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Original Research Article

Characteristics of adolescents with mental health emergencies requiring inpatient psychiatric hospitalization

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ABSTRACT

Background: Pediatric psychiatric crisis was pushed to the forefront during the COVID-19-pandemic. Emergency departments (ED) and inpatient pediatric hospitals saw much higher volumes of mental health complaints, with many patients staying in these places until definitive care was available. The study objective was to evaluate pediatric psychiatric emergency visits and hospital admissions before and during the pandemic and identify the high-risk features of the patients requiring inpatient psychiatric hospitalization.
Methods: Retrospective chart review of ED and inpatient visits conducted from 3/1/2010-2/29/2022 of adolescents aged 13-18-years with a range of psychiatric diagnoses. Part I included data collection prior to the first case of COVID-19 in Michigan (3/1/2010-3/9/2020), and part II included data collection after the first case (3/10/2020-2/28/2022). Charts of patients needing inpatient psychiatric admissions during the pandemic were reviewed for factors affecting mental health.
Results: Retrospective chart review of ED and inpatient visits conducted from 3/1/2010-2/29/2022 of adolescents aged 13-18-years with a range of psychiatric diagnoses. Part I included data collection prior to the first case of COVID-19 in Michigan (3/1/2010-3/9/2020), and part II included data collection after the first case (3/10/2020-2/28/2022). Charts of patients needing inpatient psychiatric admissions during the pandemic were reviewed for factors affecting mental health.
Conclusions: Decreased prescribed medication use and inconsistent therapy appointments were seen in adolescents requiring inpatient psychiatric hospitalization. Identifying the gaps in care presents an opportunity for reducing the need for inpatient psychiatric care.

Keywords: Adolescent mental health crisis, COVID-19 pandemic, Mental health disorders, Pediatric psychiatric hospitalization

INTRODUCTION

Mental health disorders are among the leading contributors to the global burden of disease in pediatrics. According to the US Department of Health and Human Services, one in five US children aged three to seventeen has a mental, emotional, behavioral, or developmental disorder. It is estimated that only 20% of these children who need services receive appropriate help from mental health professionals.[1] Unprecedented school closures, loss of face-to-face support systems, enforced isolation, and disrupted routines during the COVID-19 pandemic created an environment of stress, anxiety, and fear that triggered or worsened adolescent mental health issues.

The pediatric population in Michigan was especially at risk for a decline in mental health, given the state's classification as a national hot spot.[2] Malas and his colleagues published a study in clinical pediatrics which showed a four-fold increase in initial psychiatry consults at CS Mott Children's Hospital (Michigan) from July 2020 to January 2021 compared with the 2019-2020 time-period.[3,4] Pediatric mental health was declared a national emergency in October 2021 by joint consensus from American Academy of Pediatrics, the Children's Hospital Association and the American Academy of Child and Adolescent Psychiatry.[5-7]

In a meta-analysis conducted by Racine et al, it was seen that across 29 studies and 80,879 youth, the pooled estimates obtained in the first year of the COVID-19 pandemic suggested that one in four youths globally were experiencing clinically elevated depression symptoms, and one in five youths were experiencing clinically elevated anxiety symptoms.[8] A comparison of these findings to pre-pandemic estimates suggested that youth mental health difficulties doubled during the pandemic. With extended wait times in the emergency department (ED) during the pandemic, children and adolescents awaiting psychiatric placement were often placed on inpatient floors based on the local organization procedures.[9] The challenges in providing sufficient care for this population were evident even prior to the pandemic as children often had to wait months for an appointment with a mental health professional. Only 4,000 out of more than 100,000 US clinical psychologists are child and adolescent clinicians, according to American Psychological Association data.[6]

