CARE PATTERNS FOR AFFECTIVE PSYCHOSIS ACROSS DIVERSE ETHNICITIES: EXPLORING POTENTIAL CONTRIBUTORS TO COMPLICATIONS AND EMERGENCY ROOM UTILIZATION

Objective: To explore associations between access to care and environmental stressors with emergency room admissions; to evaluate patterns of complications across diverse ethnic groups related to affective psychosis.

Methods: Data from the National Inpatient Sample were used to evaluate complications and frequency of hospitalization through the emergency room as a proportion of all hospital admissions for affective psychosis across diverse ethnic groups. Unemployment data, variations of trends of proportions of emergency room admissions after the September 11th tragedy, and ratios of primary care physicians/psychiatrists to the general population were evaluated.

Results: Admissions through the emergency room as a percentage of all admissions for affective psychosis decreased from 1995 through 1999 but increased in 2001, showing a potential association with increasing unemployment rates and the September 11th tragedy. Over the same period, relatively higher frequencies of emergency room admissions as a proportion of all hospital admissions among African Americans decreased. No significant differences for complications or emergency room utilization were observed between African Americans and Whites by 2001. During the entire period, frequencies of complications in the Hispanic and Asian populations remained lower than frequencies in both African American and White populations. No associations were found between physician-to-population ratios and utilization of the emergency room.

Conclusion: Patterns of emergency room utilization and complications in African American and White populations appear to show some association with environmental stressors. Further study is warranted to evaluate protective factors associated with lower risk of complications in both Hispanic and Asian populations. (*Ethn Dis.* 2006;16:712–717)

Key Words: Affective Psychosis, Emergency Department, Race

Elmer L. Washington, MD, MPH; Jay J. Shen, PhD; Julie Kocher, MD; Charles B. Moseley, PhD

INTRODUCTION

Care patterns and complications of affective psychosis are associated with emergency room crowding and social problems, respectively. We evaluated frequency of admission through the emergency room as a proportion of all admissions and frequency of complications related to affective psychosis. Are frequencies of complications prevalent to different degrees among different ethnic groups? Does access to primary and/or psychiatric care and do environmental stressors affect patterns of emergency room utilization? Through evaluating these questions, we sought to identify opportunities for reducing emergency room utilization and complications related to this condition.

METHODS

Data

Our main data source was the National Inpatient Sample (NIS), which included the years of 1995, 1997, 1999, 2000, and 2001. The NIS is maintained by the Healthcare Cost and Utilization Project (HCUP) of the Agency for Healthcare Research and Quality. Through stratified sampling, the NIS contains \approx 20% of the total hospital discharges from US community hospitals and can be used to estimate national findings.¹ We identified comorbidities and complications to assess

the burden of chronic disease unrelated to affective psychosis and disease-related outcomes specific to affective psychosis, respectively, which is comparable to how the NIS data set has been used for evaluating medical illnesses.^{2,3} To assess co-morbidities, we included all axis II diagnoses or personality disorders, all general medical conditions that may adversely influence the psychiatric condition, and psychiatric conditions besides affective psychosis that may affect prognosis (International Classification of Diseases 9th Revision [ICD9] codes 001-289, 295, 297, 298.1-298.9, 299, 300, 301, 302, 308, 309, 317-319, and 390–999).⁴

With regard to complications, we included diagnoses that were more likely to arise from inadequately treated affective psychosis or affective psychosis that followed an unfavorable course, including medication overdose or potentially careless medication error (codes 960-979), drug or alcohol dependence or abuse (codes 303-305), suicide attempt or self-inflicted injury (codes E950-E959), homicide or deliberately inflicted injury upon another (E960-E969), legal intervention contributing to an injury (E970-E978),⁵⁻⁸ and nonspecific physiologic malfunctioning resulting from a mental disorder (code 306). As relates to emergency room utilization, we sought to identify those patients with an established diagnosis of affective psychosis or those with symptoms consistent with new-onset psychosis in the presence of an associated mood disorder. By analyzing this population, we sought to identify environmental stressors and access to care issues that may be associated with increased use of the emergency room for affective psychosis and related symptoms among

From, Aunt Martha's Youth Service Center Inc, Chicago Heights (EW), Department of Health Administration and Policy, University of Nevada (JS), and JMK Medical Group, Skokie (JK), Illinois; Department of Health Care Administration and Policy, University of Nevada, Las Vegas, Nevada (CM).

