

# The Impact of the COVID-19 Pandemic on Pediatric Mental Health Emergency

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## What is already known on this topic?

- The coronavirus disease 2019 pandemic has led to changes in the delivery of health-care services around the world.
- Access to outpatient services has declined, but the need for mental health services has increased.
- Emergency department utilization pattern provides insight into the population with limited access to health care.

## What this study adds on this topic?

- In the post-pandemic period, rates of attention-deficit hyperactivity disorder and depression have decreased, but rates of obsessive-compulsive disorder in the first year and anxiety disorders in the second year have increased compared with the pre-pandemic period in pediatric emergency department (PED) visits.
- Results from the second year when pandemic measures were relaxed show that some changes in the distribution of psychiatric diagnoses and service delivery still continue among those presenting to the PED with mental health problems.
- Ambulance use increased, hospitalization rates did not change, and completion time of psychiatric consultations decreased during the pandemic period.

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## ABSTRACT

**Objective:** The aim of this study was to compare pre/post-coronavirus disease 2019 pandemic changes in mental health-related visits to the pediatric emergency department.

**Materials and Methods:** We conducted a retrospective analysis of all mental health-related pediatric emergency department visits to a tertiary general hospital between June and September 2019, 2020, and 2021. We described pre/post-coronavirus disease 2019 changes in the use of pediatric emergency departments, such as timing of visits, sex discrepancies, diagnostic distribution, discharge planning, and others.

**Results:** Compared with the corresponding months before the pandemic (n = 187), mental health-related pediatric emergency department visits decreased by 20.8% in June–September 2020 (n = 148) and increased by 12.2% in 2021 (n = 210). The distributions of age, sex, timing of visits, reasons for presentations, hospitalization, and outpatient clinic appointment rates were not statistically significant between the years. Self-harm in females and aggression/violence in males were the most common reasons for presentation to pediatric emergency departments in each year. In the post-pandemic period, ambulance use and patients referred by other hospitals for psychiatric consultation increased, while the completion time of consultations decreased (P < .05). The frequency of attention-deficit hyperactivity disorder and depression decreased, but obsessive-compulsive disorder and anxiety disorders were more common in the post-pandemic period than in the corresponding months before the pandemic (P < .05).

**Conclusion:** Our results suggest that the coronavirus disease 2019 pandemic resulted in a significant change in mental health-related visits to the pediatric emergency department. Those in the groups with reduced visits may be at risk for delayed access to treatment for their mental and behavioral difficulties.

**Keywords:** Adolescent, depression, emergency, mental health, pandemic

## INTRODUCTION

The coronavirus disease 2019 (COVID-19) outbreak, which began in late 2019, has heightened ongoing concerns about children's mental health.<sup>1-3</sup> In Turkey, the first COVID-19 case was reported on March 11, 2020. The lockdown was initially imposed on the at-risk group of those over 65 years of age and later on those under 20 years of age. Beginning in April 2020, the national lockdown was imposed and lasted until June 2020, with implementations slowly relaxing beginning June 1. Even though the schools partially continued face-to-face education after the closure on March 16, 2020, most education was conducted online through June 2021. Unemployment, economic hardship, and reduced social support for parents impacted on their coping mechanisms. In addition to these negative effects on family climate, the strict measures to prevent the spread of the virus, such as school closures and social isolation, had unpredictable effects on the mental health of children and adolescents.<sup>4</sup> A recent meta-analysis

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indicated that emotional and behavioral change rates in children and adolescents during the pandemic ranged from 5.7% to 68%.<sup>3</sup> On the other hand, some evidence suggested that the increase in depression and anxiety symptoms during the lockdown was temporary, and the rates of the symptoms decreased.<sup>5,6</sup>

The pandemic can disrupt socioemotional development and mental well-being in childhood and adolescence through an interaction of different factors. Research has suggested that certain groups, such as females, adolescents, and individuals with preexisting mental or physical health conditions, are more vulnerable to pandemic stress.<sup>4,7,8</sup> According to the review by Bera et al.<sup>9</sup> mental health problems also changed at different time points during the pandemic. While anxiety and eating disorder symptoms were prominent in the first period, suicide attempts increased in many countries during and after the second wave.<sup>9</sup> On the other hand, child and adolescent mental health professionals reported that their workload increased and patient treatment was delayed compared to the pre-pandemic period.<sup>10</sup> Therefore, while the COVID-19 pandemic triggered the emergence of new psychological struggles, it also limited access to treatment for vulnerable populations who already had mental health problems.<sup>11</sup>