Pediatricians are now at the frontlines in the mental health crisis affecting children. In pediatric primary care settings, the reported prevalence of mental health and behavioral disorders is between 12% to 22% of children and adolescents. Among patients coming to the EDs, 70% screen positive for at least 1 mental health disorder, 23% meet criteria for 2 or more mental health disorders, 45% have a mental health disorder resulting in impaired psychosocial functioning, and 10% of adolescents endorse significant levels of psychiatric distress at the time of their ED visit.[10] Visits to an ED for psychiatric purposes are an indicator of acute-on-chronic unmet mental health needs. Psychiatric expertise and effective mental health treatment options, particularly those used to address the rising suicide epidemic among adolescents, are needed in acute care settings which are serving as safety nets. As the incidence of referrals to EDs and primary care offices increases, we, as pediatricians, are increasingly expected to meet the needs of the community.[11-13]

Strategic planning to address the increasing demand for pediatric psychiatric care in communities and tertiary care children's hospitals should prioritize the needs of children with psychiatric diagnoses and declining mental health. The objective of this study was to evaluate pediatric psychiatric emergency visits and hospital admissions prior to and during the COVID-19 pandemic to better understand the effect of increased social isolation measures on the mental health of children. Importantly the study examined the characteristics of adolescents who required in-hospital psychiatric care during the 2 years of the pandemic. The information obtained helps identify the high-risk features of the patients who needed inpatient psychiatric hospitalization and the measures that need to be taken to improve care for them.

METHODS

A retrospective chart review was conducted at Corewell Health William Beaumont University Hospital evaluating pediatric psychiatric encounters between March 1, 2010, and February 29, 2022. The study included adolescents aged 13-18 years presenting to the emergency department or requiring inpatient admission with at least one psychiatric or behavioral health diagnosis identified through electronic health record (EHR) query. Diagnoses included depression, anxiety, suicide attempt, homicidal ideation, self-harm, conversion disorder, eating disorder, bipolar disorder, panic disorder, schizophrenia, substance abuse, attention-deficit/hyperactivity disorder (ADHD), and post-traumatic stress disorder (PTSD).

The study period was divided into two cohorts based on the timing of the first confirmed case of COVID-19 in Michigan. "Retrospective I" included encounters from March 1, 2010, to March 9, 2020 (pre-COVID-19 cohort), comprising 10,546 patients. "Retrospective II" included encounters from March 10, 2020, to February 29, 2022 (COVID-19 cohort), comprising 4,663 patients.

Patient encounters were identified through EHR-based data extraction. Variables collected included age, sex assigned at birth, race, psychiatric diagnoses, total pediatric encounters, total psychiatric encounters, length of stay, and patient disposition. In addition, charts of patients requiring inpatient psychiatric admission during the COVID-19 cohort period were manually reviewed in detail. Manual chart review included collection of demographic information, home psychiatric medications and medication compliance, attendance in therapy, and additional psychosocial and mental health factors documented in standardized social work templates and psychiatry consultation notes. Of the 4,663 patients identified during the COVID-19 cohort period, 399 patients were discharged to inpatient psychiatric facilities; however, only 371 charts were accessible for detailed manual review because of EHR access restrictions.

The study protocol was reviewed and approved by the institutional review board of Corewell Health prior to data collection. Statistical analysis was performed to compare demographic and clinical characteristics between the pre-COVID-19 and COVID-19 cohorts.

RESULTS

The trend of pediatric psychiatric encounters over the course of ten years (March 2010 to February 2020) before the onset of COVID-19 pandemic and two years (March 2020 to February 2022) during shows the gradual increase in the pediatric psychiatric encounters during the former and a sudden jump in the same (to almost double) during the latter (refer Figure 1). There was an average of 1054.6 pediatric psychiatric encounters per year prior to the pandemic (total 10546 over 10 years) while the average increased to 2331.5 per year after the onset of pandemic (total 4663 over 2 years).

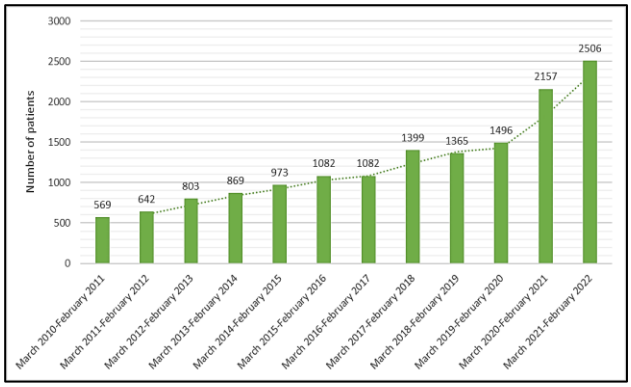

Figure 1: Trends in pediatric psychiatric emergency department and inpatient encounters before and during the pandemic.

