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ORIGINAL ARTICLE

Mental Health Visits: Examining Socio-demographic and Diagnosis Trends in the Emergency Department by the Pediatric Population

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Abstract The emergency department (ED) is increasingly being used for mental health visits by children and adolescents. It is estimated that 21–23% of youth have a diagnosable psychiatric or substance use disorder. Using data from the ED of a tertiary medical center, we examined trends in mental health diagnoses over a 5-year period. In school age children the most prevalent diagnoses were anxiety disorders (28.4%); disorders first usually diagnosed in infancy, childhood, or adolescence (26.5%), and mood disorders (18.6%). High school students were more likely to visit the ED for anxiety disorders (30%). Females (34.5%) presented more for anxiety disorders compared to males (22.7%). Mental health visits and diagnoses were higher during school months (September–May) and lower in the summer months (June–August). The diagnosis trends identified in this study have clinical implications that can contribute to evidence-based restructuring of mental health resources and screenings.

Keywords Mental health · Psychiatric diagnosis · Anxiety disorders · Mood disorders · School age

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Background

Children and adolescent visits for psychiatric illnesses are the fastest growing segment of visits to the emergency department (ED) and it has been estimated that mental health visits accounts for 5% of all ED visits in children between the ages of 5–18 years throughout the United States [1–4]. It is estimated that 21–23% of children and adolescent have a diagnosable psychiatric or substance use disorder in the United States [5, 6] and more than 13 million children need mental health services [7]. Regardless of this significant burden of disease, only 36% ever receive mental health services [8] and children with severely impairing psychiatric illnesses, only 40–50% ever receives care for their mental health problems [5, 8]. Furthermore, by 2020 mental illness will be among one of the most common causes of morbidity and mortality for children and adolescents who visited the ED [9]. Thus, there is increasing evidence that psychiatric illnesses among children and adolescents are the fastest growing component of ED visits and this trend is likely to increase.

It has been proposed that such trends could be attributed to the difficulty in accessing outpatient mental health services [1, 3, 10, 11] lack of sufficient number of mental health providers and hours of service that are not convenient [2–4]. Hence, information obtained from this study can serve as a benchmark for monitoring pediatric mental health visits in Greenville Memorial Hospital's (GMH) ED

and provide an insight on diagnoses trends in mental health visits in the southeastern US. It can also help with the planning of services to meet the needs of children and adolescents who visit the ED. We undertook the current study to examine diagnosis trends, socio-demographic characteristics and time of presentations in the pediatric population at GMH ED for mental health visits over a 5-year period.

Methods

Study Design and Population

Based on published methodological guidelines [12], a retrospective study of all psychiatric visits and diagnosis of children between the ages of 5–18 years who visited GMH ED between January 1, 2010 and December 31, 2014 was conducted. An interdisciplinary mental health team consisting of a psychiatrist, psychiatric residents, nurse practitioners, and psychiatric social workers evaluated all youth. The interdisciplinary team met on a daily basis to review all cases presenting in the previous 24 h. The team's attending psychiatrist determined the youths' diagnosis and entered it into the electronic health record. Data abstraction was done by reviewing medical and administrative records for mental health visits and diagnosis during the study timeframe using the International Classification of Diseases Nine (ICD-9) diagnosis codes of 290.0–319.0. Information obtained from medical records includes age, sex, race, psychiatric diagnoses, payment source, and, the day of the week, month and year visit took place. The Greenville Health System Institutional Review Board (IRB) approved this study.