Address correspondence and reprint requests to Jay J. Shen, PhD; University of Nevada; Las Vegas, NV 85194-3023; 702-895-5410; 702-895-5573 (fax); jay. shen@unlv.edu or j-shen@govst.edu

those with a predisposition to manifesting these symptoms.

Discharges with the principle or secondary diagnostic code of 296, the spectrum of diagnoses composing affective psychoses (296.0, 296.1, 296.2, etc) or principal diagnostic code of 298.0 (depressive-type psychoses) were abstracted. Given the chronic nature of the types of affective psychosis represented under 296, patients were included if code 296 was primary or secondary since even at the secondary level, this chronic condition was likely to have exerted an effect on the clinical course of the primary condition. On the other hand, since code 298.0, depressive-type psychoses, was more likely to indicate a more acute condition (or potentially earlyonset chronic affective psychosis), patients were only included if this code was primary. The rationale for using this criterion was to identify complications resulting from long-term, unfavorable outcomes or inadequate treatment of affective psychosis as opposed to complications resulting from an acute crisis. For assessing emergency room utilization, which is likely to arise from an acute crisis, we included patients with a primary diagnosis potentially indicating a more acute condition (298.0) and those with a primary or secondary diagnosis (296) potentially indicating a more chronic condition that was exacerbated by an acute crisis.

After data cleaning, the total numbers of the sample sizes were 73,745 in 1995, 85,840 in 1997, 83,105 in 1999, 91,551 in 2000, and 95,260 in 2001. Data were prepared by using SAS (SAS Institute Inc., Cary, NC, USA). Because of the nature of the sampling design of the NIS, we used the SUDAAN software to account for the clustering factor by specifying the sampling design as sampling without replacement. Since all discharges for particular hospitals that are selected to participate in the NIS are included during a given year, accounting for this clustering effect (a different sample than what would be obtained by randomly selecting discharges from all hospitals) is an accepted method for reducing the tendency for bias associated with considering discharges from randomly selected hospitals (but not all hospitals) during a given year. Further information about statistical procedures used in SUDAAN can be obtained by accessing the website.⁹ All results were presented as weighted national totals. We also used the 2000 American Hospital Association (AHA) hospital survey data and the 2000 Area Resource File (ARF) county-based data, which include 2000 Census information.

Measures

The main variables were frequencies of co-morbidities, complications, and percentages/risk ratios (RR) of hospitalization through the emergency room. Percentages were used for comparative purposes to evaluate trends over time. Risk ratios (RR) were estimated through multivariate analysis to determine the relative risk (relative to the reference group) of a particular event given a particular variable (eg, the relative risk of being admitted through the emergency room of the African American population as compared to the White population). We examined racial disparities and disparities related to patients' health insurance status. Race/ethnicity was categorized as White (the reference group, 79.3%), African American (13.8%), Hispanic (5.9%), Asian/Pacific Islander (.9%), and Native American (.2%). Health insurance status based on payment source was grouped as Medicare (30.7%), Medicaid (24.2%), private insurance including prepaid health plans (the reference group, 36.9%), and uninsured (ie, self-pay and no charge, 8.3%).

Analysis

We combined the trend analysis with a cross-sectional analysis. The 2000 NIS data were linked to other data sources for a cross-sectional analysis. This analysis enabled us to see the proportion of emergency room visits converting to hospitalization and also the potential association between physician distribution and emergency room visits. We merged the 2000 AHA hospital survey data with the 2000 NIS data to calculate the percentage of emergency room visits converted to hospitalization. We further merged the 2000 ARF county-based data, which includes the 2000 Census information, with the two previous datasets to test possible effects of healthcare provider distribution. We calculated two countybased provider-population ratios: the number of primary care providers and the number of psychiatrists per 100,000, respectively. Nationwide trends on the percentages of unemployed people for each year studied and the extent of increase or decrease from the previous vear were assessed.