Exploring the trend of pediatric psychiatric encounters as a percentage of total encounters showed an increasing trend in pediatric psychiatric admissions and ED visits over the course of 10 years from 7.2% to 19% of total pediatric encounters in Part I. Part II showed a similar trend (20.7% and 19.6% in the first and second year since the start of the pandemic respectively). See Figure 2.

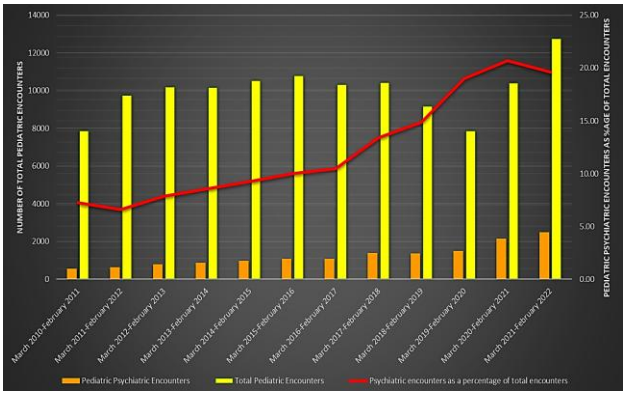

Figure 2: Trends in pediatric psychiatric emergency department and inpatient encounters as a percentage of total encounters during the study period.

While examining the racial distribution of pediatric psychiatric encounters, it was seen that the White/Caucasian population made up about 65% and 72% of total encounters before and during the pandemic. Encounters from African American population decreased from 21% to 7%, and from Asian population decreased from 5% to 1%. The label 'other' includes the patients who did not prefer to mention their race in the paperwork. Refer Figure 3.

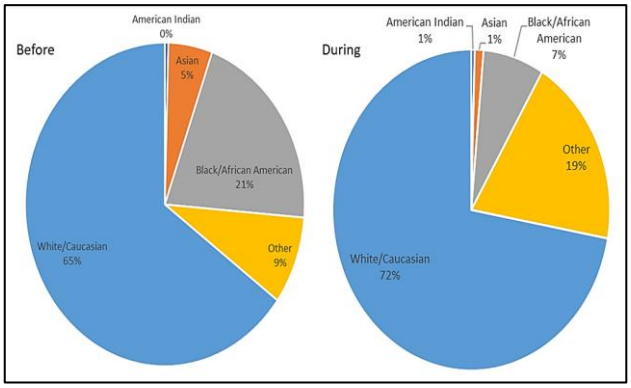

Figure 3: Racial distribution of emergency department and inpatient encounters before and during the pandemic.

Percentage of psychiatric encounters for males increased from 42.5% to 47% while for females decreased from 57.5% to 53%, however female predominance persisted, as seen in Table 1.

Table 1: Comparison of male/female patients before and during the pandemic.

Male		Female	
Before	**During**	**Before**	**During**
42.5%	47%	57.5%	53%

Home/self-care/outpatient follow up remained the main discharge disposition at 83.3% before and 91.4% during the pandemic. Patients who went to inpatient psychiatric facility decreased to half, from 16.7% to 8.6%. Refer Figure 4.

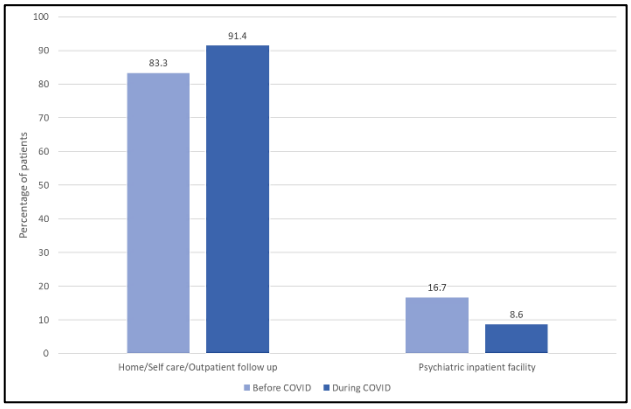

Figure 4: Disposition of the patients from the emergency department and inpatient hospital before and during the pandemic.