Statistical Analysis and Confidentiality

We categorized the study population into three school age groups: elementary school (5–10 years), middle school (11–13 years) and high school (14–18 years). The ICD-9 codes for psychiatric diagnoses identified as specific disorders were clustered into larger diagnostic categories for the purpose of analysis. The major categories are: (1) Substance-related disorders, (2) Disorders first usually diagnosed in infancy, childhood, or adolescence (includes Autistic Disorder, Rett's Disorder, Childhood Disintegration, Asperger's, Pervasive Developmental Disorder NOS, ADHD, Conduct Disorder, Oppositional Defiant Disorder, Disruptive Behavior Disorder NOS, Pica, Rumination Disorder, Feeding Disorder of Infancy or Early Childhood), (3) Mood disorders, (4) Anxiety disorders, (5) Adjustment disorders (6) Personality Disorder, (7) Schizophrenia and other psychotic disorders, (8) Mental disorders due to a general medical condition not elsewhere classified, (9) Impulse-control disorders not elsewhere classified and (10) Eating or Sleep Disorders based on previous research [13, 14]. The time of admission at the ED was categorized into two groups (regular hours (8am–5pm) and (after hours before 8am and after 5 pm). We compared demographic characteristics among the school ages groups using Chi square test with provision of frequencies and percentages; p values <0.05 were considered statistically significant. Analysis was done using SAS 9.3 (Statistical Analysis System, Cary, NC) and the graphs were created using excel 2013.

Results

There were 2700 visits defined as mental health visits (i.e., mental health diagnosis, mental health reason for visits and/or psychotropic drug prescriptions) to the ED by children between the ages of 5–18 years during the study period. The primary referral source to the ED were the youth's family (49%), the youth's school (21%), another medical provider, including the local mental health center (17%) youth's primary care provider (10%), or social welfare agency (3%). The top reasons for presentation to the ED were aggressive behaviors (68%), thoughts/actions of self-harm (27%), thought disorder (3%), and medication refills (2%). Although the family was the primary referral source, many of these families were informed by the school that the youth must be evaluated prior to returning to school. Forty percent (40%) of these families stated that they were not able to get an outpatient evaluation because of the extended wait which was 6 weeks or greater.

There was a significant ($p=0.0001$) difference in the distribution of pediatric mental health visits by year. During the 5-year period there were n = 380 (14.1%) visits in 2010; n = 565 (20.9%) visits in 2011; n = 495 (18.2%) visits in 2012; n = 565 (20.9%) visits in 2013 and n = 698 (25.9%) by the pediatric population. Additionally, we had n = 25,411 mental health visits by individuals of all ages 2010–2014. Pediatric (<= 18 years) mental health visits comprised approximately 11% (n = 2700) of all mental health visits while 89% (n = 22,711) were made by adults 19 years or older. The number of mental health visits for all ages during the study period was n = 4815 in 2010; n = 5052 in 2011; n = 5041 in 2012; n = 5146 in 2013 and n = 5360 in 2014 respectively. Of these visits, pediatric mental health visits comprised 7.9% (n = 380) in 2010; 11.2% (n = 565) in 2011; 9.8% (n = 495) in 2012; 10.98% (n = 565) in 2013; and 13% (n = 698) in 2014 respectively.

The population was predominately White in all age groups (Table 1), and this is a reflection of the population distribution in upstate South Carolina. The percentage of males (51.5%) in the age group 14–18 is higher than that of females (48.5%) but the difference was not statistically

Table 1 Socio-demographic characteristics of the study population

Characteristics	Ages 5–10 years (N = 362 visits)	Ages 11–13 years (N = 478 visits)	Ages 14–18 years (N = 1860 visits)	χ^2
Gender (% visits)				
Male	33.7	45.4	51.5	<0.0001
Female	66.3	54.6	48.5	
Race/ethnicity				
White	61.9	69.8	72.8	<0.0001
Black	27.6	21.6	19.7	
Hispanic	3.3	4.8	4.1	
Other	7.2	3.8	3.3	
Insurance				
Medicaid	77.4	65.3	52.4	<0.0001
Other types	22.6	34.7	47.6	
Time of visit				
Regular hours	51.4	49.2	38.9	<0.0001
After hours	48.6	50.8	61.1	

