

Ethnic Disparities in Initial Management of Trauma Patients in a Nationwide Sample of Emergency Department Visits

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Hypothesis: Ethnic disparities in functional outcomes after traumatic brain injuries have been demonstrated previously. However, it is not clear if these disparities are due to differential access to initial diagnostic and treatment modalities or disproportionate care at poorly funded inner-city emergency departments (EDs). We hypothesized that initial assessment of injured patients in EDs is affected by patient ethnicity.

Design: Retrospective database analysis.

Setting: Data were obtained from the National Hospital Ambulatory Medical Care Survey ED component for 2003, which includes a national probability sample survey of ED visits.

Patients: All injury-related initial ED visits of patients 15 years and older were included. Patients were divided into 3 groups: non-Hispanic white (n=6106), African American (n=1406), and Hispanic (n=1051).

Main Outcome Measures: The intensity of ED assessment and management and patient disposition from EDs were compared in the 3 groups.

Results: Compared with non-Hispanic white patients, minority patients were slightly younger and less likely to be insured but were similar in sex, mechanism of injury, and injury severity. There were no clinically significant differences between non-Hispanic white patients and the 2 minority groups in ED assessment, diagnostic and treatment modalities, and ED disposition. There were no systematic differences by region of the country, ownership of the hospitals, or insurance status of the patients.

Conclusion: The initial assessment and management of injured patients from ethnic/racial minorities was similar to that of non-Hispanic white patients in a nationwide representative sample of ED visits. Other causes of ethnic disparities in outcomes after injuries should be sought.

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ETHNIC DISPARITIES IN OUR health care system have been well documented in treatment of several diseases, such as coronary artery disease, congestive heart failure, renal failure, acute appendicitis, and organ transplant.¹⁻¹⁶ These disparities range from limited access to health care, to lower use of evidence-based therapies and a lower rate of invasive procedures. While previously unrecognized, ethnic disparities in

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trauma care are beginning to emerge. We have recently shown that long-term functional outcomes after traumatic brain injuries are significantly worse in ethnic minorities and that these deficits are primarily in specific functional domains related to reintegration into society, such as return to work or school, participation in leisure activities, and a decline in overall

standard of living.^{17,18} In a separate study, we found that ethnic minorities were less likely to be placed in acute rehabilitation on discharge from trauma centers, even after taking their insurance status into account.¹⁹ Hence, one possible explanation of ethnic disparities in outcomes of traumatic brain injuries may be access to rehabilitation services after acute care. Another possibility may be disparities in initial assessment and management on presentation to emergency departments (EDs) after sustaining a traumatic injury. Such disparities may lead to delayed recognition or inadequate management of injuries sustained in ethnic minorities.

The purpose of the current study was to determine if there are differences in initial assessment and management of trauma patients based on their ethnicity in a nationwide sample of ED visits. Our hypothesis was that initial assessment of injured patients in EDs is affected by their ethnicity.

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Table 1. Demographics and Injury Severity

	%				
	Non-Hispanic White	African American	P Value ^a	Hispanic	P Value ^a
Age, y, mean (SD)	44 (21)	39 (17)	<.001	37 (17)	<.001
Male	52	52	.71	58	<.001
Blunt mechanism of injury	91	93	.04	91	.68
Heart rate per min, mean (SD)	85 (17)	84 (18)	.03	85 (16)	.81
Systolic blood pressure, mm Hg, mean (SD)	135 (23)	133 (23)	.001	133 (22)	.007
Temperature, °F, mean (SD)	97.9 (1)	98.1 (1)	<.001	97.9 (1)	.20
Endotracheal intubation in ED	0.5	0.3	.33	0.2	.19
DOA/died in ED	0.3	0.4	.30	0.1	.30
Insured	83	77	<.001	70	<.001
Public hospital	19	24	<.001	29	<.001
Geographic region			<.001		<.001
Northeast	26	18		33	
Midwest	24	20		8	
South	29	51		22	
West	22	11		38	

Abbreviations: DOA, dead on arrival; ED, emergency department.