Emergency departments can play a critical role in identifying and treating mental health disorders among individuals with limited access to health-care services.<sup>2</sup> The disruption of many outpatient treatment services during the pandemic made the role of emergency departments even more important. A pre-pandemic study reported an increase in emergency department presentations for psychiatric crises, with self-harm and substance abuse being the most common causes.<sup>2</sup> The results of our previous study from the 7-year period before the pandemic at the same hospital where this study was conducted showed that self-harm, depression, and neurodevelopmental disorders were the most common mental health problems on presentation to the pediatric emergency department (PED).<sup>12</sup> Recent studies have shown that eating disorders, anxiety, suicidal thoughts, and suicide attempts have increased in PEDs during the pandemic period compared to the pre-pandemic period.<sup>13-15</sup>

This study aimed to investigate the impact of the COVID-19 pandemic on the PED presentations with psychiatric complaints and to contribute to the literature with the data discussed. The study includes data from the only tertiary hospital providing pediatric mental health emergency services in a large catchment area. We compared the characteristics (e.g., number of visits, reasons for presentation, diagnosis, age, sex, completion time of consultations, and discharge planning) of patients who sought emergency psychiatric care between June and September 2019, 2020, and 2021. A better understanding of how limited access to outpatient mental health services impacts emergency services during the pandemic may prioritize the identification of at-risk groups and prevention strategies in the field of child and adolescent mental health.

## MATERIALS AND METHODS

### Setting

Our study was conducted at the PED of Marmara University Training and Research Hospital. The hospital is the only center

that provides 24-hour child and adolescent psychiatric consultation service in a region with a population of approximately 1.5 million. All patients presenting to our hospital's PED are evaluated by a pediatrician. If a mental health problem is suspected, the patient is referred to the Department of Child and Adolescent Psychiatry. First, a child and adolescent psychiatry resident perform a bedside evaluation by interviewing the patient and caregiver separately, and then an experienced child and adolescent psychiatrist (physician who has completed his/her residency or has been a faculty member in the department) is consulted on call to determine the diagnosis and treatment.

In April and May 2020, when COVID-19 spread in Turkey, the hospital's emergency pediatric psychiatric services were suspended because all physicians were required to participate in the treatment of COVID-19. Emergency psychiatric services resumed in June 2020 after a restructuring of the required service distribution. Therefore, there is no record of patients who applied to the PED with psychiatric complaints in April and May 2020. For this reason, to examine the impact of COVID-19 on presentations to PED with psychiatric complaints, we included patients who presented to the PED and received a child and adolescent psychiatry consultation between June - September 2019, 2020, and 2021.

### Patients and Data

Our sample included children and adolescents aged 0-18 years who presented to the PED with psychiatric complaints. Patients' age, sex, reasons for presentations to the PED, timing of visits, previous mental health service history, diagnoses (based on the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition), and discharge planning (i.e., psychopharmacologic intervention, drugs, outpatient clinic appointment, transfer to hospitalization) were investigated.

The term "frequent visitor" was used in this study to refer to patients who had more than 1 PED visit due to psychiatric complaints within the study period, and each visit after the first (index) visit was coded as a "recurrent visit." While psychiatric diagnoses were analyzed, only the first visit was included in the analysis for frequent visitors. This prevented the same person's diagnosis from being represented more than once in the analysis. While reasons for presentation and discharge planning were analyzed, recurrent visits were also included because it is possible that reasons for presentations and treatment modalities could be different for each visit and for even the same person.

Data were derived from the electronic medical record system of the hospital. The required approvals for this study were obtained from the Ministry of Health (number: 2021-12-28T13\_14\_03, date: December 28, 2021) and the Ethics Committee of Marmara University Faculty of Medicine (number: 09.2022.126, date: January 7, 2022).

### Statistical Analysis

Statistical analyses were performed by using Statistical Package for Social Sciences software version 20 (SPSS Inc., Chicago, Ill, USA). Descriptive statistics are shown as mean  $\pm$  SD or frequency (%). The chi-square test and Fisher's exact test were used to compare categorical variables. Post hoc

analyses were performed for results that were significant in the 3-group comparisons. Bonferroni correction was used for chi-square analysis of categorical variables. The Kolmogorov-Smirnov test was used to assess the normality of the data distribution. Continuous data that were not normally distributed were analyzed with the Kruskal-Wallis *H* test between groups, and their post hoc analyses were performed using Dunn's test. Significance was set at  $P < .05$ , and all *P*-values were 2-tailed.