*Other: Represents other racial/ethnic minorities like Asians and American Indians

significant (0.157). In the younger age groups, 5–10 and 11–13 years (66.3%) and (54.6%) were female respectively. Overall, the proportion of visits by children presenting to the ED were significantly ($p < 0.001$) greater for females than for males with the most noticeable gap in the 5–10 age group. Medicaid was the predominant source of insurance for all ages (Table 1). The number of youth who visits the ED with mental health issues 21.7% was hospitalized to psychiatric facility; 12.8% to other facilities, 63.7% were discharge home and 1.8% leaves against medical advice (AMA). Age group and race was significantly associated with disposition to a psychiatric facility. Approximately 16.3% (n = 59) of children between the ages of 5–10 years who had a psychiatric diagnosis in the ED were hospitalized in a psychiatric facility whereas 25.7% (n = 123) between 11 and 13 years and 21.8% (n = 405) between 14 and 18 years were hospitalized ($p = 0.0046$). Additionally, 17.9% (n = 102) of Blacks who had a psychiatric diagnosis in the ED were hospitalized in a psychiatric facility whereas 22.3% (n = 25) of Hispanics, 23.1% (n = 442) of Whites and 16.8% (n = 18) of other races were hospitalized ($p = 0.00341$). There was no significant difference by gender (result not provided).

Diagnostic Presentation

The most prevalent diagnosis in psychiatric related visits were anxiety disorders (n = 766, 28.4%), disorders first usually diagnosed in infancy, childhood, or adolescence (n = 715, 26.5%), mood disorders (n = 501, 18.6%) and substance related disorders (n = 273, 10.1%). Significant gender differences ($p < 0.001$) in presentations were observed during the study period. Females were more likely to present for anxiety disorders (34.5%) and mood disorders (20.8%) whereas it was disorders first usually diagnosed in infancy, childhood, or adolescence (32.8%) and anxiety disorders (22.7%) for boys (Fig. 1). High school students with psychiatric related diagnoses were more likely to visit the ED for anxiety disorders (n = 557, 30%), mood disorders (n = 423, 22.7%), disorders first usually diagnosed in infancy, childhood, or adolescence (n = 321, 17.3%) and substance related disorders (n = 263, 14.1%). Middle school students were more likely to visit for disorders first usually diagnosed in infancy, childhood, or adolescence (n = 180, 37.7%) and anxiety disorders (n = 149, 31.2%), mood disorders (n = 60, 12.6%) and adjustment disorders (n = 37, 7.7%) respectively. Disorders first usually diagnosed in infancy, childhood, or adolescence accounted for most visits (n = 214, 59.1%) in Elementary school students followed by anxiety disorders (n = 60, 16.6%) and mental disorders due to a general medical condition not elsewhere classified (n = 21, 5.8%).

Diagnostic Presentation and Visit by Year, Month and Day of the Week

The data was documented for all ED visits for the study period (January 1, 2010–December 31, 2014). There was a significant increase in diagnostic presentations throughout the study period, showing significant trends by year, month and day of the week for pediatric population. Figure 2 illustrates presentation by year for each diagnostic group for the pediatric population. Mental health visit increased from 380 in 2010 to 698 visits in 2014 (83.7% increase) although there was not a steady increase over the 5 year period. Visits were more likely to occur (57.6%) after regular hours,

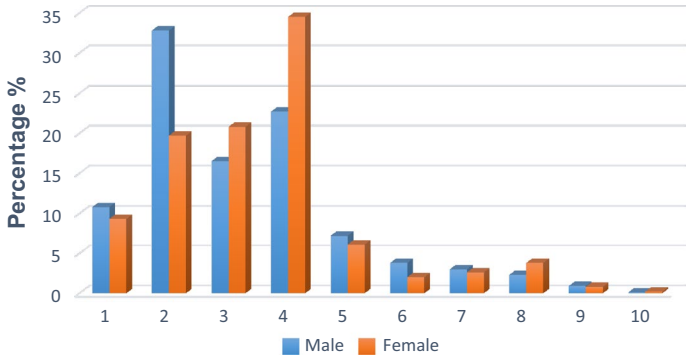

Fig. 1 Prevalence of psychiatric diagnosis in the ED by gender, *1* Substance-related disorders, *2* Disorders first usually diagnosed in infancy, childhood, or adolescence, *3* Mood disorders, *4* Anxiety disorders, *5* Adjustment disorders, *6* Personality Disorder, *7* Schizophrenia and other psychotic disorders, *8* Mental disorders due to a general medical condition not elsewhere classified, *9* Impulse-control disorders not elsewhere classified and *10* Eating or Sleep Disorders