We adjusted covariates available in our datasets when using emergency room admission (yes or no) as the response variable. At the patient level, we included age, sex, and the median zip code income level (ie, four levels: <\$25,000 (the reference level), \$25,000-\$34,999, \$35,000-\$44,999, and \geq \$45,000) by zip code of the patient's residence. We divided age into eight groups: ≤ 17 , 18–19, 30–39 (the reference group), 40-49, 50-59, 60-69, 70–79, and \geq 80 years. At the hospital level, we controlled for hospital discharge volume, bed size, teaching hospital status, metropolitan statistical area (MSA) or non-MSA status to indicate rural or non-rural areas, respectively, and the region (Northeast, Midwest, South [the reference group] and West) of hospital location. Finally, since percentages of emergency room admissions were >10% and odds ratios obtained from logistic regression were sizably larger than RRs, we converted odds ratios to RRs.¹⁰

RESULTS

Figures 1–3 compare trends of the total number of affective psychosis



Fig 1. Total number of admissions: 1995-2001

admissions, the total number of affective psychosis admissions through the emergency department, and the proportions of emergency room admissions for affective psychosis between 1995 and 2001. From 1995 to 1999, the proportion of patients who were hospitalized through the emergency room (as a percentage of all hospital admissions) for affective psychosis remained stable or decreased slightly—42.5% in 1995, 41.7% in 1997, and 40.1% in 1999 but increased to 44.7% in 2001 (Figure 3). Table 1 also shows the same trend when the relative contribution of emergency room admissions caused by affective psychosis was compared to emergency room admissions caused by other clinical conditions. According to Table 1, affective psychosis shared 1.8%, 1.9%, 1.7%, and 2.1% of total admissions through the emergency room for all clinical conditions in 1995, 1997, 1999, and 2001, respectively ranking 14th, 14th, 15th, and 10th compared to other clinical condi-



Fig 2. Total number of admissions through emergency department: 1995-2001

tions during corresponding years. Compared to 1995, patients had comparable risk (as reflected by the 95% confidence interval [CI] containing 1.00) of being admitted through the emergency room in 1997 (RR .99, 95% CI .98-1.00), slightly lower risk of being admitted through the emergency room in 1999 (RR .98, 95% CI .96-.99), and slightly higher risk of being admitted through the emergency room in 2001 for affective psychosis (RR 1.06, 95% CI 1.04-1.07). The year 1995 was considered the reference in Table 1, and the subsequent variations in risk ratios were either higher (as in 2001) or lower (as in 1997 and 1999) than the reference of 1995 for all patients.

In addition, as shown in Table 2, when one considers racial disparities with respect to emergency room admissions for affective psychosis, African American patients were more likely to be admitted through the emergency room than White patients for the first three years studied but showed no difference in 2001; RRs were 1.20, 1.14, 1.19, and 1.09 (95% CI 0.96-1.22) in 1995, 1997, 1999, and 2001, respectively. The risk of being admitted through the emergency room, in general, was comparable among Whites, Hispanics, Asians, and Native Americans except during 1995, during which the risk for Asians was significantly higher.

White patients were older and had higher frequencies of co-morbidities when compared to all three minority groups. Compared to both African Americans and Whites, Hispanics and Asians had fewer complications during each year studied. The substantially lower risk of complications experienced by Asians and Hispanics merits further investigation. The importance of social networks and social capital outside of the immediate family, a protective factor shown in the literature,^{11,12} should be assessed as a potential etiologic factor in future research.

