Summary Statistics for Pediatric Psychiatric Visits to US Emergency Departments, 1993–1999

Marion R. Sills, MD, MPH, and Shayne D. Bland, MSc†

ABSTRACT. Objectives. To describe characteristics of emergency department (ED) encounters for pediatric patients with an acute mental health diagnosis.

Methods. Data are from the National Hospital Ambulatory Medical Care Survey, which includes abstracts from the medical records of a national probability sample of visits to EDs. Analysis was limited to records of patients who were younger than 19 years and had a diagnosis of either confirmed or suspected mental disorder or a suicide attempt.

Results. There was an estimated annual average of 434,000 ED pediatric mental health visits from 1993 to 1999, an average annual rate of 326.8 visits per 10,000 people. Visit rates varied by patient’s region, age, race, and gender. Psychosis was the diagnosis in 10.8% of these patients, and suicide attempt was the diagnosis in 13.6%. ED pediatric mental health visits accounted for 1.6% of all ED visits in this age group.

Conclusions. The significant increase in emergency department pediatric mental health (EDPMH) visits from 1993–1999 is greatest among patients who are non-white, teenaged, female, and live in the Northeast or Midwest. This variation in EDPMH visits may reflect variability in the shortage of mental health providers. The lack of increase in the 2 categories of diagnoses mandatorily seen in EDs—psychoses and suicide attempts—suggests that the overall rise in EDPMH visits may have been attributable to nonurgent complaints more appropriately managed by a primary mental health provider.

ABBREVIATIONS. ED, emergency department; EDPMH, emergency department pediatric mental health (visit); NHAMCS, National Hospital Ambulatory Medical Care Survey; PSU, primary sampling unit; ESA, emergency service area; ICD-9-CM, International Classification of Diseases, Ninth Revision, Clinical Modification.

Both lay1-3 and trade4-6 publications have drawn attention to the escalating shortage of mental health inpatient and outpatient resources, and a Surgeon General’s report has called the shortage a “health crisis.”7 The online databases of the US Department of Health and Human Services’ Bureau of Primary Health Care (bphc.hrsa.gov/databases/newhpsa/newhpса.cfm) show that 771 health service areas nationwide were designated as underserved in the first 6 months of 2001.

The Methodology for Epidemiology of Mental Disorders in Children and Adolescents study estimated that almost 21% of US children ages 9 to 17 had a diagnosable mental or addictive disorder associated with at least minimum impairment.8 Between 6 million and 9 million children and adolescents have serious emotional disturbances, accounting for 9% to 13% of all children.9 There is little in the scientific literature describing the characteristics of the cohort of US children who present to emergency departments (EDs) with mental health–related diagnoses.

The purpose of this report was to describe the frequency of emergency medical utilization and the patient, drug, and visit characteristics for emergency department pediatric mental health (EDPMH) visits in the United States. We used the National Hospital Ambulatory Medical Care Survey (NHAMCS) to describe the extent and characteristics of emergency medical utilization for mental health disorders in children and adolescents. We examined differences in utilization and treatment patterns during the period 1993 to 1999. The data presented here are important for public health, clinical, and academic purposes related to disease prevalence, emergency medicine research, and therapy guidelines and projections.

METHODS

Data from the 1993–1999 NHAMCS were combined to generate national estimates of ED visits for pediatric patients with a diagnosis of either confirmed or suspected mental disorder or a suicide attempt. The NHAMCS is a multistage probability sample of visits to hospital emergency and outpatient departments conducted annually by the National Center for Health Statistics, Centers for Disease Control and Prevention.10 Only the ED data were used for this study. The survey period was from January 1, 1993, through December 22, 1999.

The NHAMCS uses a 4-stage survey design that involves probability samples of primary sampling units (PSUs), short-stay or general hospitals within PSUs, emergency service areas (ESAs) within hospital EDs, and a systematic sample of approximately 50 visits from each ED within the ESAs. The first-stage sample consisted of 112 of 1900 geographically defined PSUs that covered the 50 states and the District of Columbia. The second-stage sample of hospitals was from the 1991 SMG Hospital Market Database. A sample of 600 hospitals was randomly divided among 16 subsets, 13 of which were used in any survey year. Each sampled hospital was inducted once every 15 months. US Bureau of Census field representatives inducted the hospitals and formed a list of the

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emergency ESAs under the direction of the hospital’s ED. Up to 5 ESAs from each sampled hospital were included. There were only 2 hospitals that had 1-5 ESAs; in those cases, a sample of 5 was selected. Only those hospitals with an ED were eligible to participate in the ED component. In the final stage of sampling, hospital personnel used the daily patient logs during the randomly assigned 4-week reporting period to identify the sampled cases and pull the appropriate medical records. Hospital staff abstracted the patient, drug, and visit data from emergency medical records onto the data collection instrument usually within 1 day of the visit. Because no patients were directly contacted and confidential identifying information was not collected, the NHAMCS is exempt from institutional review board approval.