^a P values compare each minority group vs non-Hispanic white patients.

METHODS

National Hospital Ambulatory Medical Care Survey (NHAMCS) ED public use data for 2003 were retrospectively analyzed. NHAMCS is a national probability sample survey of visits to EDs conducted by the National Center for Health Statistics of the Centers for Disease Control and Prevention. The survey is a component of the National Health Care Survey, which measures the level of health care use across a variety of health care providers. NHAMCS provides data from samples of patient records selected from EDs of a national sample of noninstitutional and short-stay hospitals, excluding federal, military, and Veterans Administration hospitals, located in the 50 states and the District of Columbia. These data are used to generate national estimates of hospital ED use. The NHAMCS ED micro-data file for 2003 contained 40 253 patient visits representing approximately 114 million ED visits nationwide in 2003. Of these, 14 433 visits were related to injuries or poisoning. Of these, 12 944 were initial visits after injury (the rest were either follow-up visits or unknown status and were excluded). We excluded pediatric patients (age <15 years, n=2624) and those seen primarily for poisoning (n=324), burns (n=127), drowning (n=6), suffocation (n=20), overexertion (n=517), or natural/environmental causes (n=438). The final study population consisted of 8563 patients from 406 hospitals (1-66 patients from each hospital). The study population represented more than 24 million ED visits nationwide. These patients were classified into 3 groups: non-Hispanic white (n=6106), African American (n=1406), and Hispanic (n=1051). The 2 minority groups were compared with non-Hispanic white patients for differences in their ED management. There were 225 patients who met the study criteria whose race/ethnicity was classified as Asian, Pacific Islander, Hawaiian, Native American, or mixed races. These were excluded from the analysis.

To assess if the 3 groups were comparable, baseline features such as age, sex, insurance status, mechanism of injury, and several measures of injury severity, such as systolic blood pressure, heart rate, temperature, endotracheal intubation rate, and ED death rates, were measured. We compared intensity of ED assessment and management and disposition in the 2 minority groups (African American and Hispanic) against the non-Hispanic white group. Several indicators were used, including

evaluation by staff physician (and not by trainees or physician extenders), use of laboratory and radiology resources, hemodynamic monitoring, medication use, and ED disposition. We also explored for ethnic disparities by geographic location and private vs public ownership of hospitals. Results are presented as mean (SD) for continuous variables and proportions for categorical variables. Continuous variables were compared using *t* test and categorical variables were compared using χ^2 test. SPSS for Windows (SPSS Inc, Chicago, Illinois) was used for all statistical analyses, with *P* < .05 considered significant.

RESULTS

Patients in the 2 minority groups were slightly younger, less likely to be insured, and more likely to be treated at public hospitals (**Table 1**). However, there was no difference between the groups in mechanism of injury and injury severity. There were no important differences in intensity of ED assessment, monitoring, treatment, or disposition (**Figure 1** and **Figure 2**). There were a few small differences between groups that became statistically significant because of large sample size. However, all of the differences were too small to be of clinical or practical relevance. For example, 91% of non-Hispanic white patients sustained a blunt mechanism of injury compared with 93% of African American patients (Table 1). This difference was statistically significant at *P* = .04 but had little practical value. More importantly, there were no systematic ethnic differences when key indicators were examined by geographic regions, private vs public ownership of hospitals, or insurance status of the patients (**Tables 2, 3, and 4**).

