REVIEW

THE AMERICAN JOURNAL of MEDICINE®

Geographic Variability in Liver Disease-Related Mortality Rates in the United States

Archita P. Desai, MD,[a] Prashanthinie Mohan, MBA,[b] Anne M. Roubal, PhD,[b] Ricki Bettencourt, MS,[c] Rohit Loomba, MD, MHSc[d]

[a]Division of Gastroenterology and Hepatology, Liver Research Institute and; [b]Center for Population Science and Discovery, University of Arizona, Tucson; [c]NAFLD Translational Research Unit, Department of Medicine and Division of Epidemiology, Department of Family and Preventive Medicine, and; [d]NAFLD Translational Research Unit, Division of Gastroenterology and Epidemiology, University of California at San Diego, La Jolla.

ABSTRACT

PURPOSE: Liver disease is an important cause of morbidity and mortality in the United States. Geographic variations in the burden of chronic liver disease may have significant impact on public health policies but have not been explored at the national level. The objective of this study is to examine interstate variability in liver disease mortality in the United States.

METHODS: We compared liver disease mortality from the 2010 National Vital Statistics Report on a state level. States in each quartile of liver disease mortality were compared with regard to viral hepatitis death rates, alcohol consumption, obesity, ethnic and racial composition, and household income. Race, ethnicity, and median household income data were derived from the 2010 US Census. Alcohol consumption and obesity data were obtained from the 2010 Behavioral Risk Factor Surveillance System Survey.

RESULTS AND CONCLUSION: We found significant interstate variability in liver disease mortality, ranging from 6.4 to 17.0 per 100,000. The South and the West carry some of the highest rates of liver disease mortality. In addition to viral hepatitis death rates, there is a strong correlation between higher percentage of Hispanic population and a state's liver disease mortality rate ($r = 0.538$, $P < .001$). Lower household income ($r = 0.405$, $P = .003$) was also associated with the higher liver disease mortality. While there was a trend between higher obesity rates and higher liver disease mortality, the correlation was not strong and there was no clear association between alcohol consumption and liver disease mortality rates.

© 2018 Elsevier Inc. All rights reserved. *• The American Journal of Medicine (2018) 131, 728–734*

KEYWORDS: Cirrhosis; Death; Geographic variability; Liver disease; Population-based factors

Funding: AD is supported by the Arizona Health Sciences Career Development Award and the American Association for the Study of Liver Diseases Foundation Clinical Research Award. RL is supported by the American Gastroenterological Association (AGA) Foundation—Sucampo – ASP Designated Research Award in Geriatric Gastroenterology and by a T. Franklin Williams Scholarship Award. Funding provided by: Atlantic Philanthropies, Inc, the John A. Hartford Foundation, OM, the Association of Specialty Professors, and the American Gastroenterological Association, grant K23-090303, grant R01-DK106419 and the National Institute of Environmental Health Sciences of the National Institutes of Health Award Number P42ES010337. The study sponsors had no role in the study design, collection, analysis, interpretation of the data, or drafting of the manuscript.

Conflicts of Interest: All authors report that no conflicts of interest exist.

Authorship: AD—Study concept and design, analysis and interpretation of data, drafting of the manuscript, critical revision of the manuscript, approved final submission. AD had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

PM—Statistical analysis, drafting of the manuscript, approve final version submission.

AR—Statistical analysis, drafting of the manuscript, approve final version submission.

RB—Statistical analysis, critical revision of the manuscript, approved final submission.

RL—Study concept and design, analysis and interpretation of data, critical revision of the manuscript, obtained funding, study supervision, approved final submission.

Guarantor of the article: RL.

Requests for reprints should be addressed to Rohit Loomba, MD, MHSc, NAFLD Translational Research Unit, Division of Gastroenterology and Epidemiology, University of California at San Diego, 9500 Gilman Drive, MC 0063, La Jolla, CA 92093.

