

# Impact of COVID-19 on Pediatric Mental and Behavioral Health Visits to the Emergency Department

Jacqueline Bolt, MD,\* Faisal Mohamed Patel, MD,† Laura Stone, MD,‡ Divya Pandian, MPH,§  
Matthias M. Manuel, MD,\* and Nakia Gaines, MD\*

**Objectives:** This study aimed to describe changes in pediatric emergency department (ED) mental and behavioral health (MBH) visits before and during the early COVID-19 pandemic.

**Methods:** We retrospectively reviewed medical records of patients aged from 5 to 17 years presenting to the pediatric ED of a major tertiary care hospital with MBH-related concerns from March 2017 to September 2020. We evaluated trends in MBH ED visits over the study period, specifically comparing patient demographics, diagnosis categories, and ED disposition between the pre-COVID (2019) and COVID (2020) periods using pairwise Pearson  $\chi^2$  analyses with reported odds ratios (ORs) in SAS statistical software version 9.4 (SAS Institute Inc, Cary, NC).

**Results:** Of 8093 MBH-related visits, 58.5% were females, 85.4% were adolescents, and 62.7% self-identified as non-Hispanic. The proportion of MBH-related ED visits increased from 3.8% to 7.5% over the study period ( $P < 0.0001$ ). Although total MBH visits decreased by 17.3% from 2019 to 2020, there was a proportionate increase in MBH-to-total-ED visits, representing a 42.8% increase through 2019. Compared with 2019, there was a proportionate increase in MBH-related ED visits by females (10.6%,  $P < 0.0001$ ), older adolescents (18.2%,  $P < 0.0001$ ), and non-Hispanic patients (6.1%,  $P = 0.017$ ) in 2020. The MBH visits in 2020 were more likely related to suicidality/self-harm (OR, 1.2; confidence interval [CI], 1.1–1.4) or substance use (OR, 1.4; CI, 1.1–1.9). Compared with 2019, there were significantly higher odds of admission (OR, 1.6; CI, 1.3–2.1) or transfer for inpatient psychiatric care (OR, 1.8; CI, 1.6–2.1) in 2020.

**Conclusions:** Our data suggest that the early COVID-19 pandemic had a significant impact on MBH-related ED visits. Compared with 2019, we observed a significant increase in the proportion of MBH-to-total-ED visits primarily affecting older adolescent, non-Hispanic girls with suicidality/self-harm and substance-related disorders in 2020, despite an overall decrease in the number of MBH visits during this period. There was also an increase in the proportion of visits resulting in admission or transfer for inpatient psychiatric care in 2020.

**Key Words:** behavioral health, COVID-19, mental health

(*Pediatr Emer Care* 2022;38: 409–415)

The COVID-19 pandemic has been a rapidly evolving, yet unprecedentedly persistent reality for millions of Americans.

From the \*Division of Emergency Medicine, Department of Pediatrics, University of Texas Southwestern Medical Center/Children's Medical Center Dallas, Dallas; †Department of Emergency Medicine, Children's Medical Center Plano, Plano; and ‡Department of Psychiatry, Division of Child and Adolescent Psychiatry, University of Texas Southwestern Medical Center/Children's Medical Center Dallas; and §Department of Psychology and Psychiatry, Children's Medical Center Dallas, Dallas, TX.

Disclosure: The authors declare no conflicts of interest.

Reprints: Jacqueline Bolt, MD, Division of Emergency Medicine, Department of Pediatrics, University of Texas Southwestern Medical Center/Children's Medical Center Dallas, 1935 Medical District Dr, Dallas, TX 75235 (e-mail: jacqueline.bolt@utsouthwestern.edu).

Supplemental digital content is available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal's Web site ([www.pec-online.com](http://www.pec-online.com)).

Copyright © 2022 Wolters Kluwer Health, Inc. All rights reserved.

ISSN: 0749-5161

The widespread fear, anxiety, anger, and despair concerning not only the virus itself, but also its far-reaching social and economic impacts, have broadly infiltrated society.<sup>1–3</sup> Indeed, children are not immune to the emotional influence of the pandemic because it has disrupted and continues to shape their education, peer interactions, and numerous other facets of daily existence.<sup>4,5</sup>

It is estimated that, in the United States, mental health and substance abuse concerns comprise between 2% and 7% of all pediatric emergency department (ED) visits.<sup>6,7</sup> During the last decade, the proportion of pediatric patients presenting to the ED with mental and behavioral health (MBH) concerns has increased dramatically.<sup>6,7</sup> Research on the psychological effects of natural disasters and other traumatic events, such as the 9/11 terrorist attack, has demonstrated elevated rates of posttraumatic stress disorder in both adults and children directly affected by these events.<sup>8,9</sup> In addition, other psychological consequences such as panic attacks, anger, depression, and suicide have previously been connected with quarantine.<sup>10</sup>

During the early COVID-19 pandemic, a number of articles expressed concerns about the potential worsening of children's mental health.<sup>1,2,11</sup> As the pandemic has carried on, however, more recent literature has begun to objectively investigate the psychological impact of the pandemic and the associated social distancing on children and adolescents.<sup>12–16</sup> Recent studies have also begun to evaluate the pandemic's impact on pediatric MBH visits to the ED.<sup>17–22</sup> The overall objective of this study was to explore the impact of the COVID-19 pandemic on pediatric ED MBH visits, comparing 2019 (pre-COVID period) with 2020 (COVID period). We evaluated trends in MBH visits from 2017 to 2020 and specifically compared changes in visit pattern, patient demographics, diagnosis categories, and ED disposition between 2019 and 2020.

