Title: Addressing Racial/Ethnic Disparities in Heart Failure Hospitalization through Electronic Health Records

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Abstract

Research Objective: The study comprehensively examined racial disparities in length of stay (LOS) and target top one disparity to propose improvement plans.

Study Design: The LOS of sixteen health conditions as the principal diagnosis of hospitalization was compared between non-Hispanic white and black patients. The top one disparity was selected into the second part of analysis. Stepwise regression method was used to identify influential factors of racial disparities in LOS.

Population Studied: One-year inpatient data from 2013Q3 to 2014Q2 in an academic medical center was used for analysis.

Principal Findings: There were 6,793 encounters made by white patients and 3,058 by black patients aged 18 or older. 6.01% of white encounters were admitted to the hospital for heart failure (HF, ICD-9-CM: 420.0-429.9) while 6.70% of black encounters were admitted for the same cause. The average LOS was 5.04 days for encounters of white patients with HF and 5.29 days for black patients. After controlling gender, age, and primary payer, the blacks significantly had longer LOS than whites (p=0.044). However, severity of illness, risk of mortality and discharge status mediated the racial disparities (p=0.897). Additionally, white patients at younger age, covered by Medicare or self-pay, having major degree of illness severity, having extreme degree of mortality risk, and being discharged to home health or facility care were more likely to have longer LOS. Being male, having serious illness, and being discharged to home health or facility care are risk factors of long LOS in black patients.

Conclusions: Severity of illness and discharge status largely accounted for racial/ethnic disparities in LOS beyond other factors. Another innovative finding is that patient's characteristics have different impacts on LOS for two different racial groups.

Implications for Policy or Practice: The EHR provides capabilities to do comprehensive assessments of health disparities. Findings of this study suggest that patients who were planned to discharge to post-acute care may actually stay longer in hospitals. On the contrast, to reduce severity of illness before admission could be effective to eliminate racial/ethnic disparities in LOS. Interventions such as healthy lifestyle and screening should be promoted. Moreover, younger white patients and black male patients should be targeted to prevent any adverse outcomes.

Length of Stay (Encounter-Based)	Model 1	Model 2	Model 3	Model 4
Racial/Ethnic: Black vs White	.285***	.185*	.149*	-.008
Gender: Female vs Male		-.183**	-.221**	-.120
Age:				
45-64 vs 18-44		-.367**	-.241	-.249
65+ vs 18-44		-541***	-.451**	-.473
Primary Payer:				
Medicaid vs Commercial			.685***	.314*
Medicare vs Commercial			.339**	.035
Self-pay vs Commercial			.238	.211
Others vs Commercial			.317	.283
Severity of Illness at Admission:				
Minor vs Moderate				.223*
Major vs Moderate				.565***
Extreme vs Moderate				.870***
Risk of Mortality at Admission:				
Moderate vs Minor				.077
Major vs Minor				.150
Extreme vs Minor				.287
Discharge Status:				
Home Health Care vs Routine Discharge				.492***
Facility Care vs Routine Discharge				.782***
Died in Hospital vs Routine Discharge				.661**

Note: *: p<0.05, **: p<0.01, ***p<0.001.

Length of Stay (Encounter-Based)	Non-Hispanic White (N=408)	Non-Hispanic Black (N=205)
Gender: Female vs Male	-.042	-.238**
Age:		
45-64 vs 18-44	-.414*	-.127
65+ vs 18-44	-.826***	-.246
Primary Payer:		
Medicaid vs Commercial	.189	.312
Medicare vs Commercial	.322*	-.219
Self-pay vs Commercial	.433**	-.173
Others vs Commercial	.445	.134
Severity of Illness at Admission:		
Moderate vs Minor	.163	.466
Major vs Minor	.339**	1.021***
Extreme vs Minor	.207	1.650***
Risk of Mortality at Admission:		
Minor vs Minor	.137	-.029
Major vs Minor	.272*	-.079
Extreme vs Minor	.703**	-.053
Discharge Status:		

Home Health Care vs Routine Discharge	.538***	.348**
Facility Care vs Routine Discharge	.750***	.802***
Died in Hospital vs Routine Discharge	.955***	-.009

Note: *: p<0.05, **: p<0.01, ***p<0.001.