The ratios of primary care physicians and psychiatrists to population



Fig 3. Percent of admissions through emergency department: 1995-2001

based on the merged 2000 NIS, AHA, and ARF data revealed no significant association between emergency room admissions and either ratio (regression coefficient of the ratio of primary care physicians to population =-.01, P=.12; regression coefficient of the ratio of psychiatrists to population =.001, P=.65). This finding, however, does not necessarily mean that lack of access to evidence-based ambulatory care was not a factor contributing to increased emergency room utilization but that more meaningful measures need to be evaluated.^{13,14}

With regard to unemployment and the effect of the September 11th tragedy, as shown in Table 3, the percentage of unemployed persons decreased during each year studied except 2001 during which the percentage increased.¹⁵ This increase occurred simultaneously with an increase in the percentage of emergency room admissions for affective psychosis in 2001. Percentages of emergency room admissions for affective psychosis from January through August of each year studied compared with emergency room admissions from September through December, were increased during both periods (January through August and September through December) of the year in 2001, when compared to the same periods in other years. From January through August of 2001, the percentage of emergency room admissions as a proportion of all admissions for affective psychosis was 44.1%, compared to 41.5%, 42.6%, and 41.2% during the same periods in 1995, 1997, and 1999, respectively. During the latter part of the year, from September through December of 2001, the percentage of emergency room admissions as a proportion of all admissions for affective psychosis was 46.1%, compared to 42.6%, 41.5%, and 41.0% in 1995, 1997, and 1999, respectively. The variation in these percentages over the period studied indicate a potential association between rates of unemployment and the September 11th tragedy.

DISCUSSION

The increased (across the board) emergency room utilization in 2001, potentially related to an increased unemployment rate and the September 11th tragedy, resulted in elimination of the disparity between African Americans

Table 1.	Trend of affective	psychoses I	hospital	admissions	through	emergency	department
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	1995	1997	1999	2001
Total number of admissions	76,358	87,388	86,561	100,718
Weighted total number of admissions	528,865	587,862	606,332	730,624
Weighted total number of admissions through ED	224,768	245,138	246,171	326,589
Percent of admissions through ED	42.5	41.7	40.6	44.7
Rank among all clinical conditions admitted				
through ED	14th	14th	15th	10th
RR (95 $\%$ CI) of getting admitted through ED*	1.00 (reference)	.99 (.98–1.00)	.98 (.96–.99)	1.06 (1.04–1.07)

* The four-year data were pooled. Adjusted for age, sex, race/ethnicity, health insurance status, and the median income level by zip code and hospital characteristics. ED=emergency department; RR=risk ratio; CI=confidence interval.

Risk ratios with confidence intervals that do not include 1.00, are statistically significant.

	1995		1997		1999		2001	
Variable	Risk Ratio	(95% CI)	Risk Ratio	(95% CI)	Risk Ratio	(95% CI)	Risk Ratio	(95% CI)
ED Admission								
White (reference)	1.00	-	1.00	-	1.00	-	1.00	-
African American	1.20	(1.14-1.26)	1.14	(1.05-1.23)	1.19	(1.10-1.28)	1.09	(.96-1.22)
Hispanic	1.00	(.85-1.18)	1.01	(.90-1.14)	.96	(.82-1.10)	1.07	(.94–1.21)
Asian/Pacific Islander	1.05	(.92–1.18)	.98	(.80–1.17)	1.19	(1.02–1.35)	1.02	(.81–1.24)
Co-morbidity								
White (reference)	1.00	-	1.00	-	1.00	-	1.00	-
African American	.92	(.8797)	.96	(.92-1.00)	.96	(.92-1.00)	.96	(.94–.99)
Hispanic	.98	(.94-1.03)	.96	(.91-1.01)	.97	(.90-1.03)	.92	(.89–.96)
Asian/Pacific Islander	.92	(.82–1.01)	.84	(.75–.92)	.89	(.81–.97)	.91	(.84–.98)
Complications								
White (reference)	1.00	-	1.00	-	1.00	-	1.00	-
African American	1.19	(1.12-1.26)	1.08	(1.01 - 1.15)	1.01	(.94-1.07)	1.04	(.99–1.10)
Hispanic	.89	(.78–.99)	.77	(.6787)	.78	(.70–.87)	.85	(.8090)
Asian/Pacific Islander	.51	(.39–.65)	.43	(.3255)	.67	(.54–.77)	.69	(.5881

	Table 2.	Trends of disparities	in admissions through	n emergency de	epartment (ED) for	affective psychoses*
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Adjusted for age, sex, the median income level, and hospital characteristics.