## METHODS

### Study Design and Procedures

This is a retrospective study of children aged from 5 to 17 years presenting to the pediatric ED of a major tertiary care children's hospital with complaints pertaining to MBH before and after the onset of the COVID-19 pandemic and widespread social distancing regulations in the United States. As a baseline, we evaluated trends in these visits from March through September 2017, 2018, and 2019. We specifically compared proportions of MBH visits from March through September 2019 with those seen during the same time frame in 2020. Our pediatric ED serves a large metropolitan area, with an average annual volume of more than 170,000 visits by patients younger than 18 years in 2017 to 2019; this volume decreased to just more than 100,000 in 2020. In the 5 counties containing and surrounding our institution, there are approximately 350 inpatient pediatric psychiatry beds.

We included patients aged from 5 to 17 years who were evaluated in the ED and who received either a primary psychiatric or behavioral ED diagnosis (as defined by *International Classification of Diseases, Tenth Revision [ICD-10]* code), a Mental Health Assessment Team (MHAT) consult, or a psychiatry consult. We

chose 5 years as the lower age limit for our study population given the low likelihood of MBH diagnosis in younger children.<sup>6</sup> The ED diagnosis is the *ICD-10* diagnosis code given to the patient by the ED provider before admission, transfer, or discharge from the ED. Psychiatric or behavioral ED diagnoses were defined by a list of applicable *ICD-10* codes, adapted from previous studies by investigator consensus (see Table, Supplemental Digital Content 1, <http://links.lww.com/PEC/B2>, which details the *ICD-10* codes included in each MBH diagnosis category).<sup>6,23,24</sup> Mental Health Assessment Team and psychiatry consults are the standard of care at our institution for further evaluation of mental health concerns deemed serious by the ED clinician and result in the assessment of each patient by a mental health professional. This 3-pronged approach to identify patients with an MBH concern (presence of an applicable *ICD-10* code, MHAT consult, or psychiatry consult) was chosen to allow for the broadest capture of MBH patients seen in our ED because each individual patient may receive 1, 2, or all 3 of these during the course of their encounter.

Patients were excluded if they were younger than 5 years or older than 17 years; did not receive a MHAT consult, psychiatry consult, or primary psychiatric or behavioral ED diagnosis; or presented outside of the study time frame. Data collected included date of ED visit, age, sex, race/ethnicity, insurance type, *ICD-10* primary visit diagnosis, presence of MHAT consultation, presence of psychiatry consultation, ED disposition, and presence of previous ED visit for mental or behavioral health concerns. Annual total ED and annual total MBH visit numbers included those patients aged from 5 to 17 years seen from March to September of 2017, 2018, 2019, and 2020. Data were gathered from the Epic (Epic Systems Corporation, Verona, Wis) electronic health record of our institution. Data were extracted from charts by the institution's data intelligence service and captured in a Microsoft Excel (Microsoft Corporation, Redmond, Wash) spreadsheet. In the case of missing data or variables requiring clarification, the lead author performed additional chart review. This study was deemed to be exempt by the institutional human subjects review board.

## Data Analysis

Encounters meeting the inclusion criteria were defined as *MBH visits*. We performed descriptive statistics including frequencies and percentages for all categorical variables. Age was further categorized into clinically meaningful intervals. We computed differences in the number and proportion of visits between 2019 and 2020, generating percent change in the proportion of visits for objective comparison of demographic and diagnostic categories using pairwise Pearson  $\chi^2$  analyses at  $\alpha = 0.05$  statistical significance level. We reported odds ratios (ORs) with confidence intervals (CIs) and *P* values as appropriate. All analyses were performed using SAS statistical software version 9.4 (SAS Institute Inc, Cary, NC).

## RESULTS

There were 8093 patients who met our inclusion criteria out of the 161,871 total patients aged from 5 to 17 years who presented from March 2017 through September 2020. Emergency department volumes, patient demographics, and diagnostic characteristics are shown in Table 1. The number of pediatric MBH patients and the proportion of ED visits for an MBH concern increased steadily from 2017 to 2019, growing from 1731 patients (3.8% of total ED visits in children aged 5–17 years) in 2017 to 2419 patients (5.3% of total ED visits in children aged 5–17 years) in 2019, an overall increase of 36.7% (Table 1, Fig. 1). Analysis of trends in MBH visits from 2017 to 2020 showed significant changes by sex, age group, ethnicity, race, insurance status, MHAT or psychiatry consult, disposition, first MBH visit, and several diagnostic

categories (Table 1). The total ED volume decreased 42.1% from 2019 to 2020 (Table 1). Although the number of MBH visits also decreased from 2019 to 2020, the proportion of MBH-to-total ED visits increased by 42.8%, with MBH visits accounting for 7.5% of ED visits in 2020 (Table 1, Fig. 1).

Between 2019 and 2020, the number of females and males visiting the ED with MBH-related concerns decreased by 8.6% and 28.7%, respectively (Table 2). However, as a proportion of total annual MBH visits, visits by females with MBH-related concerns increased by 10.6%, with females having 1.2 times the odds of an ED visit in 2020 compared with 2019 (confidence interval [CI], 1.1–1.5; Table 2). Between 2019 and 2020, MBH visits by patients aged from 5 to 9 years and from 10 to 14 years decreased by 36.5% and 22.2%, respectively (Table 2). Visits by patients aged from 15 to 17 years showed an absolute decrease of 2.3%, yet as a proportion of total annual MBH visits, this age group showed an increase of 18.2% in presentations, with 50% higher odds of ED visit in 2020 as compared with 2019 (OR, 1.5; CI, 1.3–1.5; Table 2).