COMMENT

Our data suggest that there are no ethnic disparities in initial assessment and management of injured patients. These findings were consistent across different geographical regions

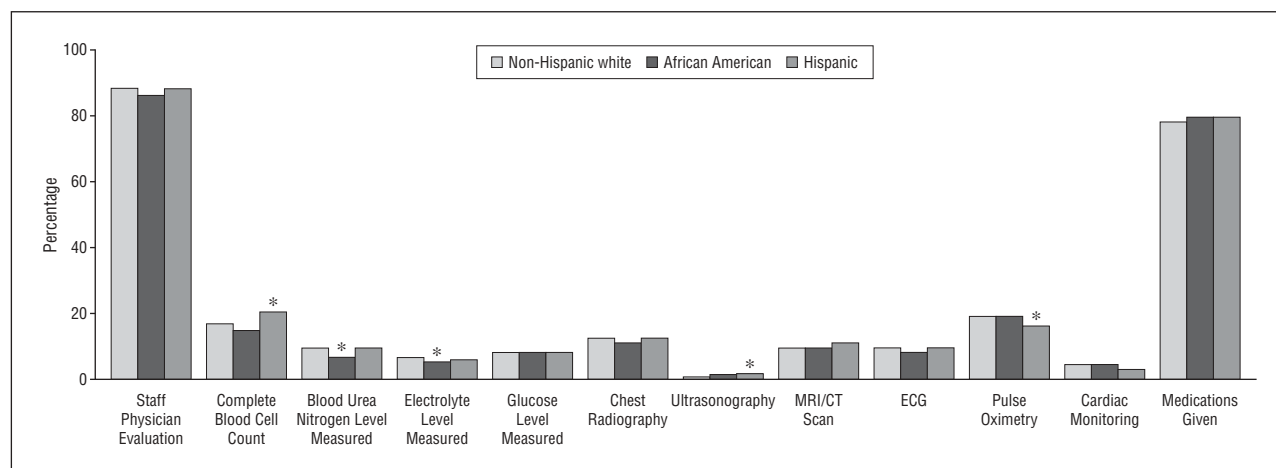


Figure 1. Intensity of emergency department assessment and monitoring. MRI indicates magnetic resonance imaging; CT, computed tomographic; ECG, electrocardiogram. * $P < .05$ compared with non-Hispanic white patients.

of the country and were not altered by insurance status of the patients or ownership status of the hospitals. Because NHAMCS data are a representative sample of all ED visits in the country, these findings truly reflect a lack of ethnic disparities at a national level in this group of patients.

The lack of ethnic disparities in initial evaluation and management of trauma patients is not surprising. The initial assessment of trauma patients is fairly standardized and based on the Advanced Trauma Life Support (ATLS) approach promoted by the American College of Surgeons Committee on Trauma.²⁰ Advanced Trauma Life Support was developed almost 3 decades ago and is based on a standardized stepwise management of all trauma patients, with a clear focus on quick recognition and aggressive treatment of all injuries. Advanced Trauma Life Support principles have been incorporated in standard surgical texts, and ATLS certification is a common requirement for physicians to practice in EDs. While there are no data to document how consistently ATLS is practiced across the country, one does not expect to see ethnic disparities in ED management of trauma patients if initial ED management of trauma patients is based on ATLS principles.

Another reason for the lack of ethnic disparities may be that the study was limited to ED management only. Injuries generally require urgent/emergent attention, unlike some chronic diseases such as coronary artery disease and congestive heart failure, where ethnic disparities are most pronounced. There are probably 2 driving forces for lack of ethnic disparities in ED care of injuries. First, hospitals and physicians are likely to treat everybody regardless of their ethnicity in an emergency. Second, federal regulations for ED care, such as the Emergency Medical Treatment and Labor Act,²¹ require that patients presenting to EDs are treated and stabilized prior to discharge or transfer. The Emergency Medical Treatment and Labor Act took effect in 1986 and was intended to ensure that all individuals have access to appropriate emergency care and that they are not inappropriately transferred to another facility. The law requires that a hospital provide an appropriate medical screening examination to any individual presenting to the hospital requesting emergency care. The purpose of the medical screening examination is to determine whether an