**RESULTS**

**Visits and Patient Characteristics**

Our study included a total of 545 visits and 470 patients during the following time periods: June-September 2019 ( $n = 187$ ), June-September 2020 ( $n = 148$ ), and June-September 2021 ( $n = 210$ ). However, in June-September 2020, visits decreased by 20.8% compared to the corresponding months in the previous year. There was also a 12.2% increase in 2021 compared to the same months before the pandemic. Figure 1 demonstrates the number of PED visits according to months and years.

Sociodemographic characteristics (sex and age distributions) of patients and the time, day, and month of visits did not differ significantly between the years. Compared with the same months before the pandemic, the number of patients arriving by ambulance at PED and patients referred by other hospitals for psychiatric consultation were higher during the pandemic. There was no statistical difference between the years for frequent visitors (12.6%,  $n=18$  in 2019; 12.6%,  $n=12$  in 2020; 11.2%,  $n=19$  in 2021), but recurrent visits were more frequent in 2020 ( $P < .05$ ). Table 1 shows the patients' age, sex, and visits data.

**REASONS FOR PRESENTATION TO THE PEDIATRIC EMERGENCY DEPARTMENT**

Reasons for presentation to the PED were categorized as follows: self-harm (43.9%,  $n = 82$  in 2019; 35.8%,  $n = 53$  in 2020; 34.8%,  $n = 73$  in 2021), aggression/violence (25.7%,  $n = 48$  in 2019; 29.1%,  $n = 43$  in 2020; 26.7%,  $n = 56$  in 2021), mood symptoms (1.6%,  $n = 3$  in 2019; 6.8%,  $n = 10$  in 2020; 5.2%,  $n = 11$  in 2021), anxiety-somatic symptoms (10.2%,  $n = 19$  in 2019; 7.4%,

$n = 11$  in 2020; 10.5%,  $n = 22$  in 2021), psychotic symptoms (4.3%,  $n = 8$  in 2019; 4.1%,  $n = 6$  in 2020; 5.7%,  $n = 12$  in 2021), forensic issues (1.6%,  $n = 3$  in 2019; 3.4%,  $n = 5$  in 2020; 6.2%,  $n = 13$  in 2021), and other (12.8%,  $n = 24$  in 2019; 13.5%,  $n = 20$  in 2020; 11%,  $n = 23$  in 2021). The distribution of reasons for presentation to the PED with mental health symptoms between the years was not statistically significant ( $P = .192$ ). Self-harm in females and aggression/violence in males were the most common reasons for presentation to the PED in each year. Table 2 demonstrates the reasons for visits in each year by sex.

Methods used for self-harm were analyzed. In 2019, 72.4% of self-harms were committed by poisoning, 15.5% by tissue damage, and 12.1% by suffocation. These percentages were 87%, 13%, and 0% in 2020 and 75.6%, 24.4%, and 0% in 2021 ( $P = .009$ ). Figure 2 shows the changes in the number of patients presenting to the PED with self-harm for each month and year.