The maximum number of patients remained on the inpatient floors or in the ED for 1 day before their final disposition (67% and 46% before and during the pandemic respectively). The percentage of patients staying for 2-5 days increased from 24.2% to 37.6%. Notably, a larger percentage of patients remained longer during the pandemic as visualized in Table 2 (13.8% for 6-20 days, increased from 6.2%, and 2.3% for >21 days, increased from 1.8%).

Table 2: Length of stay of the patients in the emergency department and inpatient hospital before and during the pandemic before their final disposition.

Length of stay (in days)	Percentage of patients (before COVID)	Percentage of patients (during COVID)
1	66.9	46.4
2 to 5	24.2	37.6
6 to 20	6.2	13.8
21 to 30	1.1	1.3
31 to 60	0.68	1.0
More than 60	0.11	0

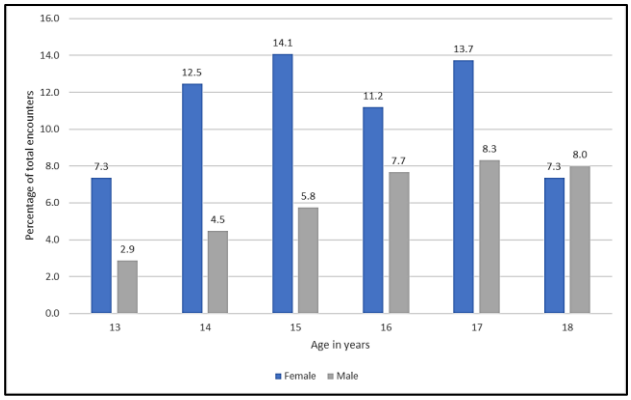

Figure 5: Patients discharged from the emergency department and inpatient hospital to an inpatient psychiatric facility divided by gender and age (n=371).

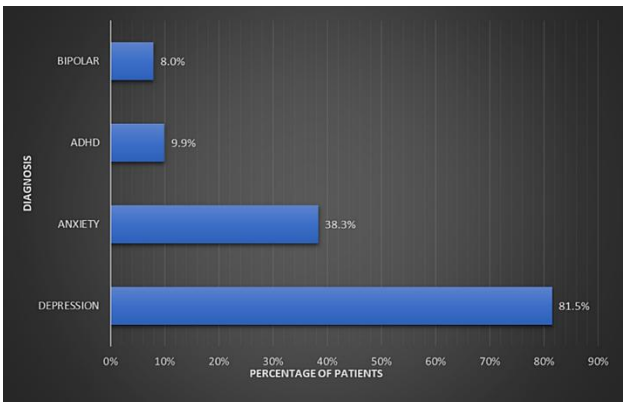

Figure 6: Major diagnoses identified in patients discharged to an inpatient psychiatric facility (n=371).

The 371 patients requiring inpatient psychiatric hospitalization (in 'retrospective II') also demonstrated female predominance at all ages, except eighteen years (as in Figure 5). The four major diagnoses identified in these patients were: depression (81.5%), anxiety (38.3%), ADHD (9.9%) and bipolar disorder (8%) as seen in Figure 6.

Table 3: Characteristics of patients requiring inpatient psychiatric placement (n=371).

