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Socioeconomics affecting quality outcomes in Asian trauma patients within the United States

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Krista L. Haines, DO,[a],* *Suresh Agarwal, MD,*[a] *and Hee Soo Jung, MD*[b]

[a] *Division of Trauma and Critical Care, Department of Surgery, Duke School of Medicine and Public Health, Duke University, Durham, North Carolina*
[b] *Division of Trauma and Acute Care Surgery, Department of Surgery, University of Wisconsin School of Medicine and Public Health, Madison, Wisconsin*

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ABSTRACT

Introduction: Asian-Americans and Pacific Islanders are often considered as a uniform group when examining race in health outcomes. However, the generally favorable economic outcomes in this group belie significant socioeconomic variance between its heterogeneous subgroups. This study evaluates the impact of socioeconomic status on the health outcomes of Asian trauma patients.

Methods: From 2012 to 2015, 52,704 Asians who presented to trauma centers were registered with the National Trauma Data Bank with known disposition. Chi^2 and multivariate logistic regression analysis for mortality were performed controlling for age, gender, comorbidities, injury severity, insurance, race, and ethnicity. Negative binomial regression analysis with margins for length of stay (LOS) was performed. Subgroup analysis was done for polytrauma (Injury Severity Score >15, $n = 14,787$).

Results: Asians represent 1.8% of the trauma population. Uninsured Asians were 1.9 times more likely to die than privately insured Asians ($P < 0.001$). Medicare patients were 1.8 times more likely to die ($P < 0.001$). Eighty-one Asians identified themselves as Hispanic, and there was no significant difference in their mortality or LOS for this group ($P = 0.06$, $P = 0.18$). Bleeding disorders, diabetes, cirrhosis, hypertension, respiratory disease, cancer, esophageal varices, angina, cerebrovascular accident, and dependent health care before trauma all individually affected mortality and were controlled for in this model ($P < 0.05$). LOS was 1.7 d longer in Medicaid patients (2.2 d with polytrauma) and 1.1 d longer in workman's compensation patients (2.1 d with polytrauma). Uninsured had a shorter LOS ($P < 0.005$). Asian males with polytrauma stayed 1.6 d longer than females ($P < 0.001$), and age did not affect LOS for this group.

Conclusions: Noteworthy socioeconomic disparities influence Asian trauma patients independent of their race. Mortality is affected by insurance status, despite controlling for injury severity and comorbidities.

Introduction

Asian-Americans make up approximately six percent of the US population, yet little literature exists on Asian-American health care.[1] No studies looking at specifically Asian-American trauma patients exist to date. In addition, outcomes studies in trauma that do include Asian as a separate race in their analysis do not breakdown the Asian-American population by socioeconomic status and instead evaluate them as a unified population with the same socioeconomic backgrounds.[2-9]

A few studies evaluating overall racial disparities in trauma have found that Asian-Americans as a subgroup have higher rates of mortality than their Caucasian counterparts.[2,3,10] Nevertheless, most analysis on racial disparities in American focuses solely on African American and Hispanic populations.[2,11-14] We hypothesized that, while the "model minority" stereotype would suggest that the Asian population may have similar outcomes to Caucasians, socioeconomic disparities evaluated by insurance status exist within this patient population and therefore affect Asian-American outcomes in trauma care.

Methods

A retrospective analysis of all Asian-American trauma patients (age 15 years and older) who presented to trauma centers participating in the National Trauma Data Bank (NTDB) from 2012 to 2015 was conducted. In the NTDB, patients may be defined as Asian, Native American, other Pacific Islander, or other race. They also have the ability to choose ethnicity as Hispanic or non-Hispanic. Those patients who identified themselves as Asian were included in this analysis. In addition, patients were further broken down by those Asian patients that identified themselves as Asian Hispanics as opposed to Asian non-Hispanics. Patients with unknown disposition and those that died in the emergency room were excluded from this analysis. Primary outcome was mortality. Secondary analysis was performed to evaluate length of stay (LOS). Patient factors included age, ethnicity, comorbidities, injury severity, and insurance status. Insurance status was defined as uninsured, private insurance, Medicaid, Medicare, government insurance, and motor-vehicle insurance.

A binomial variable for mortality was created, and then Pearson Chi^2 was performed for all comorbidities in the NTDB data set to determine what factors affected overall mortality in the Asian-American population. A multivariate logistic regression model was built for mortality controlling for age, gender, significant comorbidities, injury severity, insurance, race, and ethnicity. The analysis control was a privately insured Asian-American patient. To evaluate LOS, a negative binomial regression analysis with margins for LOS was performed. This was done using the same significant covariates used in the mortality regression model. A subgroup analysis was done to analyze more severely injured patients (Injury Severity Score [ISS] >15). To compare patients who identified themselves as Asians to Caucasian patients, a logistic regression was run for mortality controlling for prior significant covariates. Significance was defined as $P \le 0.05$. Stata SE Release 14 (College Station, TX;

StataCorp LP; 2015) was used for the analysis. The data are reported as a mean ± standard deviation.

Results

Asian-Americans represented 1.8% of the patients reported to the NTDB from 2012 to 2015. Over this 4-y period, 52,704 Asians presented to trauma centers and were registered with the NTDB with known disposition. Twenty-eight percent of these patients were presented as polytrauma (ISS >15, $n = 14,787$). Mean age was 53 ± 22, 56% of patients were male, 8.5% used alcohol, and 4.5% had illegal prescription drugs on board confirmed by testing.

Patient factors that independently impacted mortality were history of cerebrovascular accident, respiratory disease, congestive heart failure, bleeding disorders, psychiatric illness, diabetes, cirrhosis, hypertension, cancer, renal failure, angina, esophageal varices, and prior need for dependent living (Table 1). A history of steroid use significantly affected the more severely injured patients (ISS >15) but did not have an effect on mortality for patients with an ISS ≤15.

Multivariate logistic regression model showed that uninsured Asian-American patients were 1.9 times more likely to die than privately insured patients (Table 2, Figure). Patients with Medicare were 1.8 times more likely to die and those with government insurances that were not part of the Medicare/Medicaid programs were 2.5 times more likely to die than privately insured Asian-American patients. Asians who also identified themselves as Hispanic had no significant difference in mortality as non-Hispanic Asians ($P = 0.06$).

The socioeconomic status of Asian-American patients significantly affected their total hospital LOS. Asian-Americans

Table 1 − Univariate analysis of patient risk factors affecting mortality.	
Comorbidities	P value
Chronic obstructive pulmonary disease	<0.001
Bleeding disorder	<0.001
Psychiatric disorder	0.3
Chemotherapy	0.159
Diabetes	<0.001
Cirrhosis	<0.001
Hypertension	<0.001
Respiratory disease	<0.001
Myocardial infarction	0.368
Steroid use	0.172
Peripheral vascular disease	0.78
Cancer	<0.001
Congestive heart failure	<0.001
Renal failure	0.001
Esophageal varices	<0.001
Angina	0.003
Dependent healthcare	0.033
Cerebrovascular accident	<0.001