Mental and behavioral health visits by Hispanic and non-Hispanic patients decreased by 24.6% and 12.3%, respectively (Table 2). The proportion of Hispanic MBH patients decreased by 8.8%, whereas the proportion of non-Hispanic MBH patients increased by 6.1% (OR, 1.2; CI, 1.1–1.3; Table 2). Visits by Asian patients increased by 6% (+28% as a proportion of MBH visits; OR, 1.9; CI, 1.2–2.9), and visits by Black patients decreased by 14.6% (+3.3% as a proportion of MBH visits; OR, 1.5; CI, 1.2–1.9; Table 2). Visits by White patients decreased by 14.8% (+3.1% as a proportion of MBH visits; OR, 1.5; CI, 1.2–1.9; Table 2).

Analysis of ED visit characteristics revealed that MBH discharges decreased by 30.5%, MBH transfers to a psychiatric facility increased by 25.6%, and MBH admissions for medical care increased by 12.5% (Table 2). As a proportion of MBH visits, discharges decreased by 16%, transfers to a psychiatric facility increased by 51.8% (OR, 1.8; CI, 1.6–2.1), and admissions for medical care increased by 36.1% (OR, 1.6; CI, 1.3–2.1; Table 2). The number of patients presenting with a first-time MBH concern decreased by 20.6% (Table 2).

There was a decrease in the number of anxiety disorders (–42.6%), and a significant decrease in the proportion of anxiety disorders (–30.6%; OR, 0.7; CI, 0.5–0.9; Table 2). There was an increase in the number (+17.8%) and proportion (+42.5%) of substance-related disorder diagnoses, and these diagnoses were 1.4 times more likely to occur in 2020 (CI, 1.1–1.9; Table 2). The number of diagnoses related to suicide and self-injury decreased by 6.2%, whereas the proportion of these diagnoses increased by 13.5% (OR, 1.2; CI, 1.1–1.4; Table 2). Diagnoses related to attention-deficit, conduct, and disruptive behavior disorders showed a decrease (–44.2% absolute decrease, –32.5% as a proportion of MBH visits; OR, 0.6; CI, 0.5–0.8; Table 2).

## DISCUSSION

From March to September 2019 to March to September 2020, total pediatric ED visits and MBH-related ED visits decreased substantially. However, compared with the same time period in 2019, there was a proportionate increase in MBH-to-total ED visits during the early COVID-19 pandemic. The decline in total ED volume followed recommendations for social distancing, closure of schools and daycares, and other societal modifications that impacted typical pediatric ED patient numbers.<sup>19,25,26</sup> On review of our institution's overall ED visit trends, there was a notable decline in the number of patients with respiratory infections presenting in 2020. Nationally and at our own institution, pediatric MBH visits have been increasing over time, and the number of