ED data were available from 579 hospitals during the 7 years (yearly range: 374–423), which represented an overall response rate of 96.5%. Abstracted data included up to 3 physician diagnoses; up to 3 reasons for visit or complaints as stated in the patient’s (or patient surrogate’s) own words; up to 6 medications prescribed or provided; and various patient and visit characteristics, such as age, race, gender, diagnostic and therapeutic services, and visit disposition. Medications included all new or continued drugs ordered, supplied, or administered at the visit; immunization and desensitizing agents; and anesthetics. Diagnoses were classified and coded according to the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM).11 Patient’s complaints were coded to the Reason for Visit Classification,12 and medications were assigned a therapeutic class from the National Drug Code Directory, 1995 Edition.13 All classification and coding was performed centrally by the National Center for Health Statistics.

Mental health disorder visits are based on records in which any of the 3 physician diagnoses were coded 290–314.9. This broad category of mental health disorders included cases of psychotic disorders, neurotic disorders, and personality disorders. Visits for suicide attempts were identified on the basis of a record in which any of the 3 reason-for-injury codes was E950 to E959. For purposes of this study, visits by patients who were older than 18 years were excluded. The sample records included 907 records considered EDPMH visits out of 47 017 ED visits. Because of the absence of unique patient identifiers in NHAMCS, we could not detect multiple visits by the same person. We defined visits as “urgent” when they were categorized as “urgent/emergent” in the 1993–1996 surveys or as needing to be seen in ≤2 hours in the 1994–1999 surveys.

Sample weights were applied using Microsoft Access 97 (Microsoft, Inc, Redmond, WA) to yield national annual estimates of EDPMH visits. Population rates are based on the average of US Bureau of the Census estimates of the civilian, noninstitutionalized population of the United States as of July 1, 1993–1999, and have been adjusted for net underenumeration.14 A multivariable regression model containing gender, age (0–6 years, 7–12 years, 13–18 years), race (white, nonwhite), and region (Northeast, Midwest, South, and West) was used. Analysis for trends compared the data from each of the 7 years of the study. The outcome variable was the rate of EDPMH per 10 000 population at risk. For assessing the significance of the variables in the models, the likelihood ratio test (χ² statistic) was used. Data were analyzed using SAS 8.1 Statistical Software (SAS Institute Inc, Cary, NC).

RESULTS

An estimated 3 034 855 EDPMH visits were made from 1993 to 1999 by individuals who were 18 years and younger. The annual average of 433 551 visits (95% confidence interval: 382 407–484 695) provides an annual average rate of 326.8 visits per 10 000 people (95% confidence interval: 290.6–363.0). These visits represented 1.6% of all ED visits by people 18 years and younger. EDPMH visits accounted for 3.2% of all ED visits ending with admission to inpatient status for this age group. The chief complaint of patients in 9.6% of EDPMH visits was “psychological and mental disorder, not elsewhere classified.” Although “psychological and mental disorder, not elsewhere classified” was the predominant chief complaint, “adverse effect of drug abuse,” “depression,” and “headache” accounted for another 15.4% of visits.

The percentage distribution of EDPMH visits by patient characteristics is shown in Table 1 along with population rates. The mean age for EDPMH visits was 14.6 years. Seventy-one percent were teenagers, 50.5% were girls, and 77.8% were white.

The population-based rates of EDPMH visits by year from Table 1 are shown in Fig 1. Figure 1 shows a rising slope for all EDPMH visits; however, the slopes are flat for visits with a diagnosis of suicide attempt or self-injury (ICD-9-CM codes E950–E959) and psychotic disorders (ICD-9-CM codes 290–299).

