



Racial and Socioeconomic Disparities in Incidence of Mortality and Nonroutine discharge Following Pediatric Cerebrospinal Fluid Shunts

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Introduction

Socioeconomic and racial disparities are a growing concern within the U.S. healthcare system. Despite extensive research and efforts to narrow such disparities, minorities and economically disadvantaged patients exhibit inferior healthcare outcomes. Disparities in the delivery of pediatric neurosurgical care are understudied.

Methods

This study examines the impact of race and socioeconomic status on outcomes following pediatric cerebrospinal fluid (CSF) shunting procedures. Discharge information from the 2000, 2003, 2006, and 2009 Kids Inpatient Database (KID) for individuals with a diagnosis of hydrocephalus who underwent CSF shunting procedures was abstracted for analysis. Multivariate logistic regression analyses, adjusting for patient and hospital factors and annual CSF shunt procedure volume, were performed to evaluate the effects of race and payer status on likelihood of inpatient mortality and routine hospital discharge (to home).

Results

There were 37,103 hydrocephalus related shunting procedures identified from the 2000, 2003, 2006 and 2009 KID. There were a total of 31,964 (86,149 per 100,000 pediatric admissions) routine discharges and 409 (1,102 per 100,000 pediatric admissions) inpatient deaths resulting from a shunting procedure. Blacks ($p < 0.05$) had an increased likelihood of inpatient death compared to White patients. Blacks and Hispanics ($p < 0.05$) had a lower likelihood of routine discharge. There was also a disparity when comparing payer status. Medicaid patients had a significantly lower likelihood of routine discharge ($p < 0.05$) when compared to privately insured patients.

Table 1

Group	N	%
Gender		
Male	20,816	56.1
Female	16,125	43.5
Missing	162	0.4
Race		
White	16,786	45.2
Black	5,001	13.5
Hispanic	5,394	14.5
Asian/Pacific Islander	580	1.6
Native American	155	0.4
Other	1,594	4.3
Missing	7,593	20.5
Payer Status		
Medicare	64	0.2
Medicaid	16,486	44.4
Private	18,012	48.6
Self-pay	621	1.7
No charge	52	0.1
Other	1,831	4.9
Missing	37	0.1
Total	37,103	

Frequency of hydrocephalus shunting procedures—with respect to gender, race, and payer status among all pediatric patients.

Demographic data among patients undergoing shunt procedure

Table 2

Race	Odds Ratio	95% Confidence Interval	p-value
Reference			
White			
Black	0.766	0.678, 0.865	<0.0001
Hispanic	0.839	0.705, 0.999	0.0488
Asian/Pacific Islander	0.591	0.398, 0.878	0.0092
Native American	1.333	0.409, 4.349	0.6339
Other	0.600	0.471, 0.765	<0.0001
Missing	0.854	0.699, 1.043	0.1211
Payer Status			
Medicare	0.537	0.233, 1.239	0.1448
Medicaid	0.847	0.775, 0.926	0.0003
Private			
Reference			
Self-pay	1.493	0.989, 2.252	0.0563
No Charge	2.938	0.812, 10.631	0.1005
Other	0.791	0.626, 1.000	0.0498
Missing	1.505	0.352, 6.447	0.5815

Multivariate analysis of routine discharge by race and payer status

Table 3

Race	Odds Ratio	95% Confidence Interval	p-value
Reference			
White			
Black	1.577	1.021, 2.436	0.0402
Hispanic	1.451	0.944, 2.229	0.0897
Asian/Pacific Islander	2.808	1.449, 5.441	0.0022
Native American	2.938	0.713, 12.103	0.1357
Other	2.212	1.206, 4.055	0.0103
Missing	1.191	0.735, 1.931	0.4773
Payer Status			
Medicare	<0.001	<0.001, <0.001	<0.0001
Medicaid	1.112	0.825, 1.497	0.4862
Private			
Reference			
Self-pay	1.647	0.749, 3.622	0.2146
No Charge	<0.001	<0.001, <0.001	<0.0001
Other	1.095	0.617, 1.943	0.7567
Missing	<0.001	<0.001, <0.001	<0.0001

Multivariate analysis of inpatient death by race and payer status

Conclusions

This study suggests the presence of racial and SES outcome disparities following pediatric CSF shunting procedures using United States population-level data.

Learning Objectives

By the conclusion of this session, participants should be able to 1) describe the distribution of ventricular cerebrospinal shunt (CSF) procedures across demographic and economic subgroups across the US. 2) describe the impact of socioeconomic disparities on outcomes in CSF shunting procedures

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