**TABLE 1.** Demographic and Diagnostic Characteristics

Variables	Description	All Visits	2017	2018	2019	2020	P
Total pediatric ED visits		161,871	46,105	43,381	45,851	26,534	
MBH visits		8093	1731	1943	2419	2000	
% MBH visits		5.0%	3.8%	4.5%	5.3%	7.5%	<0.0001
		<b>All Visits (n = 8093)</b>	<b>2017 (n = 1731)</b>	<b>2018 (n = 1943)</b>	<b>2019 (n = 2419)</b>	<b>2020 (n = 2000)</b>	<b>P</b>
Sex	Female	4738 (58.5%)	1016 (58.7%)	1105 (56.9%)	1367 (56.5%)	1250 (62.5%)	0.0002
	Male	3355 (41.5%)	715 (41.3%)	838 (43.1%)	1052 (43.5%)	750 (37.5%)	
Age	5–9 y	1183 (14.6%)	294 (17.0%)	315 (16.2%)	351 (14.5%)	223 (11.2%)	<0.0001
	10–14 y	3931 (48.6%)	805 (46.5%)	944 (48.6%)	1227 (50.7%)	955 (47.8%)	
	15–17 y	2979 (36.8%)	632 (36.5%)	684 (35.2%)	841 (34.8%)	822 (41.1%)	
Ethnicity	Hispanic	2939 (36.3%)	607 (35.1%)	697 (35.9%)	932 (38.5%)	703 (35.2%)	<0.0001
	Non-Hispanic	5075 (62.7%)	1083 (62.6%)	1233 (63.5%)	1470 (60.8%)	1289 (64.5%)	
	Unknown	79 (1.0%)	41 (2.4%)	13 (0.7%)	17 (0.7%)	8 (0.4%)	
Race	AIAN	17 (0.2%)	1 (0.1%)	3 (0.2%)	7 (0.3%)	6 (0.3%)	<0.0001
	Asian	177 (2.2%)	22 (1.3%)	52 (2.7%)	50 (2.1%)	53 (2.7%)	
	Black or African American	1508 (18.6%)	276 (15.9%)	357 (18.4%)	472 (19.5%)	403 (20.2%)	
	NHPI	9 (0.1%)	2 (0.1%)	3 (0.2%)	1 (0%)	3 (0.2%)	
	White	5520 (68.2%)	1195 (69.0%)	1313 (67.6%)	1626 (67.2%)	1386 (69.3%)	
	Other/unknown	862 (10.7%)	235 (13.6%)	215 (11.1%)	263 (10.9%)	149 (7.5%)	
Insurance	Public	4117 (50.9%)	857 (49.5%)	954 (49.1%)	1280 (52.9%)	1026 (51.3%)	0.0002
	Private	3337 (41.2%)	756 (43.7%)	842 (43.3%)	918 (38.0%)	821 (41.1%)	
	Self-pay	515 (6.4%)	102 (5.9%)	117 (6.0%)	166 (6.9%)	130 (6.5%)	
	Other	124 (1.5%)	16 (0.9%)	30 (1.5%)	55 (2.3%)	23 (1.2%)	
MHAT/psychiatry consult	Yes	6617 (81.8%)	1365 (78.9%)	1585 (81.6%)	2004 (82.8%)	1663 (83.2%)	0.0025
	No	1476 (18.2%)	366 (21.1%)	358 (18.4%)	415 (17.2%)	337 (16.9%)	
Disposition	Discharge	5821 (71.9%)	1299 (75.0%)	1487 (76.5%)	1791 (74.0%)	1244 (62.2%)	<0.0001
	Transfer to psychiatric facility	1567 (19.4%)	243 (14.0%)	300 (15.4%)	454 (18.8%)	570 (28.5%)	
	Admit for medical care	543 (6.7%)	149 (8.6%)	122 (6.3%)	128 (5.3%)	144 (7.2%)	
	Other	162 (2.0%)	40 (2.3%)	34 (1.8%)	46 (1.9%)	42 (2.1%)	
Visits	First MBH visit	5130 (63.4%)	1161 (67.1%)	1287 (66.2%)	1495 (61.8%)	1187 (59.4%)	<0.0001
	Previous MBH visit	2963 (36.6%)	570 (32.9%)	656 (33.8%)	924 (38.2%)	813 (40.7%)	
Diagnosis	Adjustment disorders	40 (0.5%)	15 (0.9%)	11 (0.6%)	9 (0.4%)	5 (0.3%)	0.041
	Anxiety disorders	677 (8.4%)	159 (9.2%)	189 (9.7%)	209 (8.6%)	120 (6%)	0.0001
	Delirium, dementia, amnesic, and other cognitive disorders	4 (0.1%)	2 (0.1%)	1 (0.1%)	0 (0.0%)	1 (0.1%)	0.435
	Developmental disorders	11 (0.1%)	4 (0.2%)	3 (0.2%)	1 (0.0%)	3 (0.2%)	0.419
	Disorders usually diagnosed in infancy, childhood, or adolescence	150 (1.9%)	32 (1.9%)	30 (1.5%)	45 (1.9%)	43 (2.2%)	0.574
	Mood disorders	986 (12.2%)	240 (13.9%)	223 (11.5%)	272 (11.2%)	251 (12.6%)	0.052
	Personality disorders	32 (0.4%)	15 (0.9%)	16 (0.8%)	1 (0.0%)	0 (0.0%)	<0.0001
	Schizophrenia and other psychotic disorders	35 (0.4%)	7 (0.4%)	4 (0.2%)	12 (0.5%)	12 (0.6%)	0.275
	Miscellaneous mental health disorders	463 (5.7%)	116 (6.7%)	134 (6.9%)	128 (5.3%)	85 (4.3%)	0.0007
	Attention-deficit, conduct, and disruptive behavior disorders	1112 (13.7%)	254 (14.7%)	283 (14.6%)	369 (15.3%)	206 (10.3%)	<0.0001
	Impulse control disorders	60 (0.7%)	11 (0.6%)	13 (0.7%)	23 (1.0%)	13 (0.7%)	0.558
	Alcohol-related disorders	59 (0.7%)	14 (0.8%)	12 (0.6%)	15 (0.6%)	18 (0.9%)	0.639

Continued next page

TABLE 1. (Continued)

Variables	Description	All Visits	2017	2018	2019	2020	P
	Substance-related disorders	321 (4.0%)	67 (3.9%)	58 (3.0%)	90 (3.7%)	106 (5.3%)	0.002
	Suicide and intentional self-inflicted injury disorders	2365 (29.2%)	405 (23.4%)	549 (28.3%)	728 (30.1%)	683 (34.2%)	<0.0001
	Screening and history of mental health and substance abuse disorders	37 (0.5%)	7 (0.4%)	7 (0.4%)	17 (0.7%)	6 (0.3%)	0.187
	Other	52 (0.6%)	17 (1.0%)	8 (0.4%)	17 (0.7%)	10 (0.5%)	0.137
	Non-MBH diagnosis	1689 (20.9%)	366 (21.1%)	402 (20.7%)	483 (20.0%)	438 (21.9%)	0.458

Other disposition includes AMA (left against medical advice), LWBS (left without being seen), eloped, and adult referral diverted elsewhere. AIAN indicates American Indian and Alaskan native; NHPI, Native Hawaiian/Pacific Islander.

MBH patients in 2020 would have been expected to increase.<sup>6,7,27</sup> The observed decrease in total MBH patients seen in 2020 suggests that although the rate of ED presentation in this group of patients was affected by the pandemic, it was impacted to a lesser degree than the pediatric ED population as a whole.