Figure 2 shows the population-adjusted rates of EDPMHs by age, gender, race, region, and year. The population rate was greatest among teenagers and least among children 6 years and younger. Girls were 5% more likely to have an EDPMH than were boys, and whites were 2% less likely to have an EDPMH than were nonwhites. Children and adolescents in the Northeast region were much more likely to have an EDPMH visit than were people in the West region. Overall, 67.2% of EDPMH visits were considered “urgent”; this percentage rose 2.0 points annually.

The 3 most common principal diagnoses among EDPMH visits were “unspecified neurotic disorder,” “depressive disorder,” and “anxiety states,” accounting for 13.1%, 12.9%, and 11.4% of visits, respectively. When grouped by the multiaxial assessment classification of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition,15 the most common axis I disorders were “substance related disorders” (24.2%), “anxiety disorders” (16.6%), and “attention deficit and disruptive disorders” (11.3%). Fig

TABLE 1.  Number and Annual Rate of EDPMH Visits and Odds Ratio for the Association Among Age, Gender, Race, Region, and Year and Population-Adjusted EDPMH Visits, 1993–1999

<table>
<thead>
<tr>
<th>Parameter</th>
<th>No. of Visits</th>
<th>Rate per 10 000 Population</th>
<th>Odds Ratio Estimate (95% Confidence Interval)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All EDPMH</td>
<td>3 034 855</td>
<td>59.3</td>
<td></td>
</tr>
<tr>
<td>Age (y)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0–6</td>
<td>318 063</td>
<td>16.3</td>
<td>0.120 (0.119–0.120)</td>
</tr>
<tr>
<td>7–12</td>
<td>549 351</td>
<td>34.0</td>
<td>0.296 (0.295–0.297)</td>
</tr>
<tr>
<td>13–18</td>
<td>2 167 441</td>
<td>139.5</td>
<td>Referent</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>1 532 708</td>
<td>61.5</td>
<td>1.103 (1.101–1.106)</td>
</tr>
<tr>
<td>Male</td>
<td>1 502 147</td>
<td>57.2</td>
<td>Referent</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>2 360 625</td>
<td>58.5</td>
<td>0.959 (0.956–0.961)</td>
</tr>
<tr>
<td>Nonwhite</td>
<td>674 230</td>
<td>62.2</td>
<td>Referent</td>
</tr>
<tr>
<td>Regions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northeast</td>
<td>781 038</td>
<td>88.9</td>
<td>1.697 (1.691–1.702)</td>
</tr>
<tr>
<td>Midwest</td>
<td>795 946</td>
<td>70.1</td>
<td>1.260 (1.256–1.264)</td>
</tr>
<tr>
<td>South</td>
<td>844 048</td>
<td>50.1</td>
<td>0.907 (0.904–0.910)</td>
</tr>
<tr>
<td>West</td>
<td>613 823</td>
<td>54.6</td>
<td>Referent</td>
</tr>
<tr>
<td>Year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1993</td>
<td>305 219</td>
<td>43.3</td>
<td>0.775 (0.772–0.779)</td>
</tr>
<tr>
<td>1994</td>
<td>425 323</td>
<td>59.5</td>
<td>1.052 (1.048–1.056)</td>
</tr>
<tr>
<td>1995</td>
<td>438 782</td>
<td>60.6</td>
<td>1.056 (1.051–1.060)</td>
</tr>
<tr>
<td>1996</td>
<td>404 248</td>
<td>55.1</td>
<td>1.024 (1.020–1.028)</td>
</tr>
<tr>
<td>1997</td>
<td>474 081</td>
<td>64.0</td>
<td>1.087 (1.083–1.092)</td>
</tr>
<tr>
<td>1998</td>
<td>527 669</td>
<td>70.6</td>
<td>1.303 (1.298–1.308)</td>
</tr>
<tr>
<td>1999</td>
<td>459 533</td>
<td>61.0</td>
<td>Referent</td>
</tr>
</tbody>
</table>
3). The 10 most common causes of self-inflicted injury or poisoning among EDPMH visits during the study period are shown in Table 2.

Among EDPMH visits, 47.1% received at least 1 medication, although only 20.4% received >1 medication. The most commonly given medication was charcoal, administered in 5.6% of visits (Table 3). Tylenol, Ritalin, and Ativan were the next most com-

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**Fig 1.** Population-adjusted trends in pediatric psychiatric emergencies, suicide attempts, and psychotic presentations, 1993–1999.