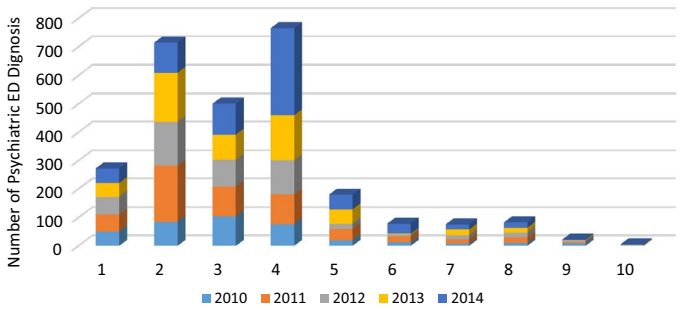

Fig. 2 Number of Psychiatic ED Diagnosis by Year, *1* Substance-related disorders, *2* Disorders first usually diagnosed in infancy, childhood, or adolescence, *3* Mood disorders, *4* Anxiety disorders, *5* Adjustment disorders, *6* Personality Disorder, *7* Schizophrenia and other psychotic disorders, *8* Mental disorders due to a general medical condition not elsewhere classified, *9* Impulse-control disorders not elsewhere classified and *10* Eating or Sleep Disorders

that is, before 8am and after 5 pm. Anxiety disorders increased consistently over the study period from 77 visits in 2010 to 306 in 2014, (297%) increased. Additionally, during the same period, adjustment disorders increased. In 2010, there were 20 visits for adjustment disorder compared to 51 visits in 2014, a 155% increase.

The monthly trend of visits by diagnostic groups was also examined (Fig. 3). Most noticeable, during the summer months of June, July and August, the prevalence of mental health visits for anxiety disorders, mood disorders and disorders first usually diagnosed in infancy, childhood, or adolescence decreased. The frequency of visits presenting to the ED significantly differ during the summer months (525/2700; 19.4%) compared to March to May (736/2700; 27.3%), September to November (789/2700; 29.2%) and December to February (650/2700; 24.1%) respectively.

In addition, during the study period, weekly trend of visits by diagnostic groups was also examined (Fig. 4). Distinct trends emerge for diagnoses types based on the day of the week.

The increasing trend in mental health related visits were consistent and more likely to occur on Tuesday (17.6%), Wednesday (16.2%) and Thursday (16%) respectively. The most frequent occurrences were anxiety disorders, mood disorders and disorders first usually diagnosed in infancy, childhood, or adolescence accounting for most of the diagnoses (Fig. 4). A higher proportion of visits for the pediatric population were more likely to occur on weekdays than weekends as shown in Fig. 4.

Discussion

This study indicates that there is clinical relevance to understanding the temporality of visits to the ED by the pediatric population. The results of this study demonstrate that mental health contributes to the trends in visits by the pediatric population to the ED as illustrated by other studies [1–3, 15, 16]. Previous studies have demonstrated that demographic factors such as gender and age have a