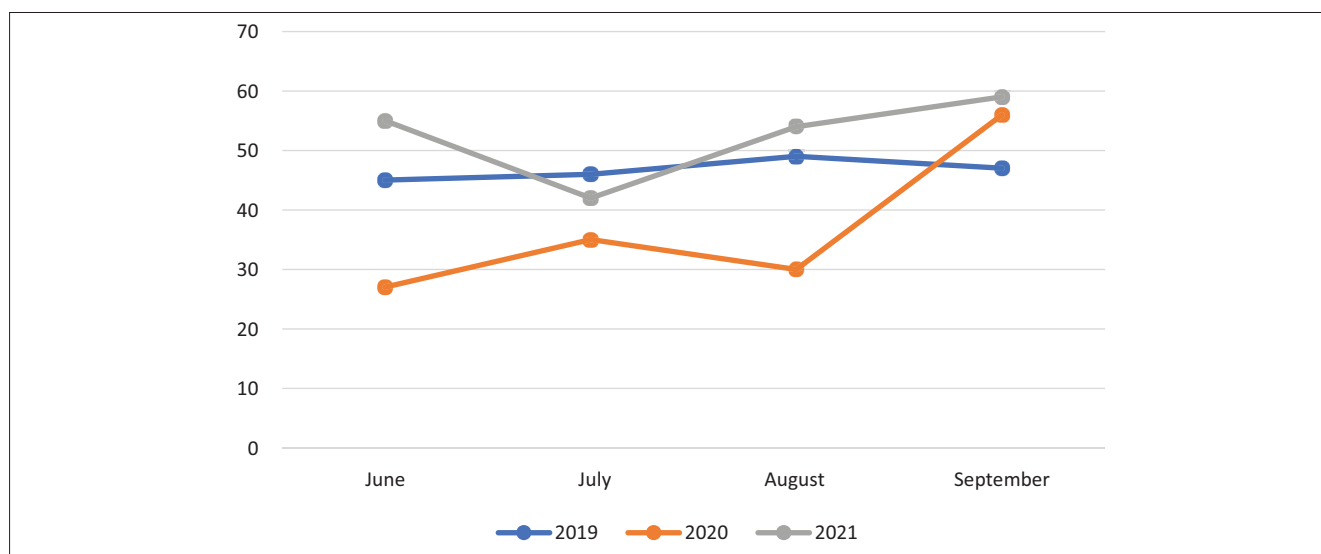
**Psychiatric Diagnoses**

Diagnostic information was missing from the hospital's electronic registration system for 4.4% ( $n = 24$ ) of the patients. For 39 patients (7.3%), the diagnosis was unclear at the time of the emergency interview. Seventy-five of the visits (13.8%) were recurrent visits. For comparison of psychiatric diagnoses between the years, patients for whom insufficient data were available in the hospital registration system, patients for whom a diagnosis could not be made at the time of the emergency interview, and recurrent visits were excluded. For the remaining patients, the distribution of psychiatric diagnosis over the years is shown in Table 3.

Rates of patients who had a previous contact with mental health service were 54.9% ( $n = 100$ ) in 2019, 58.5% ( $n = 85$ ) in 2020, and 55.5% ( $n = 116$ ) in 2021; there was no significant difference ( $P = .789$ ).

**Intervention Strategies and Discharge Planning**

Although there was no significant difference in total prescription rates, relatively more benzodiazepines were prescribed in the second year of the pandemic than the pre-pandemic period.



**Figure 1.** The number of the visits to pediatric emergency department with mental health problems.

**Table 1. Patient and Visit Characteristics**

	June–September in 2019 (I) (n = 187) n (%)	June–September in 2020 (II) (n = 148) n (%)	June–September in 2021 (III) (n = 210) n (%)	P <sup>a</sup>
<b>Age groups</b>				
Under 6 years old	3 (1.6)	7(4.7)	5 (2.4)	.447
6 years old–9 years 11 months	13 (7)	7(4.7)	8(3.8)	
10 years old–13 years 11 months	29 (15.6)	23(15.5)	39 (18.6)	
14–18 years old	141 (75.8)	111(75)	158 (75.2)	
Sex (female)	102 (63.4)	80 (68.4)	122 (64.2)	.661
Incarcerated child/adolescent <sup>b</sup>	5 (2.7)	1 (0.7)	–	
Patients brought to PED by the police <sup>b</sup>	–	6 (4.1)	7 (3.3)	
Children in institutional care	11 (5.9)	3 (2)	5 (2.4)	.087
Weekdays	130 (69.5)	110 (74.3)	151 (71.9)	.623
<b>Months of the years</b>				
June	45 (24.1)	27 (18.2)	55 (26.2)	.139
July	46 (24.6)	35 (23.6)	42 (20.0)	
August	49 (26.2)	30 (20.3)	54 (25.7)	
September	47 (25.1)	56 (37.8)	59 (28.1)	
<b>Time of days</b>				
00:00–06:00 AM	33 (17.6)	35 (12.2)	49 (20)	.191
06:00–12:00 AM	35 (18.7)	30 (20.3)	27 (12.9)	
12:00 AM–06:00 PM	49 (26.2)	45 (30.4)	70 (33.3)	
06:00 PM–12:00 PM	70 (37.4)	55 (37.2)	71 (33.8)	
Referred by other hospitals for psychiatric consultation	12 (6.2)	22 (14.9)	31 (14.8)	<b>.016</b> I<III, I<II*
Ambulance use	33 (17.6)	48 (32.4)	83 (39.5)	<b>&lt;.001</b> I<III, I<II*
Recurrent visits	24 (12.8)	31 (20.9)	20 (9.5)	<b>.008</b> II>III*

PED, pediatric emergency department.  
 Data in bold represent statistically significant differences.  
<sup>a</sup>The chi-square test.  
<sup>b</sup>P-value was not calculated because there was an empty cell with zero (0) value.  
 \*Bonferroni correction was used in post hoc analyses.