Patient characteristics	% patients (n=371)	
Prior psychiatric hospitalizations	54	
On psychiatric medications prior to hospitalization	69.9	31.2% taking as prescribed
Undergoing psychiatric therapy prior to hospitalization	80.5	22.3% attended regularly
Suicidal ideations	71.5	
Abuse (sexual, physical, or emotional)	15.9	
Aggression/homicidal ideations	11.2	
Psychosis	9.9	
Behavioral/developmental disorder (including autism)	8.9	
Eating disorder	5.1	
Identifying as LGBTQIA+	9.3	
Substance abuse	3.5	
Survivor/witness of bullying	1.9	

Characteristics affecting the mental health of these 371 patients are shown in Table 3. 54% of the patients had a history of prior psychiatric hospitalization, 70% were already prescribed psychiatric medications, and 80.5% were undergoing outpatient psychological therapy. However, only 31.2% were taking their psychiatric medications as prescribed and only 22.3% were attending their outpatient therapy sessions regularly. The data further highlights additional contributing factors that placed this population at higher risk for psychiatric hospitalizations: 71.5% reported suicidal ideation, 11.2% endorsed homicidal ideations/aggression, 15.9% were survivors of physical, emotional, or sexual abuse, 1.9% were targets of or witnesses to bullying, 5.1% had an eating disorder requiring nutritional rehabilitation, 3.5% had substance use disorder, 9.9% had associated psychosis and 8.9% had some kind of developmental delay.

DISCUSSION

The study findings demonstrated an increase in psychiatric encounters as a proportion of total pediatric encounters at a suburban referral children's hospital over the period of ten years prior to the onset of the pandemic. This trend was sustained during the two years into the pandemic while ED visits and inpatient admissions due to

other causes decreased (Figure 1 and 2). This was noted to be similar to the trend reported by several other studies.[5,11,14-19] This demonstrates the burden of mental health in our patient population and the importance of psychiatric resource availability. Table 1 showed the female predominance of pediatric psychiatric encounters before and during the pandemic. Other studies similarly showed that mental health symptoms and suicide risk rose more strongly among female than their male peers.[16,20-24] Evaluation of the racial distribution of the pediatric psychiatric encounters (in Figure 3) showed that White/Caucasian population made up the maximum of total encounters before and during the pandemic, while the encounters from the African American population decreased by 3 times, and from Asian population decreased by 5 times. Even though this data suggests that the mental health decline was not as severe in the African American and Hispanic populations, other studies have shown that compared with White peers, racial and ethnic minority children have a higher prevalence of several common mental and behavioral health conditions but are less likely to use community services. In addition, compared with White peers, Black and Hispanic children have fewer mental health visits, lower mental health medical expenditures, and are less likely to be seen by a mental health specialist.[25] We also found a linear increase in psychiatric encounters with age (Figure 5 and Table 1). Two of the largest studies in a systematic review by Kauhanen et al that focused on subjects aged 13-18 and 11-20 years found that mental health disorders increased more in older than younger participants during the pandemic.[17] We can utilize this epidemiological information to identify high risk adolescents (Caucasians, females, older) in the primary care setting and explore the basis of this disparity.

On comparing the disposition of the patients before and during the pandemic, it was seen that most patients were discharged to home/self-care/outpatient follow up before and during the pandemic; however, the percentage of patients who went to an inpatient psychiatric facility decreased by half (Figure 4) during the pandemic. This was likely due to the limited number of beds for the increasing number of patients during the pandemic, so the cases which were less severe were set up with outpatient appointments. Our data confirmed the lived experience of ED and inpatient units where adolescents boarded for much longer durations while awaiting inpatient psychiatric beds demonstrated by doubling in the percentage of patients who waited longer than 6 days (Table 2).[9]

We reviewed the charts of 371 patients who required inpatient psychiatric rehabilitation during the two years of the pandemic to understand the social determinants of health leading to repeated hospitalizations and decreased access to community services. In this review, the four major diagnoses identified (Figure 6) were depression, anxiety, ADHD and bipolar disorder. Similarly, a study from the United Kingdom found increasing depression symptoms and a study in Germany found increasing anxiety symptoms, conduct and hyperactivity problems.[18,19] Other studies demonstrated the predominance of depression and anxiety disorders.[17,21,23] It is important to recognize the importance of diagnosing and treating these early as pediatric providers.

