ORIGINAL
ARTICLES

Postacute Care after Pediatric Hospitalizations for a Primary Mental Health Condition

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Objectives To determine the proportion of US children hospitalized for a primary mental health condition who are discharged to postacute care (PAC); whether PAC discharge is associated with demographic, clinical, and hospital characteristics; and whether PAC use varies by state.

Study design Retrospective cohort study of a nationally representative sample of US acute care hospitalizations for children ages 2-20 years with a primary mental health diagnosis, using the 2009 and 2012 Kids' Inpatient Databases. Discharge to PAC was used as a proxy for transfer to an inpatient mental health facility. We derived adjusted logistic regression models to assess the association of patient and hospital characteristics with discharge to PAC.

Results In 2012, 14.7% of hospitalized children (n = 248 359) had a primary mental health diagnosis. Among these, 72% (n = 178 214) had bipolar disorder, depression, or psychosis, of whom 4.9% (n = 8696) were discharged to PAC. The strongest predictors of PAC discharge were homicidal ideation (aOR, 24.9; 96% CI, 4.1-150.4), suicide and self-injury (aOR, 15.1; 95% CI, 11.7-19.4), and substance abuse–related medical illness (aOR, 5.0; 95% CI, 4.5-5.6). PAC use varied widely by state, ranging from 2.2% to 36.3%.

Conclusions The majority of children hospitalized primarily for a mood disorder or psychosis were not discharged to PAC, and safety-related conditions were the primary drivers of the relatively few PAC discharges. There was substantial state-to-state variation. Target areas for quality improvement include improving access to PAC for children hospitalized for mood disorders or psychosis and equitable allocation of appropriate PAC resources across states. *(J Pediatr 2017;■■:■■-■■).*

C hildren and adolescents hospitalized for a mental health condition account for a substantial portion of pediatric acute care hospital admissions. Nearly 10% of hospitalized children >3 years of age have a mental health diagnosis as their principal reason for admission,[1,2] and the prevalence of mental health conditions among children receiving hospital-based care is increasing. Among US pediatric hospitalizations, mood disorders increased by >80% from 1997 to 2010[3] and admissions for mental health problems and substance abuse increased 24% from 2007 to 2010.[4] The overall increase in admissions to US children's hospitals is 5 times greater for children with than without a mental health diagnosis[5] and comorbid mental health conditions significantly increase the duration of stay and cost of care for patients with medical and surgical hospitalizations.[6] The financial impact of pediatric mental health treatment is significant. Inpatient and outpatient costs are estimated at $247 billion annually.[7]

Children with primary mental health conditions may be admitted to acute care hospitals for medical treatment related to their mental health condition (eg, treatment for ingestions associated with suicide attempts) or for temporary hospitalization to afford a closely monitored environment before discharge to a postacute care (PAC) facility proficient in providing mental health care. This practice effectively converts acute care hospitals into a safety net for children in need of mental health treatment.[8,9] However, most acute care hospitals are poorly equipped to provide comprehensive care for pediatric primary mental health problems and many struggle to ensure that patients receive appropriate mental health care after discharge.[10-13]

The increased prevalence and use of acute care hospital services by children with mental health conditions has drawn attention to the limited resources available

ICD-9-CM	*International Classification of Diseases, Ninth Revision, Clinical Modification*
KID	Healthcare Cost and Utilization Project Kids' Inpatient Database
PAC	Postacute care

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either to provide or link these patients with appropriate mental health care.[14] Resources for child mental health care may also vary by geographic region, because some regions report underfunding for mental health resources, resulting in severe shortages of outpatient services and beds at free-standing psychiatric hospitals.[15,16] In a healthcare climate emphasizing cost containment while promoting high value, identifying the most appropriate roles for acute inpatient care, PAC, and outpatient management are important steps toward achieving an optimal allocation of finite resources. Nevertheless, because most prior studies have been limited to single institutions, little is known on a national level about the clinical characteristics of patients who are discharged to PAC, predictors of PAC use, or how PAC use varies by state.

To narrow these knowledge gaps, this study used a nationally representative sample of US hospitalizations for children ages 2-20 years with a primary mental health diagnosis to determine the proportion of US children hospitalized for a primary mental health condition who are discharged to PAC; whether PAC discharge is associated with demographic, clinical, and hospital characteristics; and whether PAC use varies by state.