We found significant increases in proportions of MBH visits for teenagers aged from 15 to 17 years as well as for female patients in 2020, consistent with other studies.<sup>17,18,20,22</sup> This may be partially

related to the changes in adolescents' social lives imposed by social distancing measures. Adolescents may also have been more severely impacted by mental health concerns, given their greater exposure to and ability to understand both world events and familial stressors.

Hispanic patients showed a decline in their proportion of MBH visits, whereas non-Hispanic patients showed an increase. Concern has been previously voiced that Hispanic and Black individuals may experience proportionally worse access to mental health

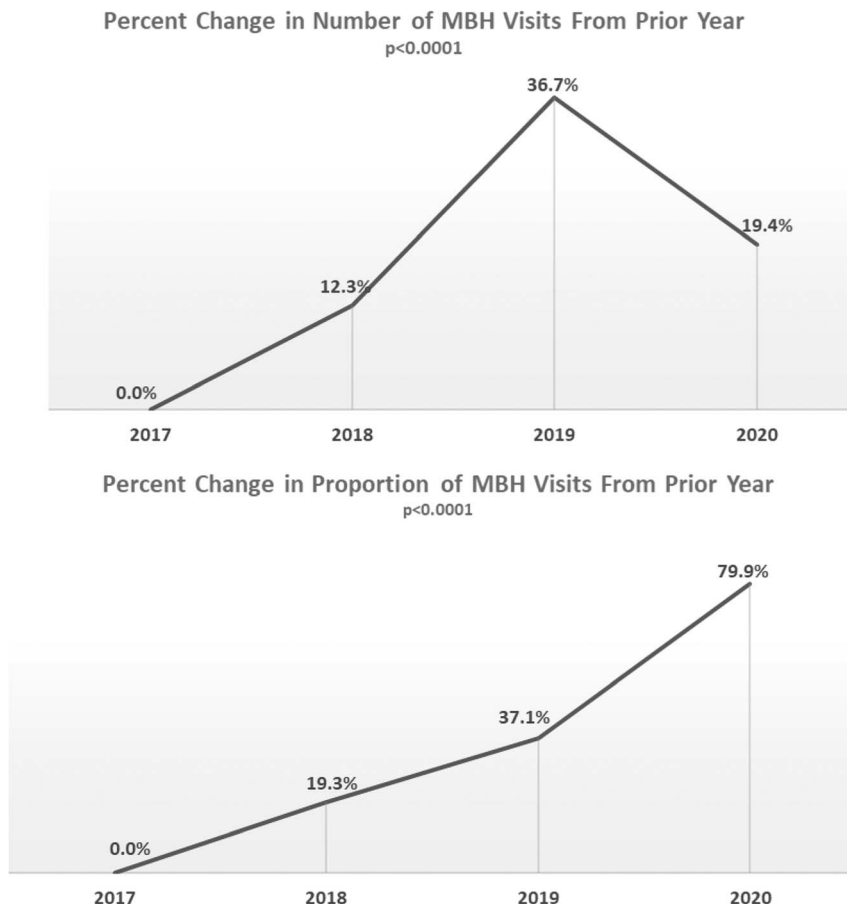


FIGURE 1. Percent change in number and proportion of MBH visits from previous year.