There was no statistically significant difference between the years in terms of outpatient clinic appointment, transfer to hospitalization, reasons for presentation and psychiatric diagnoses of those transferred to hospitalization, collaboration with child protection services, and referral for medical assessment to rule out possible medical causes. Table 4 demonstrates discharge planning and intervention strategies used in visits by year.

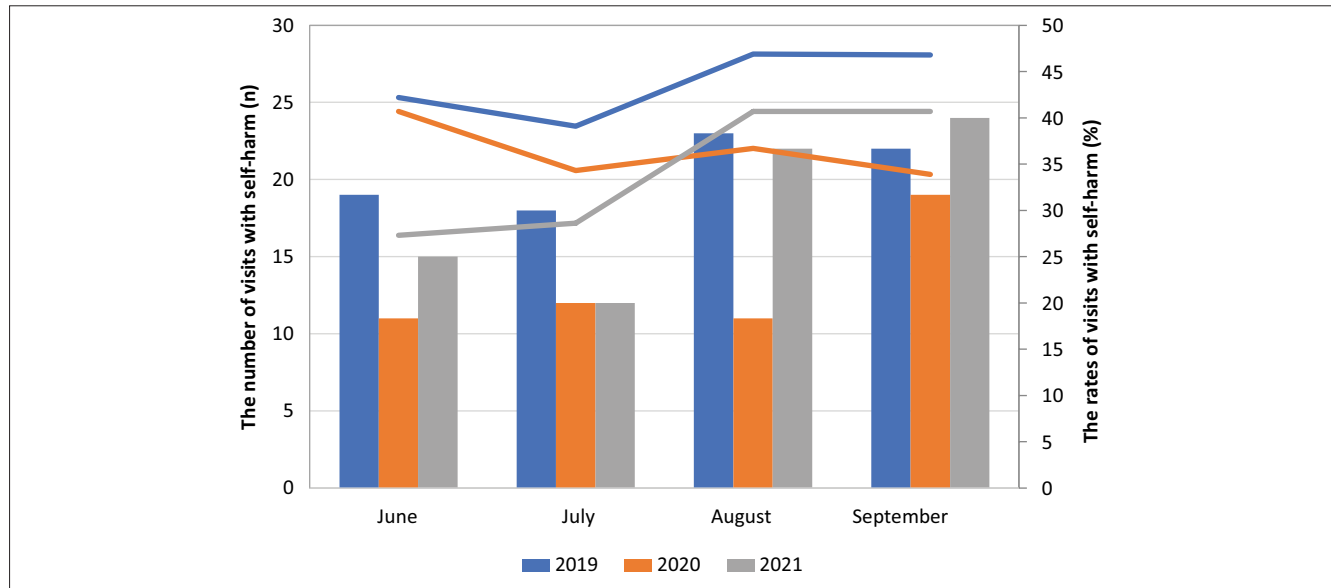
**DISCUSSION**

Although the pandemic caused great distress to children and adolescents, especially in the first phase, the accessibility of mental health services was limited compared to the pre-pandemic years. Our findings showed that the number of visits to the PED decreased by a ratio of 5 to 1 in the first phase of the

**Table 2. Reasons for Presentation to PED by Sex**

		Self-harm	Aggression/ Violence	Mood Symptoms	Anxiety–Somatic Symptoms	Psychotic Symptoms	Forensic Issues	Other	P <sup>a</sup>
Female (n = 365)	2019 (n = 122)	65 (53.3)	27 (22.1)	2 (1.6)	10 (8.2)	4 (3.3)	2 (1.6)	12 (9.8)	.285
	2020 (n = 104)	42 (40.4)	22 (21.2)	8 (7.7)	6 (5.8)	6 (5.8)	5 (4.8)	15 (14.4)	
	2021 (n = 139)	58 (41.7)	30 (21.6)	10 (7.2)	14 (10.1)	6 (4.3)	8 (5.8)	13 (9.4)	
Male (n = 180)	2019 (n = 65)	17 (26.2)	21 (32.3)	1 (1.5)	9 (13.8)	4 (6.2)	1 (1.5)	12 (18.5)	.351
	2020 (n = 44)	11 (25)	21 (47.7)	2 (4.5)	5 (11.4)	–	–	5 (11.4)	
	2021 (n = 71)	15 (21.1)	26 (36.6)	1 (1.4)	8 (11.3)	6 (8.5)	5 (7)	10 (14.1)	

PED, pediatric emergency department. <sup>a</sup>The chi-square (χ<sup>2</sup>) test



**Figure 2.** The number and rate of patients who presented to the emergency department with self-harm. Bars represented the number of visits with self-harm, and lines represented the rates of visits with self-harm in the months June–September of 2019, 2021, and 2021.

