Social Vulnerability Is Associated with Increased Cirrhosis Mortality and Decreased Liver Transplantation

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Background

• Prior research in a cirrhosis cohort (HealthLNK, 2006-2012) found poor health outcomes for Black and Hispanic patients with cirrhosis, though this does not account for other SDOH.1-3

• Health outcomes vary significantly by geography across the country and within cities driven by societal factors and community level social determinants of health (SDOH).4

• The effect of these community-level SDOH are not well understood in liver cirrhosis.

Research Objectives

1. Evaluate differences in patient and disease characteristics based on community level SDOH

2. Estimate the net effect of community level SDOH on cirrhosis mortality and liver transplantation

Methods

Patient Cohort: 19,906 patients with cirrhosis were identified in a deidentified dataset of patients from 6 centers in the Greater Chicago Metropolitan Area. This data was merged with Illinois Department of Public Health (IDPH) death data and United Network for Organ Sharing (UNOS) transplant data. 5-digit ZIP code data was available for each patient in the dataset.

Social Determinants of Health: The CDC Social Vulnerability Index (SVI) is a composite index measure designed initially for disaster management5 and applied to predict health outcomes.6 It is reported as a percentile score based on community level and converted 5-digit ZIP code level by population weighted medians.

Propensity Score Weighting: Identified similar patients based on patient demographic and disease characteristics.

Competing Risk Survival Analysis: Fine-Gray sub-distribution hazard model to identify the hazard of all-cause mortality, liver related death, non-liver related death, or liver transplantation with appropriate competing risks or censoring at the end of study.

Competing Risk Survival Analysis:

Identified similar patients based on patient demographic and disease characteristics. Increased vulnerability is associated with increased cirrhosis mortality and liver transplantation. This confirms previous research in cirrhosis, though this does not account for other SDOH.2-6

Table 1. Table of Demographics and Diseases Characteristics

Table 2. Table of Hazard Ratios of Cirrhosis Outcomes

Figure 1. Cumulating Risk Survival Analysis

Figure 3. Cumulative Incidence of All Cause Mortality and Liver Transplantation stratified by quintiles of SVI (2.0 is lowest 0.2, 5.0 is highest 0.81-1)

Table 3. Table 1. Demographics and diseases characteristics with trends significant by Chi-squared p<0.05

Table 4. Table 2. Hazard Ratios of Cirrhosis Outcomes

Results

• Increased vulnerability (SVI) is associated with increased all cause mortality, decreased liver transplantation, and increased non-liver related mortality.

• SVI was not associated with increased liver related mortality, though preliminary subgroup analysis suggests this effect is not uniform (i.e. Hispanic paradox)

Limitations

• This study is retrospective in design and does not identify a direct causal relationship between social determinants and cirrhosis outcomes.

• It is relatively dated, covering the period from 2006-2012, the era before DAA treatment for HCV.

• The SVI measure is limited to the geographic level of data was limited to the 5-digit zip code, within which significant variance of community level SDOH can exist. It is also an index measure not constructed from relevant factors (i.e. food deserts, public spaces).

Conclusions

Community level SDOH (SVI) predicts cirrhosis outcomes after accounting for patient and disease characteristics. Increased vulnerability is associated with increased mortality and decreased liver transplantation. This confirms previous research in cirrhosis, though this does not account for other SDOH.2-6

References