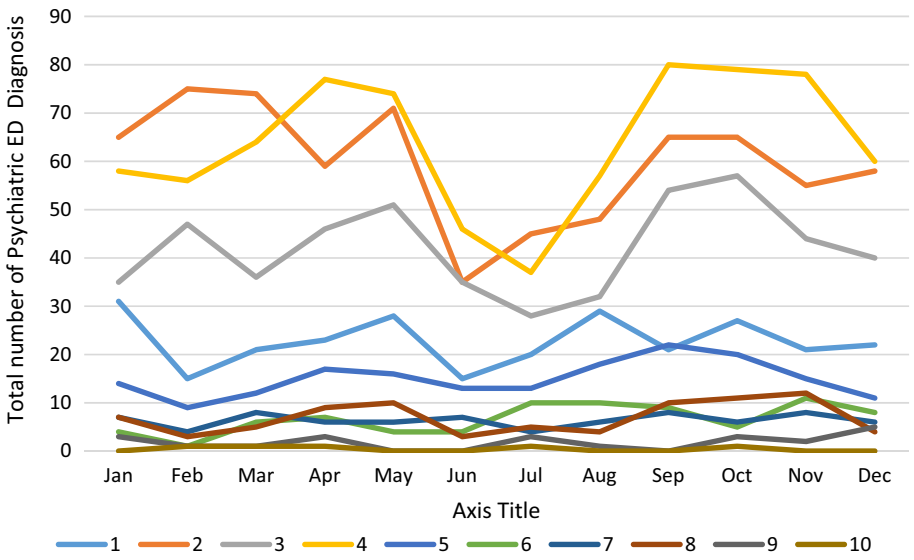

Fig. 3 Number of Psychiatric diagnoses by Month in the ED, *1* Substance-related disorders, *2* Disorders first usually diagnosed in infancy, childhood, or adolescence, *3* Mood disorders, *4* Anxiety disorders, *5* Adjustment disorders, *6* Personality Disorder, *7* Schizophrenia and other psychotic disorders, *8* Mental disorders due to a general medical condition not elsewhere classified, *9* Impulse-control disorders not elsewhere classified and *10* Eating or Sleep Disorders

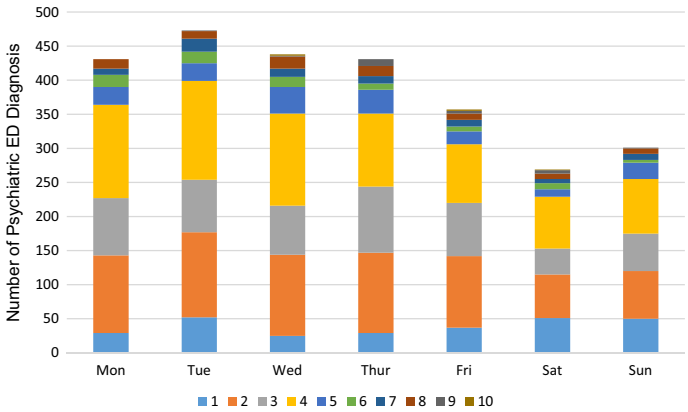

Fig. 4 Diagnosis type by Weekday, *1* Substance-related disorders, *2* Disorders first usually diagnosed in infancy, childhood, or adolescence, *3* Mood disorders, *4* Anxiety disorders, *5* Adjustment disorders, *6* Personality Disorder, *7* Schizophrenia and other psychotic disorders, *8* Mental disorders due to a general medical condition not elsewhere classified, *9* Impulse-control disorders not elsewhere classified and *10* Eating or Sleep Disorders

significant impact on youth seen in the ED [17–19]. These studies have demonstrated that the majority of the referrals for pediatric psychiatric care are for non-urgent reasons. Many of the ED visits are the result of events that occur during the day in the life of a youth, including challenges at school, home or the community and it is the parental perception of these events that result in youth presenting to the ED [20].

While the majority of the childhood visits were female, the adolescent visits were predominantly male. The percentage of male to female youth presenting to the ED increased with age. Although not available in this study, prior studies have shown that aggression toward self or others is closely associated with admission to the ED for evaluation [21, 22]. Males more frequently display aggressive behaviors [23, 24] perhaps contributing to the increasing number of males in the older age group.

In our study, we examine the trend in a wide range of mental health diagnoses and anxiety disorders accounted for the most commonly presented diagnoses to the ED among youth with mental health emergencies. This finding is consistent with other large-scale studies of the prevalence of mental health conditions in children and adolescents [2, 25]. The prevalence of anxiety among youth frequently lead to a number of behavioral issues, such as conflicts with peers, the inability to complete work in school, and withdrawn behaviors, which may trigger referrals to the ED. The finding of high numbers of youth with depression, disorders first usually diagnosed in infancy, childhood, or adolescence and substance use are also consistent with pervious findings. Our findings were consistent with recent studies that suggest that youth tend to present more commonly to the ED during school months, and after regular hours on weekdays [26, 27]. Our study found that the highest frequency of visits was from September through November and March through May. There was a significant decrease in the number of mental health visits by pediatric population to the ED from June through August. The service use findings are consistent with the stressful periods in the lives of the youth at school and correlate with returning

to school following an extended summer break (September–November) and the end of the school year stressors, such as exams (March–May).