**Table 3.** Psychiatric Disorders of the Patients (SES Predominantly Low Average and Low, Not Individually Determined)

	June–September in 2019 (I) (n = 143) n (%)	June–September in 2020 (II) (n = 95) n (%)	June–September in 2022 (III) (n = 169) n (%)	P
Free of psychiatric disorders	11 (7.7)	21 (22.1)	19 (11.2)	<b>.004<sup>a</sup></b> II>I*
ADHD	25 (17.5)	10 (10.5)	8 (4.7)	<b>.001<sup>a</sup></b> I>III*
Intellectual disability	13 (9.1)	10 (10.5)	12 (7.1)	.614 <sup>a</sup>
Autism spectrum disorders	12 (8.4)	4 (4.2)	8 (4.7)	.286 <sup>a</sup>
Tic disorders <sup>b</sup>	–	1 (1.1)	1 (0.6)	
CD/ODD	17 (11.9)	6 (6.3)	11 (6.5)	.165 <sup>a</sup>
Anxiety disorders	6 (4.2)	4 (4.2)	18 (10.7)	<b>.040<sup>a</sup></b> III>I, III>II*
Conversion disorder	8 (5.6)	1 (1.1)	3 (1.8)	.070 <sup>a</sup>
OCD	1 (0.7)	4 (4.2)	11 (6.5)	<b>.031<sup>a</sup></b> III>I*
Depression	66 (46.2)	25 (26.3)	62 (36.7)	<b>.008<sup>a</sup></b> I>II*
Bipolar disorders	8 (5.6)	4 (4.2)	9 (5.3)	.887 <sup>a</sup>
Psychotic disorders	7 (4.9)	9 (9.5)	17 (10.1)	.214 <sup>a</sup>
Stress-related disorders	8 (5.6)	3 (3.2)	3 (1.8)	.181 <sup>a</sup>
Substance use disorders	7 (4.9)	5 (5.3)	13 (7.7)	.544 <sup>a</sup>
Eating disorders	2 (1.9)	3 (3.2)	8 (4.7)	.220 <sup>c</sup>
Comorbidities	41 (28.7)	17 (17.9)	37 (21.9)	.132 <sup>a</sup>
Number of diagnoses (mean ± SD)	1.28 ± 0.73	0.97 ± 0.68	1.13 ± 0.69	<b>.005<sup>d</sup></b> I>II**

ADHD, attention-deficit hyperactivity disorder; CD, conduct disorder; OCD, obsessive-compulsive disorder; ODD, oppositional defiant disorder; SES, Socioeconomic status.

Data in bold represent statistically significant differences.

<sup>a</sup>The chi-square test.

<sup>b</sup>P-value was not calculated because there was an empty cell with zero (0) value.

<sup>c</sup>Fisher’s exact test.

<sup>d</sup>Kruskal–Wallis H test.

\*Bonferroni correction was used in post hoc analyses.

\*\*Dunn’s test was used in post hoc analyses.

<b>Table 4.</b> Outcomes of the Visits				
	<b>June–September 2019 (I)</b> <b>(n = 187)</b> <b>n (%)</b>	<b>June–September 2020 (II)</b> <b>(n = 148)</b> <b>n (%)</b>	<b>June–September 2021 (III)</b> <b>(n = 210)</b> <b>n (%)</b>	<b>P</b>
Referral for medical examination to rule out possible medical causes	33 (17.6)	26 (17.6)	45 (21.4)	.544 <sup>a</sup>
Transferred to hospitalization	22 (11.8)	14 (9.5)	13 (6.2)	.149 <sup>a</sup>
Collaboration with child protection unit	11 (5.9)	10 (6.8)	15 (7.1)	.877 <sup>a</sup>
Outpatient clinic appointment	118 (63.1)	91 (61.5)	114 (54.3)	.165 <sup>a</sup>
Prescription	97 (51.9)	70 (47.3)	98 (46.7)	.544 <sup>a</sup>
Oral antipsychotics	75 (40.1)	42 (28.4)	79 (37.6)	.069 <sup>a</sup>
Injectable antipsychotics	14 (7.5)	20 (13.5)	14 (6.7)	.058 <sup>a</sup>
Benzodiazepines	5 (2.7)	3 (2)	16 (7.6)	<b>.014<sup>a</sup></b> <b>III&gt;I,</b> <b>III&gt;II*</b>
Antidepressants	10 (5.3)	10 (6.8)	8 (3.8)	.455 <sup>a</sup>
Completion time of consultation (hours) (mean ± SD)	4.04 ± 5.92	3.10 ± 3.79	2.66 ± 3.06	<b>&lt;.001<sup>b</sup></b> <b>I&gt;II,</b> <b>I&gt;III**</b>