**TABLE 2.** Comparison of Change in MBH Visits Between 2019 and 2020

Variables	Description	2019 (n = 2419)	2020 (n = 2000)	Difference in No. Visits 2019–2020 (% Change)	% Change in Proportion of MBH Visits 2019–2020	OR (95% CI)	P
Sex	Female	1367 (56.5%)	1250 (62.5%)	-117 (-8.6%)	10.6%	1.2 (1.1–1.5)	<0.0001
	Male*	1052 (43.5%)	750 (37.5%)	-302 (-28.7%)	-13.8%	—	
Age	15–17 y	841 (34.8%)	822 (41.1%)	-19 (-2.3%)	18.2%	1.5 (1.3–1.9)	<0.0001
	10–14 y	1227 (50.7%)	955 (47.8%)	-272 (-22.2%)	-5.9%	1.2 (1.1–1.5)	0.034
	5–9 y*	351 (14.5%)	223 (11.2%)	-128 (-36.5%)	-23.2%	—	
Ethnicity	Non-Hispanic	1470 (60.8%)	1289 (64.5%)	-181 (-12.3%)	6.1%	1.2 (1.1–1.3)	0.017
	Hispanic*	932 (38.5%)	703 (35.2%)	-229 (-24.6%)	-8.8%	—	
	Unknown	17 (0.7%)	8 (0.4%)	-9 (-52.9%)	-42.9%	—	
Race	AIAN	7 (0.3%)	6 (0.3%)	-1 (-14.3%)	3.4%	1.5 (0.5–4.6)	0.464
	Asian	50 (2.1%)	53 (2.7%)	3 (6%)	28.0%	1.9 (1.2–2.9)	0.005
	Black	472 (19.5%)	403 (20.2%)	-69 (-14.6%)	3.3%	1.5 (1.2–1.9)	0.001
	NHPI	1 (0%)	3 (0.2%)	2 (200%)	275%	5.2 (0.6–107.5)	0.151
	White	1626 (67.2%)	1386 (69.3%)	-240 (-14.8%)	3.1%	1.5 (1.2–1.9)	0.001
	Other/unknown*	263 (10.9%)	149 (7.5%)	-114 (-43.3%)	-31.5%	—	
Disposition	Admit for medical care	128 (5.3%)	144 (7.2%)	16 (12.5%)	36.1%	1.6 (1.3–2.1)	0.0001
	Transfer to psychiatric facility	454 (18.8%)	570 (28.5%)	116 (25.6%)	51.8%	1.8 (1.6–2.1)	<0.0001
	Other	46 (1.9%)	42 (2.1%)	-4 (-8.7)	10.5%	1.3 (0.9–2.0)	0.207
	Discharge*	1791 (74.0%)	1244 (62.2%)	-547 (-30.5%)	-16.0%	—	
Visits	Previous MBH visit	924 (38.2%)	813 (40.7%)	-111 (-12.0%)	6.4%	1.1 (1.0–1.3)	0.096
	First MBH visit*	1495 (61.8%)	1187 (59.4%)	-308 (-20.6%)	-4.0%	—	
Diagnosis	Adjustment disorders	9 (0.4%)	5 (0.3%)	-4 (-44.4%)	-32.4%	0.7 (0.2–2.0)	0.472
	Anxiety disorders	209 (8.6%)	120 (6%)	-89 (-42.6%)	-30.6%	0.7 (0.5–0.9)	0.001
	Delirium, dementia, amnesic, and other cognitive disorders	0 (0.0%)	1 (0.1%)	1 (N/A)	—	—	0.271
	Developmental disorders	1 (0.0%)	3 (0.2%)	2 (200%)	275%	3.6 (0.4–34.9)	0.232
	Disorders usually diagnosed in infancy, childhood, or adolescence	45 (1.9%)	43 (2.2%)	-2 (-4.4%)	15.6%	1.2 (0.8–1.8)	0.493
	Mood disorders	272 (11.2%)	251 (12.6%)	-21 (-7.7%)	11.7%	1.1 (0.9–1.4)	0.181
	Personality disorders	1 (0.0%)	0 (0.0%)	-1 (-100%)	-100.0%	—	0.363
	Schizophrenia and other psychotic disorders	12 (0.5%)	12 (0.6%)	0 (0%)	20.0%	1.2 (0.5–2.7)	0.640
	Miscellaneous mental health disorders	128 (5.3%)	85 (4.3%)	-43 (-33.6%)	-19.7%	0.8 (0.6–1.1)	0.107
	Attention-deficit, conduct, and disruptive behavior disorders	369 (15.3%)	206 (10.3%)	-163 (-44.2%)	-32.5%	0.6 (0.5–0.8)	<0.0001
	Impulse control disorders	23 (1.0%)	13 (0.7%)	-10 (-43.5%)	-31.6%	0.7 (0.3–1.3)	0.268
	Alcohol-related disorders	15 (0.6%)	18 (0.9%)	3 (20%)	45.2%	1.5 (0.7–2.8)	0.282
	Substance-related disorders	90 (3.7%)	106 (5.3%)	16 (17.8%)	42.5%	1.4 (1.1–1.9)	0.011
	Suicide and intentional self-inflicted injury disorders	728 (30.1%)	683 (34.2%)	-45 (-6.2%)	13.5%	1.2 (1.1–1.4)	0.004
	Screening and history of mental health and substance abuse disorders	17 (0.7%)	6 (0.3%)	-11 (-64.7%)	-57.1%	0.4 (0.2–1.1)	0.064
	Other	17 (0.7%)	10 (0.5%)	-7 (-41.2%)	-28.6%	0.7 (0.3–1.6)	0.389
	Non-MBH diagnosis	483 (20.0%)	438 (21.9%)	-45 (-9.3%)	9.7%	1.1 (1.0–1.3)	0.115

Other disposition includes AMA (left against medical advice), LWBS (left without being seen), eloped, and adult referral diverted elsewhere.

\*Reference group in pairwise analysis.

AIAN indicates American Indian and Alaskan native; NHPI, Native Hawaiian/Pacific Islander.

care as compared with other ethnic/racial groups as a result of the pandemic.<sup>28</sup> Other studies have revealed lower odds of presentation for MBH concerns for Black children and concomitantly higher rates of presentation for White children during 2020 as compared with 2019.<sup>18,20</sup> We found an increase in proportion of

White patients and, interestingly, an increase in proportion of both Asian and Black patients in 2020. This suggests that in our population, individuals from these racial groups were more likely to seek out emergency MBH care during the pandemic. Our findings regarding ethnicity may reflect the presence of culturally protective

factors among Hispanic patients that allowed for fewer presentations for emergency MBH care during the pandemic. Alternatively, they may relate to barriers to seeking mental health care during the COVID-19 era that are experienced disproportionately by minorities. These barriers may include the perceived danger of presenting to a medical facility during a pandemic, as well as the financial, transportation, or other obstacles either preventing or discouraging ED visits by this population. In addition, these factors may be compounded by cultural stigmas toward seeking mental health care and mistrust of the mental and medical health care system.<sup>29,30</sup>

In 2020, fewer MBH patients were discharged from the ED, and significantly more MBH patients were either transferred for psychiatric care or admitted for medical care. The patients seen during the pandemic may have represented a subset of children struggling with more severe MBH concerns during this time frame, thus necessitating higher rates of admission for subsequent psychiatric or medical treatment. Factors associated with the pandemic itself, such as social distancing measures, changes in school attendance, and disruption of normal routines, may have contributed to more significant MBH pathology than seen in 2019. Finally, this change in disposition may also reflect a decreased availability of adequate outpatient mental or behavioral health resources that would have been needed to allow these patients to be safely managed outside of a hospital setting.

