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ED utilization of medical clearance testing for psychiatric admission: National Hospital Ambulatory Medical Care Survey analysis

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ABSTRACT

Introduction: Routine medical clearance testing of emergency department (ED) patients with acute psychiatric illnesses in the absence of a medical indication has minimal proven utility. Little is known about the variations in clinical practice of ordering medical clearance tests.
Methods: This study was an analysis of data from the annual United States National Hospital Ambulatory Medical Care Survey from 2010 to 2014. The study population was defined as ED visits by patients ≥18 years old admitted to a psychiatric facility. We sought to determine the percentage of these ED visits in which at least one medical clearance test was ordered. Using a multivariate logistic regression model, we also evaluated whether patient visit factors or regional variation was associated with use of medical clearance tests.
Result: A medical clearance test was ordered in 80.4% of ED visits ending with a psychiatric admission. Multivariate logistic regression demonstrated a statistically significant increased odds ratio (OR) of medical clearance testing based on age (OR 1.02, 95%CI 1.01, 1.03), among visits involving an injury or poisoning (OR 2.38, 95%CI 1.54, 3.68), and in the Midwest region as compared to the Northeast region (OR 2.2, 95% confidence interval [CI] 1.09, 4.46), after adjusting for other predictors.
Discussion: Our study demonstrated that, on a national level, 4 out of 5 ED visits resulting in a psychiatric facility admission had a medical clearance test ordered. Future research is needed to investigate the reasons underlying the discrepancies in ordering patterns across the U.S., including the effect of local psychiatric admission policies.

1. Introduction

In 2017, the American College of Emergency Physicians (ACEP) updated their earlier 2006 clinical policy "Critical Issues in the Diagnosis and Management of the Adult Psychiatric Patient in the Emergency Department" [1]. The update reaffirmed the recommendation of the 2006 ACEP clinical policy: "Do not routinely order laboratory testing on patients with acute psychiatric symptoms. Use medical history, previous psychiatric diagnoses, and physician examination to guide testing" [1]. This recommendation was consistent with previous work showing limited utility for routine medical clearance testing for patients presenting to the emergency department (ED) with acute psychiatric illness [2,3].

Many psychiatric hospitals require screening diagnostic studies for medical clearance prior to psychiatric admission [4-6]. A better understanding of the variation in medical clearance testing for psychiatric admissions is needed to inform clinicians and policymakers about potential targets for interventions to reduce unnecessary testing and decrease healthcare costs.

While previous work has attempted to ascertain the utility of routine medical clearance tests for psychiatric admissions [3,5,7-12], little is known about the overall adherence to the ACEP guidelines and variations in clinical practice of ordering medical clearance tests. We aimed to address this knowledge gap by determining the percentage of ED visits ending with an admission to a psychiatric facility that had a

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medical clearance test ordered, and whether geographic region or other variables are associated with use of such tests.

2. Material and methods

2.1. Study design

This descriptive study was a secondary analysis of data collected from the National Hospital Ambulatory Medical Care Survey (NHMACS), and met criteria for exemption by the Institutional Review Board.

2.2. Study setting and population

NHAMCS is an annual, national probability sample of ambulatory visits to non-federal, general, and short-stay hospitals in the United States (U.S.) [13], NHAMCS uses a four-stage probability sampling design, collecting a nationally representative sample of ED visits. At each sampled hospital, trained hospital staff members monitored by the U.S. Census Bureau's agents complete a patient record form of each sampled visit during a randomly assigned 4-week reporting period.

We analyzed NHAMCS data from 2010 to 2014. The study population was defined as ED visits by patients ≥18 years old in which the patient was transferred to a psychiatric facility or admitted to a mental health or detoxification facility.

2.3. Study protocol

The primary predictor variable was hospital geographic region (West, Northeast, Midwest, or South). Additional predictors included patient age, sex, race, insurance status, presence of at least one of the following chronic medical conditions (HIV, diabetes, stroke, dialysis, or congestive heart failure), visit related to injury or poisoning, and provider type. Providers were categorized as having been seen by an attending physician, resident (defined as intern or resident), or advanced practice provider (physician assistants and nurse practitioners).