Data in bold represent statistically significant differences.  
<sup>a</sup>The chi-square test.  
<sup>b</sup>Kruskal–Wallis *H* test.  
\*Bonferroni correction was used in post hoc analyses.  
\*\*Dunn's test was used in post hoc analyses.

pandemic and then slightly increased in the second year of the pandemic compared to the pre-pandemic year. Moreover, the number of patients referred by other hospitals for psychiatric consultation, the number of patients brought by the police to the PED for psychiatric evaluation, and the use of ambulances increased in the post-pandemic years. Although there was no statistically significant difference among the reasons for presentation to the PED between the years, there was a clear decrease in visits due to self-harm especially among females. The impact of the pandemic was also evident in the distribution of psychiatric diagnoses. We found that attention-deficit hyperactivity disorder (ADHD) and depression decreased among children and adolescents presented to the PED with mental health problems. On the other hand, obsessive-compulsive disorder (OCD) increased in the first year of the pandemic and anxiety disorders increased in the second year. The completion time of consultations was reduced by an average of 1 hour, and benzodiazepines were used more frequently. Additionally, in all 3 years, more than half of the patients presented to the PED had a previous history of mental health service contact, suggesting that, apart from the pandemic, psychiatric morbidity is an important risk factor for psychiatric emergency visits.

Our results showed that emergency department visits with psychiatric complaints decreased in the first year of the pandemic (in 2020). Nevertheless, this confirms previous studies examining a similar period.<sup>15,16</sup> Fear of contagion COVID-19, lockdown, and assignment of all health-care personnel for diagnosis and treatment of COVID-19 could be some of the reasons why the visits decreased. Because outpatient clinics were also less accessible, the delay caused by the pandemic for people who needed mental health treatment becomes more striking.<sup>16,17</sup> In the second year of the pandemic when measures were relaxed,

long-lasting and delayed unmet mental health problems may have led to an increase in the number of visits compared to previous years.

Our results showed an increase in the proportion of emergency psychiatric evaluations for patients brought by the police in the post-pandemic period. Evidence suggests that during similar disaster periods, domestic violence and abuse may increase with reduced access to public areas such as schools.<sup>18,19</sup> On the other hand, although there was an increase in those who received psychiatric evaluations due to forensic evaluation, it was not statistically significant. Not only police but also family members or clinicians may request a forensic examination. However, the increase in police contacts in the post-pandemic period is striking. The consequences of the pandemic on neglect, abuse, and domestic violence, children in the justice system, and children in institutional care are still poorly understood. We believe that clinicians and service providers should focus on this area in the future.

This study has shown a decrease in emergency psychiatric visits for children with ADHD and other neurodevelopmental disorders. Children with ADHD often have problems with emotional regulation and high comorbidity; therefore, they are thought to be an important risk group for the occurrence of mental health problems during the pandemic.<sup>20</sup> There are conflicting results on how the COVID-19 pandemic has affected the mental health of children with ADHD.<sup>21-23</sup> Melegari et al<sup>22</sup> showed that lockdown was associated with emotional and behavioral improvement especially in children with ADHD with high symptom severity but not in children with mild symptoms. Our study did not evaluate ADHD symptom severity; however, it is a reasonable assumption to think that patients with severe ADHD symptoms are more likely to use the emergency department and

represent a population with a decreasing number of psychiatric emergency crises. However, many parents of children with ADHD may not perceive their complaints to be severe enough to visit the PED. In addition, reductions in academic load, peer victimization, rejection, and the flexible hours to complete for tasks have led to a decrease in school-related anxiety, which may be the reason for the positive effect on individuals with ADHD.<sup>21</sup>

