches over 200 on the Y axis. There are two dots above the top whisker, the top-most of which reaches 558.5 on the Y axis

Assessment & Disposition

The Boston Emergency Services Team (BEST) is involved in disposition planning for patients whose primary insurance is Medicaid. Thus, both insurance and BEST involvement in securing a higher level of care placement was evaluated as proxy markers for socioeconomic status to see if there may have been any differences in demographics affected by the pandemic. There was no statistical difference between the two cohorts in this collected parameter. ($p = 0.378$).

Several variables were collected as a proxy to gauge illness severity, none of which showed statistical significance. Discharge disposition was not statistically significant across inpatient units ($p = 0.54$) nor residential programs ($p = 0.378$) nor home/outpatient programs ($p = 0.39$). Additionally, the number of patients presenting to the emergency department from a treatment program did not differ greatly between the two years ($p = 0.39$) nor did the percentage of patients who returned to the program from the ED ($p = 0.4266$). In examining the number of encounters with patients who had abnormalities in vital signs, EKGs, or electrolytes, there was no statistical significance across all three ($p = 0.39$, $p = 0.54$, and $p = 0.378$, respectively).

Discussion

Our results support our hypothesis that there was a statistically significant increase in patients with eating disorders presenting to this Emergency Department during the COVID-19 pandemic, despite an overall decrease in Emergency Department utilization. This is consistent with international data demonstrating overall both decrease in utilization of care during the pandemic, potentially due to fear around accessing care during the pandemic [1] and simultaneous increase in eating disorder symptomatology [3, 12, 13]. Our findings, while representative of a single-center study, are also consistent with additional

data from across the country showing that both emergency department visits and hospitalizations for children and adolescents with eating disorders doubled during the pandemic [14, 15]. Furthermore, this data underscores the severity of the circumstances which led the American Academy of Pediatrics (AAP), the American Academy of Child and Adolescent Psychiatry (AACAP), and the Children's Hospital Association (CHA) to declare a national state of emergency in pediatric mental health in October 2021 [16].

The number of gender non-binary and transgender patients in this study was not large enough to compute statistical significance. However, it is worth noting that there were more gender non-binary and transgender patients presenting to the Emergency Department with eating disorders during the pandemic. Previous research suggests an association between eating disorder symptomatology in gender nonbinary and/or transgender individuals who experience minority stress and/or internalized transphobia [17]. Additional research from residential eating disorder programming also indicates that Two-Spirit, Lesbian, Gay, Bisexual, Transgender, Queer/Questioning, Intersex, Asexual (2SLGBTQIA+) individuals may experience more lifetime traumas and more eating disorder symptomatology than non-2SLGBTQIA+ clients [18]. Further research is needed to delve into the impact of the pandemic on the mental health of youth and adolescents who are gender non-binary, transgender, and/or identify as 2SLGBTQIA+, and how to best support them.

Boarding time in the Emergency Department and on medical floors increased during the pandemic. This is consistent with national data demonstrating that both the number of patients boarding and time spent awaiting psychiatric placement increased significantly during the pandemic [19]. In considering the boarding crisis, it is worth noting that the Joint Commission recommendation is that patients board for no longer than 4 h [20]. Finding placement for patients likely was complicated by the impact of the pandemic on treatment centers: in accordance with guidance, many programs slowed admissions and decreased census in order to minimize the spread of the virus. Programs with double rooms, for example, may have converted the rooms to single occupancy, while other hospitals may have converted psychiatric beds for medical placement [21, 22]. While these measures were necessary to address the pandemic, it is likely that they contributed to the increased boarding times for placement. The ongoing boarding and mental health crisis [16] spotlights the need for more resources to address mental health issues for children and adolescents, including expanding insurance coverage for mental health treatment across all levels of care.

Boarding time may be further exacerbated for patients with eating disorders who have comorbidities such as other psychiatric diagnoses and/or medical complications of their eating disorder. Residential and partial hospitalization treatment programs often require patients to have stable vital signs and electrolytes before they can be admitted to the program, and may have restrictions on admissions surrounding comorbidities and safety. Thus, patients with medical and/or psychiatric co-morbidities may experience extended boarding times while awaiting a placement.

The most common presenting problem in both cohorts was suicidal ideation/ risk. Previous research has demonstrated strong associations between eating disorders and suicidal ideation and also shown an increase in suicidality in adolescents during the pandemic [23–25]. This concerning evidence highlights the importance of making mental health care both more widely available and accessible for youth and adolescents.

Despite collecting multiple parameters to attempt to assess any changes in eating disorder severity between cohorts, no statistically significant differences occurred within the dataset. Defining “severity” of an eating disorder is a challenge – BMI, for example,

is not necessarily an accurate indication of illness severity nor medical state [23]. Weight is used to specify severity of anorexia nervosa in the DSM-V despite statistical evidence that this may not be accurate [23, 26]. In our data, both physical parameters (ie. BMI, abnormal vital signs; electrolyte imbalances) and psychological parameters (ie. suicidality, CGAS, CGI) along with disposition showed no statistical differences between the cohorts. In absence of a standardized, proven measure of “severity” of eating disorders, we cannot conclude that there was no change in “severity” of illness during the pandemic; rather, that our collected parameters did not demonstrate statistical significance between cohorts.

Similarly, we collected parameters as proxies to try to evaluate any differences in socioeconomic status (SES) of patients to try to capture any disproportionate impact(s) of the pandemic as related to SES. The parameters we collected – private vs public insurance, and involvement of the BEST team – did not show any statistical significance. We hypothesize that a larger dataset with expanded scope of mental health assessment may align with national and international data linking lower socioeconomic status and increased risk for psychological distress [27, 28].

Limitations

This study likely underestimates the number of children and adolescents who struggled with eating disorders during this timeframe within the pandemic, as it is a single-center study and only captured patients who presented to the Emergency Department. Patients with eating disorders who were admitted to this hospital who did not go through the Emergency Department were thus not captured in the study. Also, patients whose symptomatology increased but who did not present to the ED were thus also not accounted for. Additionally, patients whose symptoms may have started during the pandemic may have been especially hesitant to seek care, given the additional stress of the pandemic in addition to the known phenomenon of a delay in seeking treatment in part due to stigma [29].

Future Directions

Our data support the hypothesis that eating disorder presentation increased during the pandemic, and that patient boarding in the Emergency Department and on inpatient medical floors also significantly increased during this time. Further research is needed to elucidate contributing factors and address the effects of the pandemic on pediatric mental health. Expanding the dataset beyond our center would also increase the external validity of the study. Additional support is critical for these particularly fragile patients who are medically compromised and in crisis.

Author Contribution Study conception, design, material preparation, and data collection were performed by Margot Lurie and Dr. Zheala Qayyum. Statistical analysis performed by Dr. Georgios Sideridis. First draft of the manuscript written by Margot Lurie and Dr. Zheala Qayyum, and all authors commented on previous versions of the manuscript. All authors have read and approved the final manuscript.

Funding This study was supported by an American Academy of Adolescent and Child Psychiatry Summer Medical Student Fellowship grant.

Declarations

Conflicts of Interest The authors have no conflicts of interest to disclose.

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