Impact of Socioeconomic and Demographic Factors on In-Hospital Mortality in Sepsis: Insights from the 2020 NIS

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Introduction

- Sepsis is a life-threatening systemic response to infection
- Outcomes are influenced by socioeconomic and demographic variables
- Our project aimed to identify risk factors impacting survivability and hospital outcomes in sepsis patients using national data
- Data source: 2020 National Inpatient Sample (NIS) database

Methods

- Population: 596,093 patients with sepsis (NIS 2020)
- Statistical Analysis:
  - Bivariate χ^2 & log-total-charges regression → outcome & mortality differences by sex
  - Survey-weighted logistic regression → in-hospital mortality predictors
  - Linear regression → trends in length of stay (LoS)

Results

- **Age:**
  - Survivors were younger (62.7 ± 18.3 years; p < .001)
  - Each 10-year increase → 37% higher odds of in-hospital death (OR 1.37; 95% CI 1.36–1.37)
- **Race/Ethnicity:** Higher mortality → Black (OR 1.31), Hispanic (OR 1.41), Native American (OR 1.57) patients
- **Hospital type:** Urban non-teaching (OR 1.38) and teaching hospitals (OR 1.69) → higher mortality
- **Comorbidities:**
  - Uncomplicated diabetes protective = OR 0.91
  - Complicated diabetes protective = OR 0.95
- **Sex:** Female patients → 8.4% shorter LoS
- **Length of stay:** Survivors = 8.8 ± 11.3 days

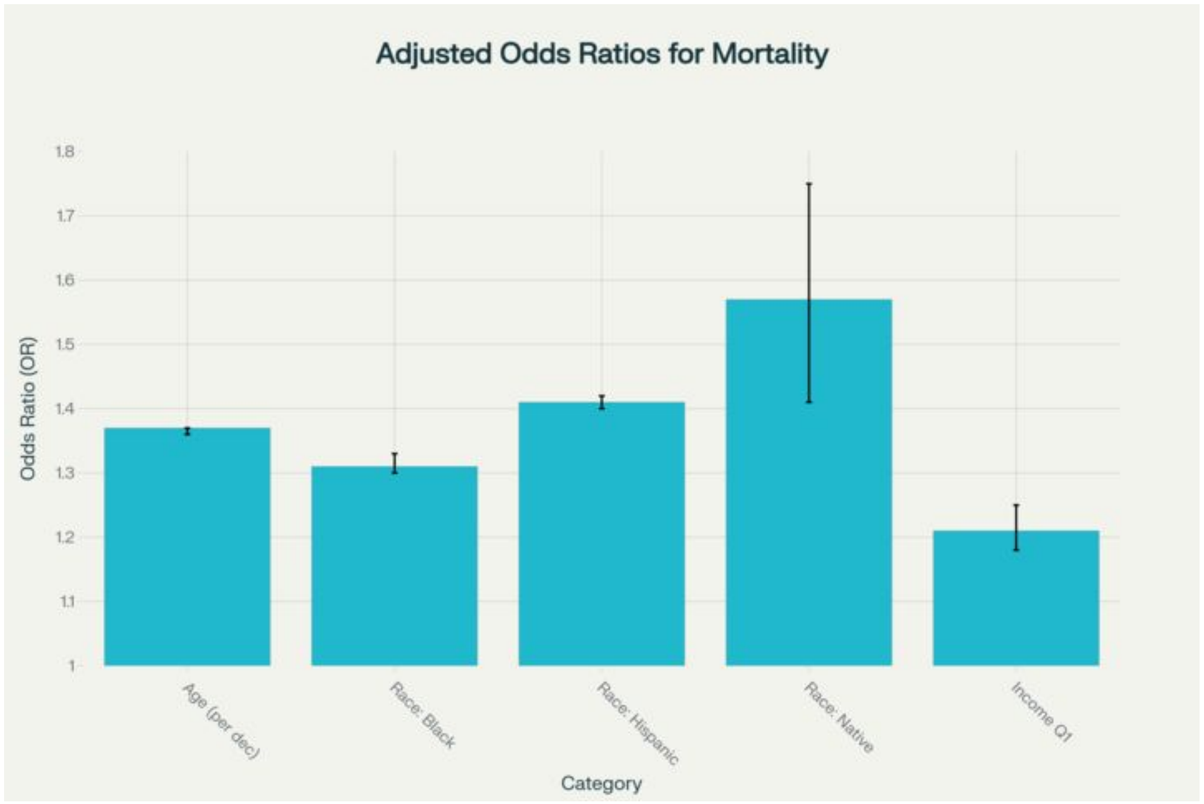

Figure 1. Bar Chart of Mortality Risks by Race and Socioeconomic Factors: The bar chart above showing the mortality odds ratio for different race and socioeconomic factors.

Variable	OR	95% CI	p-value
Age (per 10 years)	1.37	1.36-1.37	<0.001
Female (vs. Male)	0.87	0.86-0.88	<0.001
Race: Black	1.31	1.30-1.33	<0.001
Race: Hispanic	1.41	1.40-1.42	<0.001
Race: Native American	1.57	1.41-1.75	<0.001
Urban Non-Teaching Hospital	1.38	1.35-1.40	<0.001
Urban Teaching Hospital	1.69	1.66-1.71	<0.001
Uncomplicated Diabetes	0.91	0.90-0.92	<0.001
Complicated Diabetes	0.95	0.94-0.96	<0.001

Figure 2. Summary Table of Logistic Regression Results (Key Mortality Predictors): The table above showing the mortality odds ratio, 95% confidence interval, and p-value for each variable.

Figure 3. Bar Chart of Adjusted LOS by Key factors: The bar chart above showing the LOS regression coefficients separated by key factors.

Discussion

- Age, minority race/ethnicity, and hospital type strongly predict mortality in sepsis
- Diabetes showed unexpected protective association
- Female patients experienced shorter stays and lower mortality risk
- Socioeconomic and structural factors appear central to outcome disparities

Limitations:

- Retrospective database analysis
- No long-term follow-up beyond in-hospital outcomes
- Limited clinical data
- Pandemic-specific patterns may have influenced findings

Conclusion

- Sepsis outcomes are worse in older adults, racial/ethnic minorities, and patients in urban hospitals
- Women and white patients had more favorable outcomes
- Sociodemographic disparities should guide quality improvement and targeted interventions

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