

Clinical Science

The Hispanic paradox: does it exist in the injured?



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Abstract

BACKGROUND: Hispanics have similar or lower all-cause mortality rates in the general population than non-Hispanic whites (NHWs), despite higher risks associated with lower socioeconomic status, hence termed the “Hispanic Paradox.” It is unknown if this paradox exists in the injured. We hypothesized that Hispanic trauma patients have equivalent or lower risk-adjusted mortality and observed-to-expected mortality ratios than other racial/ethnic groups.

METHODS: Retrospective analysis of adult patients from the 2010 National Trauma Data Bank was performed. Hispanic patients were compared with NHWs and African Americans (AAs) to assess in-hospital mortality risk in each group.

RESULTS: Compared with NHWs, Hispanic patients had lower unadjusted risk of mortality. After adjusting for potential confounders, the difference was no longer statistically significant. Mortality risk was significantly lower for Hispanic patients compared with AAs in both crude and adjusted models. Hispanic patients had significantly lower observed-to-expected mortality ratios than NHWs and AAs.

CONCLUSION: Despite reports of racial/ethnic disparities in trauma outcomes, Hispanic patients are not at greater risk of death than NHW patients in a nationwide representative sample of trauma patients. Published by Elsevier Inc.

The Hispanic population is the fastest-growing racial/ethnic group in the United States,¹ accounting for approximately 17% (53 million) of residents. The number of Hispanics in the United States is projected to double by 2060, reaching over 100 million.² Hispanics often exhibit similar or better health outcomes and have lower all-cause

mortality rates than non-Hispanic whites (NHWs), despite increased risks associated with lower average education and income levels.³⁻¹⁰ In a 20-year study (1990 to 2010), Hispanic ethnicity was associated with 17.5% lower mortality compared with NHWs.¹¹ Other studies have shown that despite a higher prevalence of risk factors for cardiovascular disease and diabetes,¹² including lower access to health care, lower socioeconomic status, and lower levels of education, Hispanics have a lower incidence of both coronary and vascular death than NHWs.¹³⁻¹⁶ This discordance between higher prevalence of risk factors but better-than-expected mortality outcomes among the Hispanic population is referred to as the “Hispanic paradox.”

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Trauma literature regarding racial disparities in patient outcomes is inconsistent. Some studies suggest that Hispanics and other racial and ethnic minorities are at an increased risk of death.^{5,17–22} One study indicates that, after controlling for demographic, insurance, injury, and comorbidity data, African American (AA) and Hispanic patients who sustained severe injuries following a motor vehicle collision were at a higher risk of death compared with NHWs.²³ Another study found that AA, Asian, and Hispanic patients with severe traumatic brain injury were more likely to die compared with NHWs.²⁴ However, other studies have shown greater odds of death for AAs and Asians,¹⁹ but similar odds between Hispanics and NHWs.²⁵

An important limitation of previous studies of racial disparities in trauma outcomes is that they either did not include Hispanics or grouped them together with other minorities such as Asians and AAs.^{26,27} In addition, Hispanic trauma patients have not been described well in trauma literature in terms of demographics, injury patterns, and outcomes, compared with other racial/ethnic groups. The purpose of this study is to describe the Hispanic trauma patient population and to determine if the Hispanic paradox exists in the injured. We hypothesized that risk-adjusted mortality and observed-to-expected mortality ratios among Hispanic patients are equivalent to or lower than those of non-Hispanic race/ethnicity in a national sample of trauma patients.

Patients and Methods

We retrospectively reviewed the National Trauma Data Bank's National Sample Program (NSP) for the year 2010. The NSP is a statistically representative sample of trauma patients used to develop national estimates.²⁸ All patients greater than or equal to 18 years of age with blunt or penetrating injury and known race and ethnicity were included, while patients greater than 89 years with other mechanisms of injury (burns, poisoning, drowning, asphyxiation) and missing race and ethnicity data were excluded. These criteria identified 118,413 patients (Fig. 1). Patients were divided into 3 groups based on their race and ethnicity: NHW (85,176, 72%), Hispanics (13,652, 12%), and AA (19,585, 17%). Measures of mortality were the primary outcomes of interest, including risk-adjusted in-hospital mortality and observed-to-expected ratios in the 3 groups.

Hispanics were compared with NHWs and AAs using chi-square test for categorical variables and Mann–Whitney *U* test for continuous variables. Results are presented as medians and interquartile range, proportions, and means and standard deviations as appropriate. Multivariate logistic regression models were used to determine the association between in-hospital mortality and racial/ethnic group adjusting for potential confounding effects of age, sex, Injury Severity Score (ISS), Glasgow Coma Scale (GCS) score, blunt versus penetrating injury, presence of hypotension on arrival (systolic blood pressure <90 mm Hg), heart rate (HR), and insurance status. Insurance status was classified

as public (ie, Medicare, Medicaid, other government-assisted programs), private (commercial insurance), and uninsured. Results from logistic regression analysis are presented as odds ratios (ORs) with 95% confidence intervals (CI) for odds of death in NHWs and AAs compared with Hispanics. We calculated the observed-to-expected (*O/E*) mortality ratios within each ethnic group to estimate the expected probability of death for each patient. We used the same logistic regression model without race/ethnicity and summed individual patient probabilities within each racial/ethnic group to generate the total number of expected deaths (*E*). The observed (*O*) number of deaths was divided by the expected number to generate an *O/E* mortality ratio for each race/ethnicity with 95% CIs. While logistic regression allows for estimating risk for the population treated as a whole, *O/E* mortality ratios determine if expected mortality derived from the regression model is accurate within individual race/ethnicity subgroups. Statistical Package for the Social Sciences for Windows (SPSS, Inc., version 20, Chicago, IL) and Statistical Analysis Software (SAS, version 12.1, Cary, NC) were used for statistical analyses, with *P* value less than .05 considered significant. This study was approved by the Institutional Review Board and adhered to established guidelines on the treatment of human subjects.

Results

Hispanic patients were younger, more likely to be male, discharged home, and suffer from penetrating and firearm injuries than NHWs (Table 1). Hispanic patients were less likely to be insured and to suffer from injuries because of falls, had lower ISS, and shorter lengths of stay than NHWs. Hispanic patients were less likely to suffer from penetrating trauma compared with AAs, but equally likely to be injured by a firearm.

Compared with NHW patients, Hispanic patients had lower unadjusted risk of mortality (crude OR .72, 95% CI .64 to .81, *P* < .001). Although this difference persisted after adjusting for age, sex, blunt or penetrating injury, ISS, GCS, systolic blood pressure, heart rate, and insurance status, it was no longer statistically significant (adjusted OR .93, 95% CI .77 to 1.11, *P* = not significant). Compared with AA patients, the risk of mortality was significantly lower for Hispanic patients in both crude (OR .82, 95% CI .71 to .94, *P* = .01) and adjusted (OR .71, 95% CI .58 to .88, *P* = .002) models. Hispanic patients had significantly lower *O/E* mortality ratios than both NHW and AA patients (Fig. 2).

Comments

Our findings indicate that Hispanic trauma patients have similar or better risk-adjusted mortality odds compared with NHWs (adjusted OR .93, 95% CI .77 to 1.11) and AAs (OR .71, 95% CI .58 to .88). Hispanic patients also had better-than-expected mortality shown by the *O/E* ratio, which was significantly lower than that of NHWs and

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