CI=confidence interval.

Risk ratios with confidence intervals that do not include 1.00 are statistically significant.

and Whites during this year. Some research has shown that sudden increases in unemployment rates are associated with greater mental health services utilization than are stable, high levels of unemployment; sudden increases in unemployment may be associated with lack of support programs in the former instance.^{16,17}

Lower risk of complications among Hispanic and Asian populations merits further evaluation. Favorable effects exerted by positive nonfamilial contacts demonstrated in literature not specific to these populations^{11,12} may have exerted a similar influence in these populations as well.

CONCLUSION

Our research evaluated several questions related to prevalence of complications among different ethnic groups as well as how access to care and environmental stressors affect emergency room utilization. While we found no statistically significant association between ratios of primary care physicians/psychiatrists to general population and emergency room utilization, we believe that more sensitive measures of access may have shown an association. We did find a potential association between environmental stressors and emergency room utilization. In addition, we found lower patterns of complications among Asian and Hispanic patients than among Whites and African Americans. Augmentation of social support services that have demonstrated an impact on reducing mental health services utilization should be considered during periods of heightened environmental stress. Further research evaluating the effect of these programs on complications as well as further research leading to clarification of protective factors in Hispanic and Asian communities is crucial to reducing social problems associated with

Table 3. National unemployment rates and percent of ED admissions for affective psychoses before and after September

	1995	1997	1999	2001
National unemployment rate (%)*	5.6	4.9	4.2	4.7
Changes in unemployment rate from previous year (%)	5	5	3	.7
January-August				
Percent of total annual admissions	67.9	67.0	66.9	67.6
Percent of admissions through ED	41.5	42.6	41.2	44.1
September-December				
Percent of total annual admissions	32.1	33.0	33.1	32.4
Percent of admissions through ED	42.6	41.5	41.0	46.1

Source: Bureau of Labor Statistics. Annual averages - household data: employment status. Available at: www.bls.gov.

ED=emergency department.

Augmentation of social support services that have demonstrated an impact on reducing mental health services utilization should be considered during periods of heightened environmental stress.

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potentially preventable complications of this condition.

LIMITATIONS

Several limitations should be noted. First, hospital characteristics that are routinely reported and controlled for in the NIS dataset (such as hospital size, teaching status, and hospital volume), although relevant when analyzing several medical conditions, may have limited relevance when considering psychiatric conditions. With literature demonstrating a relationship between unemployment and mental healthcare utilization at a public hospital,¹⁶ controlling for the public or private status of the hospital may have been more relevant but could not be accomplished with the NIS dataset. Second, several insurance products limit coverage on behavioral health care. These limitations may have affected the accuracy of billing diagnoses for several patients. Third, given reliance on billing diagnoses, patients with chronic conditions may have been omitted from the sample if affective psychosis was not given a relatively high coding priority (either primary or secondary). Fourth, as stated in a previous issue of psychiatric services, reliance on a large administrative dataset based largely on billing data also raises concerns about the accuracy of diagnostic information used for analysis.¹⁸ While this dataset has been used extensively for analysis of medical patterns of care, it has been used to a much less extent for analysis of psychiatric conditions. In addition, other limitations that are common to the NIS data set; such as lack of specific clinical information beyond diagnostic codes, may have limited the accuracy of patient categorization which relied on these codes.

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AUTHOR CONTRIBUTIONS

Design concept of study: Washington, Shen, Moseley

Acquisition of data: Shen

- Data analysis interpretation: Washington, Shen, Kocher
- Manuscript draft: Washington, Shen, Kocher, Moseley

Statistical expertise: Shen

Acquisition of funding: Shen

- Administrative, technical, or material assistance: Washington, Shen, Kocher, Moseley
- Supervision: Washington, Shen