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Authors

Danner, Omar K
Matthews, L Ray
Wilson, Kenneth L
[et al.](#)

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Healthcare Outcome Disparities in Trauma Care

Omar K Danner, MD*
L Ray Matthews, MD*
Kenneth L Wilson, MD*
Sheryl L Heron, MD, MPH†

* Department of Surgery, Morehouse School of Medicine, Atlanta, Georgia

† Department of Emergency Medicine, Emory University School of Medicine, Atlanta, Georgia

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A recent article by Dr. Haider et al¹, “Association between Hospitals Caring for a Disproportionately High Percentage of Minority Trauma Patients and Increased Mortality: A Nationwide Analysis of 434 Hospitals,” raised the question of whether there was an increased mortality risk among trauma patients treated at hospitals with higher proportions of minority patients (i.e., black and Hispanic patients combined). They categorized 434 hospitals included in the National Trauma Data Bank between 2007 and 2008 on the basis of the percentage of minority patients admitted and treated due to acute traumatic injury. In their analysis they compared the adjusted odds of in-hospital mortality between hospitals with less than 25% of patients who were minorities as the reference group (majority) versus hospitals with 25% to 50% of patients who were minorities (mixed) and hospitals with more than 50% of patients who were minorities.¹

In the study, they examined over 311,500 trauma victims with an Injury Severity Score (ISS) of 9 or greater and who were white, black, or Hispanic patients. Of note, hospitals that had a 50% or higher percentage of minority patients were more likely to have additional patients with penetrating trauma, younger patients overall, fewer female patients, and the highest crude mortality, which is a typical profile of hospitals in the urban setting. What is the implication for trauma care outcomes in at-risk populations? In a recent study Hsai and Shen² identified certain groups to be at higher risk for worse access to trauma centers than others. Although the subject of proper access to trauma care remains an issue of significant concern, a more compelling question is whether trauma centers across the nation are providing the appropriate quality and level of service to their seriously injured patients.

For the past several decades, the field of injury control has grown and adopted several methods to decrease injury and save lives. Led by the Centers for Disease Control and Prevention’s (CDC) National Center for Injury Prevention and Control, a national focus on the burden of injury and the enormous cost

and impact on society has emerged. Despite the decline in homicide rates during the 1990s, disparities in outcome have not been eliminated.³ In fact, intentional injury disparities such as homicide remained highest among black children across all study age groups in the CDC study.³ The differences in mortality outcomes among these patients treated at trauma facilities serving higher proportions of minority patients may contribute significantly to the known racial disparities. The real question is why? Our belief is that greater resources and focus should be placed on total system improvement as the best opportunity to make a difference in improving care for ALL trauma patients and eliminating healthcare disparities in all populations across the nation, regardless of the mixture of the patient base.

Although the causes for these injury outcome disparities have been attributed to lack of education, inadequate laws, lack of resources and cultural factors that may affect delivery of healthcare, we believe the contribution of healthcare system-related factors has not been thoroughly investigated or fully explored. Whereas targeted educational efforts can be relatively easy to implement, promote the development of strategist partners in the community, and also serve to inform the public, education alone is simply not enough to solve this societal challenge.⁴ This realization creates a huge opportunity for the field of injury prevention. While an informed and activist public, along with subsequent legislative efforts and law enforcement are important, proper trauma system and hospital staffing and resources must be made readily available if parity of trauma-related healthcare outcomes are our collective goals. If the findings of Dr. Haider’s study⁵ are indeed true, injury prevention may be a plausible strategy to help address the trauma-related outcome disparities in at-risk populations treated at predominantly minority-based hospitals. However, greater amounts of economic resources will be needed to achieve equal outcomes for trauma care regardless of the patient population or payor mix of the treating trauma facility.

In Haider's study¹, crude mortality was significantly lower at hospitals with less than 25% of patients who were minorities. After adjusting for age, sex, insurance status, injury severity, the presence of severe head and/or extremity injury, the presence of hypotension on arrival to the emergency department (ED), and the type and mechanism of injury, the odds of mortality continued to increase with an increasing proportion of minority patients. When compared with the reference group of predominantly majority hospitals, patients treated at mixed hospitals had a 16% higher adjusted risk of death. This further increased to a 37% increased odds of death among patients treated at predominantly minority hospitals.¹ These differences in mortality outcomes among trauma facilities serving higher proportions of minority patients may contribute significantly to the known racial disparities experienced by trauma patients in the United States (U.S.).^{1,5}