2.4. Outcome

The primary outcome measured was presence of at least one of the following medical clearance studies [14]: complete blood count (CBC), electrolytes, blood urea nitrogen/creatinine (BUN/Cr), blood alcohol concentration (BAC), liver function tests (LFT), toxicology screen, or electrocardiogram (EKG). Toxicology screen included both urine and serum tests. This list was chosen because it includes several tests routinely requested by inpatient psychiatric facilities prior to psychiatric admission independent of a medical indication for testing.

2.5. Data analysis

We reported unweighted raw ED visits along with weighted national representative size and proportions. We reported the yearly trends of number of visits which ended with a transfer to a psychiatric facility or admitted to a mental health or detoxification facility. We performed a multivariable logistic regression to assess the independent associations between the presence of medical clearance labs and predictors.

All analysis were conducted using SAS 9.4 (Cary, NC) and incorporated NHAMCS complex survey design features including cluster, strata, and probability weights to produce nationally representative estimates. As recommended, prior to analysis we evaluated for any estimates that had <30 samples per cell [15]. Statistical significance was defined by $p < 0.05$.

3. Results

From 2010 to 2014, the NHAMCS included an unweighted total of 112,293 ED visits, representing a weighted sample of 133 million yearly ED visits, of which an estimated 1.2 million (0.91%) visits resulted in a transfer to a psychiatric facility or admission to a mental health or detoxification facility. The average age in our sample was 41.8 years old (95%CI 40.6, 42.9) and the majority of visits were by males (55.17%) and non-Hispanic white patients (69.44%). Of note, estimates for non-Hispanic-other patients were excluded due to a small subgroup size and poor reliability in standard error estimates. Additional visit characteristics are reported in Table 1.

Over the 5-year study period, 80.37% of patients undergoing psychiatric admission received at least one medical clearance test. Fig. 1 displays the proportion of ED visits admitted to a psychiatric facility that had medical clearance testing across the study years. The most frequently ordered tests were CBC (68.67%) and toxicology screening (50.61%). Additional frequencies of tests are reported in Table 2. Of note, 24.7% of included visits that received testing had a diagnosis consistent with injury or poisoning.

A multivariate logistic regression showed a statistically significant increased odds ratio (OR) of medical clearance testing in the Midwest

Table 1
Characteristics of ED visits for patients admitted to psychiatric facilities.

	Unweighted ED visits	Weighted ED visits in thousands	Standard error	Percent of total ED visits with psych admit	95%CI	
Age						
18–29 years old	502	338.2	30.2	27.87	24.67	31.07
30–44	526	357.1	27.9	29.43	26.39	32.46
45–59	532	367.3	27.5	30.27	27.59	32.94
≥60 years old	204	150.9	18.7	12.44	9.60	15.27
Sex						
Female	776	544.0	38.3	44.83	41.07	48.58
Male	988	669.5	47.8	55.17	51.42	58.93
Race						
Non-Hispanic White	1100	842.6	58.7	69.44	65.16	73.72
Non-Hispanic Black	376	229.3	26.2	18.90	15.26	22.54
Hispanic	224	113.7	14.0	9.37	7.28	11.45
Insurance						
Private	321	242.7	22.5	20.01	17.07	22.95
Medicare	383	270.0	24.3	22.25	19.16	25.35
Medicaid	535	328.7	29.4	27.09	23.51	30.67
Other	108	58.9	10.6	4.85	3.28	6.43
Uninsured	259	218.7	25.7	18.02	14.49	21.55
Unknown	158	94.3	15.5	7.77	5.51	10.04
Provider						
Attending	1224	883.8	58.4	74.63	70.47	78.79
Resident/intern	261	129.1	20.8	10.90	7.64	14.17
PA/NP	219	171.3	23.4	14.47	11.07	17.87
Region						
Northeast	563	281.4	37.2	23.19	18.01	28.37
Midwest	317	264.2	33.6	21.78	16.96	26.60
South	521	456.6	43.8	37.63	31.99	43.27
West	363	211.1	28.5	17.40	13.15	21.65
Any significant chronic medical condition						
No	1592	1089.3	67.3	89.77	87.73	91.82
Yes	172	124.1	14.1	10.23	8.18	12.27
Whether visit was for poisoning or injury						
No	1395	939.6	62.9	77.44	74.12	80.75
Yes	369	273.8	23.9	22.56	19.25	25.88
Total	1764	1213.4	72.4	100.00		

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