Analysis of ED diagnoses revealed a significant increase in MBH visits for substance-related disorders in 2020. As children spent more time at home because of social distancing measures, they may have had greater access to medications and drugs potentially available in their residences. The absolute number of suicide and self-injury diagnoses declined, but these diagnoses were more likely to occur among MBH patients in 2020. We found a significant decrease in the proportion of anxiety disorder diagnoses and no significant change in the proportion of mood disorder or adjustment disorder diagnoses, 3 categories of diagnoses that may have been anticipated to increase as a result of the pandemic.<sup>4,5,31,32</sup> Although surprising, other studies have also noted similar decreases or lack of significant change in presentations for depressive or anxiety-related disorders after the onset of the COVID-19 pandemic.<sup>5,19,22,33</sup> It is possible that less acute concerns may have been managed by caregivers at home, with parents preferring to avoid possible exposure to COVID-19 in an ED. Alternatively, the transition to distance learning may have mitigated some pre-COVID stressors, such as bullying, peer pressure, and the social demands of school, leading to a decrease in presentations for related concerns.<sup>34</sup> Attention-deficit, conduct, and disruptive behavior disorder diagnoses showed a significant decrease in 2020; this may be related to the transition to virtual classrooms and subsequent decrease in the number of children identified by the school system as having concerning behavioral symptoms.

Strengths of this study include an analysis of the MBH ED visits seen at a large-volume pediatric tertiary care center, with both academic and community ED settings, as well as a description of trends in MBH visits over multiple years preceding the pandemic. It also offers a regional perspective on the state of mental health in our institution's catchment area; this information can be used to guide the ongoing response to the needs of our community and to plan for future situations that may similarly impact MBH ED presentations. Although highlighting significant changes in MBH ED presentations associated with the COVID-19 era, this study cannot prove causation given the multitude of potentially confounding personal and societal changes also occurring during this time frame. This study includes data from a relatively short period and is not representative of all of the fluctuations in pediatric MBH ED presentations during the course of the pandemic. Our data captured only the primary ED visit diagnosis for each patient, and we may

have found more significant changes in MBH diagnosis categories if additional diagnoses were included in the analysis.

Future areas of study include analysis of changes in pediatric MBH presentations to the ED over a longer time as the COVID-19 pandemic continues to evolve. Additional analysis of patients' disposition could lend insight into whether MBH presentations during the pandemic were indeed of greater severity, or if they resulted in fewer discharges as a result of decreased outpatient MBH resources. Evaluating ongoing trends in MBH presentations by minority groups and investigating the causes for their changes in ED presentation could reveal additional health care disparities or protective factors experienced by these groups and could provide areas of future advocacy.

In conclusion, we found that although total pediatric MBH visits decreased during the early COVID-19 pandemic, they represented a greater proportion of ED visits during this time frame, with significantly higher proportions of presentations for older teenagers, females, and patients of non-Hispanic ethnicity. Mental and behavioral health patients were less likely to be discharged from the ED in 2020, with higher odds of admission for further psychiatric care. Substance-related diagnoses significantly increased after the onset of COVID-19, and in addition, suicide/self-injury diagnoses showed a significant proportionate increase as compared with 2019. These findings support a critical, ongoing need for mental health resources both inside and outside of the ED setting, particularly during the societal disruptions associated with a global pandemic. As schools reopen and social distancing measures relax, continued evaluation of trends in pediatric MBH presentations is warranted, and additional research is needed to design effective prevention and intervention methods, both for the current COVID-19 pandemic and for future events of similar societal impact.

#### ACKNOWLEDGMENT

*The authors thank Halim Hennes, MD, MS, for his assistance in proofreading and editing the manuscript.*

#### REFERENCES

- Dubey S, Biswas P, Ghosh R, et al. Psychosocial impact of COVID-19. *Diabetes Metab Syndr*. 2020;14:779–788.
- Banerjee D, Rai M. Social isolation in COVID-19: the impact of loneliness. *Int J Soc Psychiatry*. 2020;66:525–527.
- Serafini G, Parmigiani B, Amerio A, et al. The psychological impact of COVID-19 on the mental health in the general population. *QJM*. 2020;113: 531–537.
- Fegert JM, Vitiello B, Plener PL, et al. Challenges and burden of the coronavirus 2019 (COVID-19) pandemic for child and adolescent mental health: a narrative review to highlight clinical and research needs in the acute phase and the long return to normality. *Child Adolesc Psychiatry Ment Health*. 2020;14:20.
- Witt A, Ordonez A, Martin A, et al. Child and adolescent mental health service provision and research during the COVID-19 pandemic: challenges, opportunities, and a call for submissions. *Child Adolesc Psychiatry Ment Health*. 2020;14:19.
- Lo CB, Bridge JA, Shi J, et al. Children's mental health emergency department visits: 2007–2016. *Pediatrics*. 2020;145:e20191536.
- Kalb LG, Stapp EK, Ballard ED, et al. Trends in psychiatric emergency department visits among youth and young adults in the US. *Pediatrics*. 2019;143:e20182192.
- Neria Y, DiGrande L, Adams BG. Posttraumatic stress disorder following the September 11, 2001, terrorist attacks: a review of the literature among highly exposed populations. *Am Psychol*. 2011;66:429–446.
- Neria Y, Nandi A, Galea S. Posttraumatic stress disorder following disasters: a systematic review. *Psychol Med*. 2008;38:467–480.