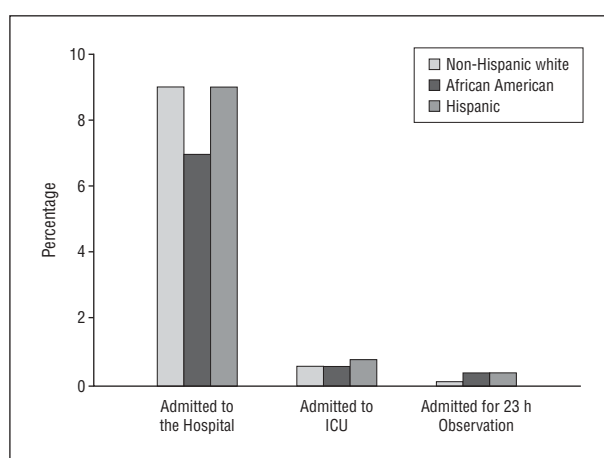


Figure 2. Hospital admission rates after emergency department disposition. ICU indicates intensive care unit.

emergency medical condition exists. If the clinical staff determines that an emergency medical condition does exist, they must either provide the treatment necessary to stabilize the individual or, if the facility and staff are unable to provide the care needed, the individual may be transferred. Another reason for the lack of ethnic disparities in the ED for injured patients may be that ED care typically does not require participation of specialist services. Low hospital admission rates in this patient cohort suggest that most of the injuries were probably minor and hence likely were treated by ED staff only. In addition, ED visits are not restricted by insurers, who otherwise may require preauthorization for nonemergent medical care.

The obvious implication of the lack of ethnic disparities in ED management is that other causes of ethnic disparities in functional outcomes of trauma patients should be sought. These may include quality of inpatient care, use of high-cost medications and procedures, access to acute and long-term rehabilitation services, and follow-up after discharge from acute care hospitalization. It is also entirely possible that the disparities in outcomes have little to do with quality of medical care received. Other factors, such as the socioeconomic status, educational level, em-

Table 2. Ethnic Differences by Geographic Region

	%											
	Northeast			Midwest			South			West		
	NHW	AA	HIS	NHW	AA	HIS	NHW	AA	HIS	NHW	AA	HIS
Staff physician evaluation	86	85	88	86	89	87	89	86 ^a	92	91	86 ^a	86 ^a
Complete blood cell count	17	15	21	17	19	16	15	12 ^a	17	20	25	21
Chest radiography	11	9	10	12	10	11	13	13	14	12	12	14
MRI/CT scan	10	6	11	10	12	7	10	9	8	11	8	12
Pulse oximetry	16	11 ^a	10 ^a	18	19	14	17	18	18	29	31	20 ^a
Cardiac monitoring	4	2	2	5	6	1	4	3	5	3	4	3
Medications given	74	72	75	78	78	75	80	80	80	80	85	83
Admitted to the hospital	10	9	11	9	7	10	8	6	10	8	9	8

Abbreviations: AA, African American; CT, computed tomographic; HIS, Hispanic; MRI, magnetic resonance imaging; NHW, non-Hispanic white.

^a $P < .05$ compared with NHW patients.

Table 3. Ethnic Differences by Ownership of the Hospital

	%								
	Public			Private for Profit			Private Not for Profit		
	NHW	AA	HIS	NHW	AA	HIS	NHW	AA	HIS
Staff physician evaluation	86	85	84	93	83 ^a	94	88	87	89
Complete blood cell count	17	15	22	16	14	15	17	16	20
Chest radiography	12	13	13	14	11	13	12	11	11
MRI/CT scan	9	9	9	11	9	4 ^a	10	8	13 ^a
Pulse oximetry	17	17	5 ^a	20	16	17	20	20	21
Cardiac monitoring	5	5	2 ^a	4	3	6	4	3	3
Medications given	77	73	79	82	82	78	78	80	79
Admitted to the hospital	8	11	11	7	4	3	9	6 ^a	10

Abbreviations: See Table 2.

^a $P < .05$ compared with NHW patients.