Our study is unique in that additional characteristics of adolescents admitted to inpatient psychiatric care were explored (Table 3). Our data showed that there is a high incidence of needing repeat inpatient psychiatric care in adolescents who are not taking their medications as prescribed and/or participating in their therapy sessions. Adolescent psychiatric rehospitalizations are a frequent and costly occurrence that impose significant emotional and psychological distress on patients and their families. These repeat hospitalizations place substantial demands on healthcare resources, disrupt social support systems, and negatively impact school performance. Additionally, they contribute to increased stigmatization for both youth and their families.[26,27] This represents an opportunity for the provision of more intense outpatient psychiatric care and social support to prevent repeated psychiatric crises. Paying careful attention to social determinants of health for each patient to develop an individualized care plan may ensure consistent use of psychiatric medications and psychological therapy that can aid recovery.

Our data analysis further highlights the importance of screening for other physical, social and developmental factors that may contribute to worsening psychiatric morbidity (Table 3) to identify at-risk adolescents for early intervention and prevention. In a review by Madden et al, markers of clinical severity such as suicidal behaviors and self-injury and a greater clinical burden of emotional and behavioral symptoms were associated with a heightened risk of psychiatric readmission, as were admission diagnoses of psychotic disorders such as schizophrenia, mood disorders, and developmental disorders such as autism and intellectual disability.[28] The studies by Kumar et al and Chang et al similarly demonstrated high suicide burden in adolescents with mood disorders, witness/survivors of physical/sexual abuse, neglect, substance abuse, impulsive/aggressive behaviors, personality disorders, among others.[29,30] Furthermore, adolescents with eating disorders have a high risk of future medical complications, psychiatric comorbidities, suicidality and relapse.[31] Tordoff et al highlighted disproportionate burden of mental health disorders among transgender and non-binary youths.[32] Depression and anxiety seem to be more prevalent in sexual minority groups as compared to their heterosexual counterparts as in studies by Waller et al and Argyriou et al.[33,34]

The findings of declining mental health seen in our study (and numerous other studies) have long term dire consequences as poor mental health in childhood is associated with future morbidity and mortality in addition to lower socio-economic status and less stable social

relationships in adulthood.[12,35,36] Key factors in reducing the likelihood of subsequent psychiatric admissions include providing adequate inpatient care to effectively address the acute presenting issues; engaging both patient and family in psychotherapy; ensuring a comprehensive discharge plan and delivering evidence-based support services to facilitate a smooth transition from inpatient to outpatient psychiatric care (e.g., discharge services, follow-up calls, short-term case management, bridge visits, and psychoeducation); maintaining sufficient outpatient services to support community integration; and enhancing communication between inpatient and outpatient providers both prior to and following discharge. Effectively preventing psychiatric readmissions includes providing alternatives to psychiatric hospitalization (e.g., day hospital, short-term crisis unit, various forms of supported housing, and assertive community treatment services) should a subsequent psychiatric crisis develop.[28,37]

Despite the important findings demonstrated, this study is not without its limitations. The study was retrospective in nature and only analyzed data from two years into the pandemic and did not compare the findings over a longer time-period. It further needs to compare the trend of these visits as the social restrictions were weaned with time even though the pandemic continued. While we did not evaluate the specific obstacles to accessing care, it is known that numerous clinics were unavailable for patient consultations, telehealth services were gradually being established, certain psychiatric facilities experienced temporary closures due to COVID-19 outbreaks. Some families encountered increased challenges in securing transportation or faced job loss, resulting in a loss of regular income and health insurance. This further complicates access to care. Identifying the gaps in care prior to psychiatric crisis presents an opportunity for reducing the need for inpatient psychiatric care.

CONCLUSION

The pediatric psychiatric crisis during the COVID-19 pandemic exposed our system's health care gaps. EDs and inpatient units needed to work beyond their capacity to overcome this, with many patients staying in these places until definitive care was available.

There is a high incidence of needing repeat inpatient psychiatric care in high-risk adolescents as their access to medications and therapy is low. Identifying the gaps in care helps optimize the health of our patients and their families by reducing the need for inpatient psychiatric care and re-admissions.

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