10. Tsamakis K, Triantafyllis AS, Tsiptsios D, et al. COVID-19 related stress exacerbates common physical and mental pathologies and affects treatment (review). *Exp Ther Med*. 2020;20:159–162.
11. Liu JJ, Bao Y, Huang X, et al. Mental health considerations for children quarantined because of COVID-19. *Lancet Child Adolesc Health*. 2020;4:347–349.
12. Panda PK, Gupta J, Chowdhury SR, et al. Psychological and behavioral impact of lockdown and quarantine measures for COVID-19 pandemic on children, adolescents and caregivers: a systematic review and meta-analysis. *J Trop Pediatr*. 2021;67:fmaa122.
13. Magson NR, Freeman JYA, Rapee RM, et al. Risk and protective factors for prospective changes in adolescent mental health during the COVID-19 pandemic. *J Youth Adolesc*. 2021;50:44–57.
14. Luijten MAJ, van Muilekom MM, Teela L, et al. The impact of lockdown during the COVID-19 pandemic on mental and social health of children and adolescents. *Qual Life Res*. 2021;30:2795–2804.
15. Meherali S, Punjani N, Louie-Poon S, et al. Mental health of children and adolescents amidst COVID-19 and past pandemics: a rapid systematic review. *Int J Environ Res Public Health*. 2021;18:3432.
16. Jones EAK, Mitra AK, Bhuiyan AR. Impact of COVID-19 on mental health in adolescents: a systematic review. *Int J Environ Res Public Health*. 2021;18:2470.
17. Leeb RT, Bitsko RH, Radhakrishnan L, et al. Mental health–related emergency department visits among children aged <18 years during the COVID-19 pandemic—United States, January 1–October 17, 2020. *MMWR Morb Mortal Wkly Rep*. 2020;69:1675–1680.
18. Leff RA, Setzer E, Cicero MX, et al. Changes in pediatric emergency department visits for mental health during the COVID-19 pandemic: a cross-sectional study. *Clin Child Psychol Psychiatry*. 2021;26:33–38.
19. DeLaroche AM, Rodean J, Aronson PL, et al. Pediatric emergency department visits at US children's hospitals during the COVID-19 pandemic. *Pediatrics*. 2021;147:e2020039628.
20. Krass P, Dalton E, Doupnik SK, et al. US pediatric emergency department visits for mental health conditions during the COVID-19 pandemic. *JAMA Netw Open*. 2021;4:e218533.
21. Cheek JA, Craig SS, West A, et al. Emergency department utilisation by vulnerable paediatric populations during the COVID-19 pandemic. *Emerg Med Australas*. 2020;32:870–871.
22. Davico C, Marcotulli D, Lux C, et al. Impact of the COVID-19 pandemic on child and adolescent psychiatric emergencies. *J Clin Psychiatry*. 2021;82:20m13467.
23. Hoffmann JA, Stack AM, Samnaliev M, et al. Trends in visits and costs for mental health emergencies in a pediatric emergency department, 2010–2016. *Acad Pediatr*. 2019;19:386–393.
24. Chakravarthy B, Yang A, Ogbu U, et al. Determinants of pediatric psychiatry length of stay in 2 urban emergency departments. *Pediatr Emerg Care*. 2017;33:613–619.
25. Pines JM, Zocchi MS, Black BS, et al. Characterizing pediatric emergency department visits during the COVID-19 pandemic. *Am J Emerg Med*. 2021;41:201–204.
26. Pepper MP, Leva E, Trivedy P, et al. Analysis of pediatric emergency department patient volume trends during the COVID-19 pandemic. *Medicine (Baltimore)*. 2021;100:e26583.
27. Santillanes G, Axteen S, Lam CN, et al. National trends in mental health–related emergency department visits by children and adults, 2009–2015. *Am J Emerg Med*. 2020;38:2536–2544.
28. Double jeopardy: COVID-19 and behavioral health disparities for Black and Latino communities in the US: Substance Abuse and Mental Health Services Administration. Available at: <https://www.samhsa.gov/sites/default/files/covid19-behavioral-health-disparities-black-latino-communities.pdf>. Accessed September 6, 2021.
29. Jon-Ubabuco N, Dimmitt Champion J. Perceived mental healthcare barriers and health-seeking behavior of African American caregivers of adolescents with mental health disorders. *Issues Ment Health Nurs*. 2019;40:585–592.
30. Brewer AG, Davis MM, Sheehan K, et al. Sociodemographic characteristics associated with hospitalizations for anxiety and depression among youth in Illinois. *Acad Pediatr*. 2020;20:1133–1139.
31. Galea S, Merchant RM, Lurie N. The mental health consequences of COVID-19 and physical distancing: the need for prevention and early intervention. *JAMA Intern Med*. 2020;180:817–818.
32. Ye J. Pediatric mental and behavioral health in the period of quarantine and social distancing with COVID-19. *JMIR Pediatr Parent*. 2020;3:e19867.
33. Chadi N, Spinoso-Di Piano C, Osmanliu E, et al. Mental health–related emergency department visits in adolescents before and during the COVID-19 pandemic: a multicentric retrospective study. *J Adolesc Health*. 2021;69:847–850.
34. Vaillancourt T, Brittain H, Krygsman A, et al. School bullying before and during COVID-19: results from a population-based randomized design. *Aggress Behav*. 2021;47:557–569.