Table 4. Ethnic Differences by Insurance Status of the Patients

	%					
	Insured ^a			Uninsured		
	NHW	AA	HIS	NHW	AA	HIS
Staff physician evaluation	88	86 ^b	88	89	87	90
Complete blood cell count	17	15	20	16	16	17
Chest radiography	12	11	10	12	12	16
MRI/CT scan	9	8	10	12	9	11
Pulse oximetry	20	20	16 ^b	17	17	16
Cardiac monitoring	4	3	2 ^b	3	4	6
Medications given	78	80	80	80	75	78
Admitted to the hospital	9	7	9	5	6	10 ^b

Abbreviations: See Table 2.

^a Insurances include private, Medicare, Medicaid, workers' compensation, and others.

^b $P < .05$ compared with NHW patients.

ployment and insurance status, rural vs urban location, language barriers, and cultural and religious beliefs and practices, need to be studied further to understand differences between various ethnic groups.

The current study has a few limitations. The most important limitation is that NHAMCS data provide a global

view of ED care in the country. It is possible that ethnic disparities exist at individual hospitals or specific neighborhoods or certain cities. Along the same lines, NHAMCS data do not differentiate between care provided at trauma centers vs nontrauma centers. Identification of such differences will require more specific data from individual hospitals or areas. Another potential limitation of this negative study is the possibility of a type II error (ie, inability to identify ethnic disparities when they exist). We do not believe that to be the case because of our sample size. The study was powered to identify a 5% difference in use rate of any diagnostic test between non-Hispanic white patients and either minority group. Also, this was a cross-sectional study using 2003 data, providing a single snapshot in time. It is possible that over time, disparities have been eliminated. NHMACS does not capture information on "actual" or "true" trauma, as may be described by trauma team activation at designated trauma centers. Also, there is no information on commonly used indexes of injury severity, such as the Injury Severity Score, Revised Trauma Score, Glasgow Coma Scale, Abbreviated Injury Score, and Trauma Injury Severity Score Probability of Survival. Finally, the data were restricted to ED processes of care only because the purpose of this study was to assess ethnic disparities in emergency care. The NHMACS database does not provide information on

final patient outcomes, such as in-hospital mortality, 30-day mortality, or functional outcomes.

We conclude that despite reports of ethnic disparities in outcome after traumatic brain injuries, and in several other diseases, the initial assessment and management of injured patients from ethnic/racial minorities is similar to that of non-Hispanic white patients in a nationwide representative sample of ED visits. Other causes of ethnic disparities in outcomes after injuries should be sought.

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INVITED CRITIQUE

Outcome differences by race have been identified across numerous medical specialties and over a spectrum of diseases. Given that race is linked to several variables that themselves affect outcomes (such as socioeconomic status, access to care, and insurance, to name a few), investigating outcome disparities is truly a complex undertaking. That emergent trauma care, arguably the most evenly available and protocolized treatment (especially in mature trauma systems), suffers from such disparities is troubling. For those of us who practice in centers where about 90% of trauma care is provided to minority patients, these results remain especially galling.

By analyzing data from the National Hospital Ambulatory Medical Care Survey database, Shafi and Gentilello present work that helps chip away at this issue. This thorough and well-constructed analysis shows that there do not appear to be any significant differences in the provision of care to patients who visit the EDs as a result of injury. However, there are significant limitations to this study that must

be kept in mind to truly interpret the data. This study does not identify major traumas nor level of trauma care nor is it linked to outcomes data. As such, it is not a study of systematic trauma care and therefore does not assure that the identified absence of treatment differences is a contributing factor to disparate outcomes of trauma care by race. The inference is that the emergency care provided is identical across all injury severities and as such can be eliminated as a source of disparities. This is very suggestive data, and though it is far from definitive, this study clearly adds to the accruing body of investigation of this topic. It is vitally important that similar responsible and thorough analyses are performed to successfully address this issue.

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