Methods

Using a retrospective cohort study design, we assessed the discharge disposition of all patients ages 2-20 years who were hospitalized in an acute care hospital with a primary mental health diagnosis at discharge. The data source was the 2012 Agency for Healthcare Research and Quality's Healthcare Cost and Utilization Project Kids' Inpatient Database (KID).[17] The KID contains administrative data for a sample of pediatric hospitalizations of patients 0-20 years of age, using the American Hospital Association universe of community, nonrehabilitation hospitals as the standard to represent a national estimate of inpatient resource utilization for children across all hospitals in the US. The KID randomly samples 10% of newborn discharges from every participating hospital and 80% of non-newborn pediatric discharges. The stratified sampling frame has been previously described, with the Healthcare Cost and Utilization Project providing sampling weights to create nationally representative statistics.[17] The KID includes hospital information, patient demographic information, and *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD-9-CM) discharge diagnoses and procedures from 4179 acute care hospitals in 44 states.[17] To examine statewide variation in PAC use, data from the 2009 KID was used because it was the most recent version for which individual state data were available (3974 hospitals from 44 states).[17]

Demographic characteristics included age, sex, race/ethnicity, and insurance status (government, private or self-pay, and other). Clinical characteristics were number and presence of any chronic conditions and type of primary mental health condition. To identify chronic conditions, we used the Agency for Healthcare Research and Quality's Chronic Condition Indicator, which groups ICD-9-CM diagnosis codes into chronic vs nonchronic conditions.[18] Patients with a primary discharge

diagnosis of a mental health condition were identified using ICD-9-CM codes as reported previously.[1] Patients <2 years of age and those with conditions related to obstetric care and childbirth (MDC 14 from the All Patient Refined Diagnosis Related Groups, 3M HIS, Wallingford, Conneticut) were excluded. Hospital characteristics included urban/rural location, teaching status, and type (freestanding children's hospitals vs other hospital types).

To identify discharges from acute care hospitals to a PAC facility, we used the KID discharge disposition variable,[19] which includes the following categories: routine (home or self-care), transfer to short-term hospital, other transfers, home health care, against medical advice, died in hospital, discharged alive, and destination unknown. Dispositions designated "other transfers" included discharges and transfers to a skilled nursing facility, an intermediate care facility, a psychiatric hospital or a stand-alone (or "distinct") psychiatric unit of a hospital, another type of institution not defined elsewhere, hospice, an inpatient rehabilitation facility or rehabilitation unit of an acute care hospital, a Medicare-certified long-term care hospital, a designated disaster alternative care site, or a facility that provides custodial or supportive care with a planned acute care hospital inpatient readmission. Given that the study population was restricted to children with a primary mental health condition, "other transfers" were used as a proxy for transfer to an inpatient mental health treatment facility. This discharge disposition designation was validated at the institution of one of the authors, where 99% of patients with primary mental health diagnoses with discharge dispositions mapping to the KID "other transfers" category were found to have been transferred to an inpatient mental health facility, in contrast with only 0.05% of patients with primary medical or surgical with discharges mapping to "other transfers." The KID does not include hospitalizations in stand-alone psychiatric facilities and does not distinguish acute care hospitals with or without internal inpatient psychiatric units.

Statistical Analyses

All analyses were weighted using survey weights for KID data provided by Healthcare Cost and Utilization Project.[17] Categorical variables were summarized using frequencies and percentages. In bivariate analyses, we used χ^2 test of proportions to test associations between PAC discharge and demographic, clinical, and hospital characteristics, and to assess variation across states in the percent of mental health discharges and the percent of mental health discharges to PAC. In multivariable analyses, the likelihood of discharge to a PAC facility was assessed using a generalized linear mixed effects model with fixed effects for demographic, clinical, and hospitalization characteristics that were associated with discharge disposition at $P < .1$ for bivariate analyses. Random intercepts were included for each state, to account for state-level clustering. Models were reduced using backward elimination. Because of the large sample size, characteristics with aORs of >2.0 were considered to have the most clinically significant correlations with increased PAC use. All statistical analyses were performed using SAS v.9.4 (SAS Institute, Cary, North Carolina),