This study also supports previous findings that mental health challenges seem to increase during the months' children attend school, September through May [26, 27], which may be due to increased stress. Elevated stress levels during the school months may be attributed to the pressure to make or sustain a friendship, meeting expectations of parents and teachers, or from failing grades [28]. Additionally, stress is associated with poor mental health outcomes such as depression [29–31]. The predominance of anxiety disorders across race, gender, and time in youth presenting to the ED supports the role that increased stress may play in the higher number of visits to the ED during school months. In addition, the increase in pediatric ED mental health visits during school months may be attributable to an increase in potential referral sources. During school months, youth are more likely to have supervisory contact with adults who may have some training in assessing normal development and normal responses to stressors. Teachers, coaches, tutors and even employers of youth may be more likely to observe youth behavior during school months and can assist in identifying at-risk youth.

The results of our study also align with previous studies indicating most of the visits occurred after regular office hour (57.6%). For example, most visits for mental health services occurred between 5 pm and 12-midnight. This often reflects behaviors that became evident earlier in the day, but care was not accessible in community-based settings. It may also reflect that parents or guardians of youth in distress are not available to seek mental health care during business hours for various reasons. Previous studies have found that the ED is the location where many individuals seek care when usual sources of care are unavailable [3, 32]. The fact that services are accessed in the evening, and early morning substantiates the need for round clock service to meet the needs of youth who may not otherwise have access to mental health services. The presence of high quality mental health services has been found to assist youth in connecting to appropriate outpatient services when the initial interventions occur in the ED [33].

In this study, as the population ages, females are less likely than males to present to the ED for mental health emergencies and, with the exception of Hispanics, fewer minorities present to the ED than Whites as they become older, which maybe a reflection of the population distribution in the Upstate. These findings suggest the potential impact of the differential rate of maturity between genders and the increasing role of culture and ethnicity in access to mental health care. Understanding the socio-demographic characteristics and diagnostic trends that presented to the ED can be applied to increase access and target preventative measures for children and adolescents with mental health challenges or crises. However, the study population was predominantly White and was mostly Medicaid recipients. Thus, generalizing the results of this study should be taken with caution.

Our study findings should be interpreted in the context of its limitations. First, the study population was limited to the ED of GMH, in Upstate South Carolina, which may not be representative of EDs across South Carolina or North America. Mental health visits to the ED may not have been captured completely due to coding differences. This may arise from coding non-psychiatric visits before psychiatric visits when the primary reason for the visit is for a mental health problem. Emergency Departments does not capture all health care visits for youth with mental illness presentations, therefore the data regarding temporal trends are specific to EDs. There is a supposition that all school-aged children that present to the ED attend school. There may be some benefit of differentiating the type of school (public, private, charter, parochial, home-schooled) a child attends in order to better explore the potential impact on presenting diagnoses and temporal trends. There may also be some benefits to confirmation of school attendance in order to clearly define the relationships between school, stress and ED visits. There was also significant variation in the disposition of children that visit the ED for psychiatric disorder by race and age but a multivariate analysis was not done to determine if race and age group were factors associated with increased psychiatric hospitalization.

Our findings are in keeping with previously reported trends in pediatric mental health in the US and Canada, indicating an increase in mental health related visits and psychiatric diagnoses to the ED [3, 15, 26]. As this study period occurs over 5 years, changes in resource availability may potentially have influenced the frequency of visits from this population.

Summary

The temporal trends identified in this study have clinical implications that can contribute to evidence-based restructuring of mental health resources and screenings. Given that our study confirms that youth tend to present to the pediatric ED more often during school months, it may be of particular benefit to target enhancing the mental health education of the most likely potential referral sources including parents, educators, coaches and school-based mental health clinicians. It may be particularly helpful to heighten screening skills among school based mental health providers in order to improve preventive supports. Increasing the ability of EDs to provide mental health care by trained professionals 24 h/day may better equip healthcare systems to

accommodate the needs of this particular population. The overall goal of re-allocating and enhancing mental health supports would be to increase mental health care access. Additional research on the role that school based services and level engagement in outpatient mental health treatment prior to pediatric ED presentation would be of some benefit. Future studies on the roles of gender and culture as well as school type and school attendance on ED presentation of mental health diagnoses would be of significant benefit.

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