After adjusting for potential confounders, an increased chance of death was noted for patients treated at hospitals that treated a higher percentage of minority patients when compared with the reference group hospitals. Although this study is intriguing in nature, it raises several questions and concerns. First, is there actually a difference in quality of the care being provided at hospitals that treat a higher percentage of minority patients? And how does the race and ethnicity of some patients affect the outcome and care of all patients admitted to U.S. trauma centers? It is a commonly-held belief that minority populations as a whole tend to be more economically disadvantaged, which means hospitals serving these populations often have greater economic constraints and staffing challenges.⁵ The question is whether the observed effect is due to the minority status of the patient population, or rather the economic status of the hospitals, the quality and availability of subspecialty care providers, and the physiologic status of patients being treated at the facilities included in this study. Interestingly, there was no difference in adjusted mortality between whites and minorities within the same type of hospital.¹ In addition, a 3% greater concentration (21% vs. 18%) or volume of patients with an ISS > 25 treated at the minority-based hospital versus those hospitals which treated <25% of minority trauma patients was present. This overall mortality difference could possibly be due to a slightly higher percentage of more critically injured individuals being triaged at these inner-city or minority-based medical centers.

Second, higher level trauma centers in the U.S. tend to be located at academic institutions in highly populated inner-city areas, where many minorities typically reside and work.⁶ Although not explicitly stated in their study, based on the number of patients (pts) seen at each hospital type, the predominantly minority and mixed hospitals saw a greater concentration or volume of higher acuity patients per week (19.2 pts/week and 17.1 pts/week-mixed versus 11 pts/week-majority). Furthermore, it is worth noting that the number of patients with an ISS \geq 25 and hypotensive on arrival to the ED

were slightly higher in the minority-based hospitals.¹ As the overall crude mortality difference is only 1 to 2 percent, these small disparities may have significant clinical implication in determining the chances for an unfavorable outcome after severe trauma for ALL patients presenting to the predominantly minority and mixed hospitals.

Multiple studies have demonstrated racial disparities in mortality and functional outcomes after traumatic injury in the U.S.^{5,7,8} Patients treated at hospitals with higher proportions of minority trauma patients tend to have higher volumes of trauma patients, higher acuity of patients, and greater economic restraints, which could potentially lead to increased chances of morbidity and death, even after adjusting for potential confounders. Although differences in outcomes between trauma hospitals may be theoretically explained by racial disparities, the ethnic status or race of one patient probably does not contribute significantly to the care or outcome of the next patient. More plausibly, the staffing, economic status of the hospital system, the quality of care provided and the physiologic status of the injured patient more than likely play a greater role in the ultimate outcome of each individual patient. In Haider's study¹, hospitals serving higher proportions of minority patients with trauma have a significantly disadvantaged payor mix, with nearly double the percentage of uninsured patients compared with hospitals with less than 25% of patients being minorities. This payor mix disparity may adversely influence the structure and process of care a hospital system can deliver to critically injured patients. Consequently, it may be advantageous to change the definition of vulnerability from those of minority status to anyone who presents to trauma hospitals that treat a higher percentage of minorities and underrepresented individuals, which is a very powerful argument for improving trauma care for all.

Institutional and health system-related factors of many hospitals, especially those located in economically depressed urban neighborhoods, serve a substantially higher proportion of minority patients.^{2,5} Such hospitals have been shown to have worse outcomes and suboptimal quality of care for a variety of diseases and surgical interventions.⁹⁻¹³ Baicker et al⁹ suggested that differences in the quality of care observed between hospitals may originate from variations in practice patterns, technological capabilities, hospital capacity and supply of specialists, or patient characteristics. Although Level I trauma centers have been shown to have lower mortality rates for severely injured trauma patients overall,^{14,15} not all similarly designated trauma centers achieve the same risk-adjusted outcomes.¹⁶⁻¹⁸ The reasons for these variations in outcome are unclear, but they may also be related to the heterogeneity of patient populations by payor mix, injury mechanism, or inconsistent practice patterns. Additional issues at public hospitals include nurse staffing shortages, constrained budgets, and lack of capital and technical support.^{19,20}

It has been suggested by Hosking et al²¹ and Green et al²²

that improving cultural competency, addressing health literacy, and implementing quality-of-care improvement initiatives focused on equity and educating the public may reduce disparities in healthcare. Healthcare policies focused on improving cultural competency and directing resources to trauma centers serving a high proportion of minority patients could have a beneficial effect on the worse outcomes related to disparities in quality of care within and between hospitals among non-majority patients with severe injury. Nevertheless, the care provided by trauma personnel in the acute phase of the trauma care at Level I trauma centers around the country, in many clinicians' opinion, remains exceptional. In the end, we applaud Dr. Haider and his colleagues for their study, and believe this paper lays the foundation for more in-depth analysis of ways trauma centers can improve the care and outcome for ALL patients, regardless of race, ethnicity, patient mix, insurance status, geographic location or socioeconomic class.

Address for Correspondence: Omar K. Danner, MD. Morehouse School of Medicine, 80 Jessie Hill Jr. Drive, S.E., Suite 7B, Atlanta, GA 30303. Email: odanner@msm.edu.

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