**Fig 2.** Population-adjusted rate of EDPMH visits, 1993–1999.

**Fig 3.** Most common diagnoses for EDPMH visits, 1993–1999.
commonly given medications. The mean number of medications given was 0.79 per EDPMH visit; for non-EDPMH ED visits, this number was 1.21 per visit.

The disposition data show that 19.4% of EDPMH visits ended with admission for inpatient care, 8.9% of which were admitted directly to the intensive care units of the hospital from the ED. In comparison, 9.4% of all non-EDPMH ED visits in this age group ended in admission, 4.5 of whom were admitted directly to intensive care units. Of all EDPMH visits, 15.8% were transferred to other facilities and 33.4% were referred to another clinic. Approximately 3.3% of the EDPMH visits ended with the patient’s death or death on arrival to the ED. It is possible that some of those patients who were admitted to the hospital subsequently died.

DISCUSSION

A significant shift occurred in both the frequency and the patient characteristics of EDPMHs between 1993 and 1999. The increase in EDPMHs during the 7 years is primarily attributable to patients without a more emergent psychiatric diagnosis, such as suicide attempt or psychotic disorder. There is a higher population-adjusted rate of EDPMHs in the Northeast and Midwest, as well as among nonwhites, girls, and adolescents. The most common axis I disorders were “substance related disorders,” “anxiety disorders,” and “attention deficit and disruptive disorders.” The majority of patients received no medications, and only 35% were either admitted or transferred to another facility.

The primary indicator for relative resource utilization in NHAMCS is rate of hospitalization; length of ED stay and cost information are not included in the data set. EDPMH patients are admitted to both the general ward and the intensive care unit at a higher rate than are non-EDPMH ED patients in this age group, indicating a higher relative resource utilization rate. Although EDPMHs account for only 1.6% of all ED visits, this suggests that they represent resource utilization greater than is predicted by this small percentage.

Limitations of using NHAMCS data to describe EDPMH visits include that the NHAMCS does not permit evaluation of the need for resources used, such as medication or hospitalization, based on clinical characteristics such as the results of a psychological evaluation. In addition, there may be underreporting of medications or other tests performed in the ED that are so routine that they are not recorded, such as blood pressure, electrocardiogram, or administration of aspirin. Before the 1997 NHAMCS survey, there was no distinction between suspected and confirmed diagnoses, which limits the value of EDPMH figures for survey years before 1997. The NHAMCS does not include federal hospitals within the scope of the survey, although it is doubtful that the number of EDPMH visits in the United States would be higher if visits to veteran administration and military hospitals were considered. The small sample of hospitals (494 nationally) precludes an equally small standard error for national estimates and military hospitals were considered. The small sample of hospitals (494 nationally) precludes an equally small standard error for national estimates and military hospitals were considered.
visit classification, although the observed coding error rate was <2% overall. Despite the limitations presented here, these factors do not affect the trend data because the same limitations apply for all years of NHAMCS data.

The ED is only 1 of several clinical settings in which children and adolescents may present for mental health concerns; other settings include mental health care provider offices (specialty and nonspecialty), primary medical care provider offices, community mental health centers, youth crisis centers, and the juvenile justice system. Our data refer only to ED utilization and do not reflect all emergent pediatric mental health encounters.

CONCLUSION

A significant shift occurred in both the frequency and the patient characteristics of EDPMHs between 1993 and 1999. The increase in EDPMHs during the 7 years is greatest among patients who are nonwhite, adolescent, and female and live in the Northeast or Midwest. This variation in EDPMH may reflect variability in the shortage of mental health providers on a regional and/or a local basis. The lack of increase in the 2 categories of diagnoses mandatorily seen in EDs—psychoses and suicide attempts—suggests that some of the overall rise in EDPMH visits was attributable to less urgent mental health complaints and likely represents decreased access to regular mental health care.

EDs are often poorly staffed for evaluation and treatment of pediatric mental health problems. Future research might address factors related to increasing utilization of the ED for pediatric mental health problems. An evidence-based approach to children’s mental health problems should be directed toward guiding the referral process so as to evaluate the impact of care on costs, long-term mental health (including adult mental health problems), and impact on other systems, including the juvenile justice system, schools, and the emergency medical system.

REFERENCES

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