The results of our study showed a decrease in PED volume in relation to depression and self-harm. At the beginning of the pandemic and lockdown, the number of emergency psychiatric consultations for suicide attempts decreased, which was observed in many countries such as Turkey,<sup>24</sup> Spain,<sup>25</sup> France,<sup>26</sup> and the USA.<sup>27</sup> However, there are also concerns that this decrease was due to a delay in seeking mental health care caused by fear of getting infected with COVID-19.<sup>28</sup> There are studies showing that rates of suicide attempts were higher in the later stages of the pandemic than in the early stages.<sup>29,30</sup> Our results showed that rates of depression and self-harm increased slightly in 2021 but were not as high as before the pandemic. In September 2021, when face-to-face education resumed in schools, the number of visits due to self-harm was higher than in the same month before the pandemic; however, they were proportionally lower than in the pre-pandemic period across all visits. The question of how the transition to face-to-face education affects these ratios should be explored in future research.

The increase in anxiety and OCD clearly continued into the second year of the pandemic. Research pointed out a rise in anxiety symptoms during the pandemic.<sup>31</sup> The frequency of anxiety symptoms ranged from 1.84%<sup>32</sup> to 74% among studies.<sup>33</sup> In the Racine et al's<sup>34</sup> meta-analysis, the frequency of anxiety in children and adolescents was twice the pre-pandemic numbers. Moreover, studies reported that the pandemic increased OCD symptoms,<sup>35</sup> that pandemic anxiety triggered obsessions in individuals with preexisting psychiatric conditions,<sup>36</sup> and that the incidence of recent OCD cases increased.<sup>37</sup> Our findings confirm previous studies, and we go a step further by showing that rates of anxiety and OCD among psychiatric emergencies in children and adolescents continued to increase in the second year of the pandemic.

Ambulance use and referral by other hospitals for psychiatric consultation could be considered as a proxy indicator of the emergency and severity of emotional and behavioral symptoms, which were elevated in our study. In contrast, we also found a decrease in hospitalization rates, but this was not statistically significant. This could be due to the restricted capacity of inpatient services to reduce the risk of COVID-19 transmission. Supporting this, a study from China showed that during the pandemic the hospitalization rate decreased by half and that 25% of inpatient services were closed.<sup>17</sup> Thus, we might conclude that the pandemic affected not only the distribution of psychiatric diagnoses but also the intervention strategies preferred by physicians. Additionally, our findings indicated that compared to the pre-pandemic period, the completion time of consultations was on average 1 hour shorter in the post-pandemic period, confirming the results of studies that found shorter lengths of stay in PED.<sup>16</sup> To reduce the risk of transmission during the pandemic, the time spent in the hospital and

the interview may have been decreased. It would be helpful to examine in future studies whether the changes in how clinicians deliver health care are permanent.

Several limitations should be considered when interpreting our results. First, our data are limited to the PED; therefore, the patient profile in outpatient clinics might yield different results regarding the impact of the pandemic on child and adolescent mental health. Second, the referral reasons labeled as "others" and visits in which there were insufficient data for a diagnosis could influence our results. Third, apart from the 4 months, the period studied could have a different distribution of diagnoses. Finally, our study does not include parental socioeconomic status and their mental health history, which might influence the use of mental health service. On the other hand, the fact that all patients were diagnosed by a child and an adolescent psychiatrist and that the hospital is the only pediatric mental health referral center in a large catchment area increases the reliability and representativeness of our findings.

## CONCLUSION

The COVID-19 pandemic has complicated service delivery in all health-care settings around the world. Countries have developed many policies to ensure the maintenance of health services and to manage the new patient burden.<sup>17</sup> Among the groups potentially at risk for stressful life events are children and adolescents. There is a considerable rise in the need for emergency pediatric mental health services for those brought in by the police and those referred from other hospitals for psychiatric assessment. Also, anxiety and OCD increased among children and adolescents presenting to the PED with psychiatric crisis. Community-based interventions specifically tailored to at-risk populations could decrease loads of hospitals. The results of our study suggest that it is imperative to develop child and adolescent mental health interventions after the highly infectious phase of the pandemic.

**Ethics Committee Approval:** Ethical committee approval was received from the Ethics Committee of Marmara University Medical Faculty (Approval No: 09.2022.126, Date: 07/01/2022).

**Informed Consent:** Verbal/Written informed consent was obtained from the patients who agreed to take part in the study.

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