E-mail address: roloomba@ucsd.edu

0002-9343/$ - see front matter © 2018 Elsevier Inc. All rights reserved.
https://doi.org/10.1016/j.amjmed.2018.01.047

INTRODUCTION

While chronic liver disease is the 12th leading cause of death in all Americans, it is the fourth leading cause of death in those 45-54 years of age and the sixth leading cause of death in Hispanic Americans.[1] In the United States, liver disease mortality has been attributed to individual characteristics such as ethnicity, race, obesity, and alcohol consumption.[2-5] Beyond the impact of individual characteristics on liver disease mortality, assessment of geographic variations may inform health promotion strategies, intervention programs, resource allocation, and health policies. In other disease states, geographic variations have led to impactful preventive measures. For example, description of the "Stroke Belt" in Southern states led to better understanding of demographic and health care system determinants of health with the establishment of research and clinical collaboratives aimed at reducing health disparities.[6,7] Similarly, in an analysis of geographic variations, heart-healthy policies and built environment characteristics significantly impacted cardiovascular mortality.[8] Currently, there are no prior studies describing the geographic variation in liver disease across the United States. Therefore, the aim of this study was to examine interstate geographic variability in liver disease mortality in relation to important comorbid conditions.

CLINICAL SIGNIFICANCE

- Liver disease is an important cause of morbidity and mortality in the United States. Understanding the geographic variations in liver disease mortality is essential to reducing existing health care disparities.
- There is significant interstate variability in liver disease mortality rates, with the South and Midwest carrying the highest rates of liver disease mortality.
- There is significant association between a state's liver disease mortality rate and higher proportion of Hispanic population, racial diversity, and household income.

METHODS

Data Sources

This is a cross-sectional analysis of state-specific liver disease mortality rates and factors predicted to be associated with liver disease mortality at a population level. This study was considered exempt from oversight by the University of Arizona Institutional Review Board because it did not meet the definition of research or human subject research. Age-adjusted liver disease mortality rate was derived from the National Vital Statistics in 2010.[1]

Death rates due to viral hepatitis were derived from the Centers for Disease Control and Prevention reporting of cause of death for 2010.[9] Alcohol consumption is defined as an adult reporting having at least one alcoholic drink in the last 30 days in the 2010 Behavioral Risk Factor Surveillance Survey. Obesity is defined as having a body mass index >30.0. Body mass index is calculated by dividing an adult's self-reported weight in kilograms by the square of their height in meters obtained from the 2010 Behavioral Risk Factor Surveillance System.[10]

Race and ethnicity were obtained from 2010 Census data. Data reported are weighted averages based on each state's total population. Ethnicity was broken into 2 large categories—Hispanic or non-Hispanic. Race categories include "White," "Black or African American," "American Indian or Alaska Native," "Asian," "Native Hawaiian or Other Pacific Islander," or "Some Other Race."[11] Median household income is derived from the 2010 US Census. It is the median household income for all households in the state over the past 12 months at 2010 inflation-adjusted dollars.[12]

Statistical Analysis

Age-adjusted liver disease mortality was categorized into quartiles. Each state was assigned its corresponding outcome quartile value. This quartile value was then used as an outcome variable. Raw values of each of the independent variables were obtained from the data sources previously described. Quartile cutoff values (Q1, Q2, Q3, Q4) were calculated for each variable. Mean values of each independent variable were calculated for the states, grouped into each of the liver disease mortality quartiles. Box plots of each independent variable (% viral hepatitis, % alcohol consumption, % obese, % Hispanic, and median household income) were created by the outcome variable categories (mortality quartile). Kruskal-Wallis tests tested for across-group differences. For race, the population-weighted percentage of each race category was averaged across the states within each of the 4 quartiles of liver disease mortality and compared by chi-squared test. All analyses were performed in SAS 9.4 (SAS Institute Inc., Cary, NC).

RESULTS

Interstate Variability in Liver Disease Mortality

Figure 1 and **Table 1** show significant variability in age-adjusted liver disease mortality at a state level. Age-adjusted liver disease mortality ranges from 6.4 to 17.0 per 100,000. In the northeastern United States, rates of age-adjusted liver disease mortality are the lowest in the country. New Hampshire and New York have the lowest rates in the United States (6.4 and 6.6/100,000, respectively). In contradiction to this general assumption, West Virginia's rate is in the highest quartile, with a rate of 10.7/100,000. States in the west and central southwest carry some of the highest liver disease mortality rates, with New Mexico reporting the highest liver disease mortality,

Download English Version:

https://daneshyari.com/en/article/8603749

Download Persian Version:

https://daneshyari.com/article/8603749

Daneshyari.com