

Letters

Disparities in Cardiovascular Mortality Related to Heart Failure in the United States



During the first decade of the 21st century, cardiovascular disease (CVD) mortality decreased significantly in the United States, continuing a trend since 1970. However, the rate of decline slowed dramatically in 2011 (1). Simultaneously, heart failure (HF) prevalence increased and is projected to continue to increase due to the aging population and growing prevalence of obesity and diabetes. Given significant disparities in HF prevalence, we sought to evaluate national trends in mortality attributed to HF-related CVD by sex and race.

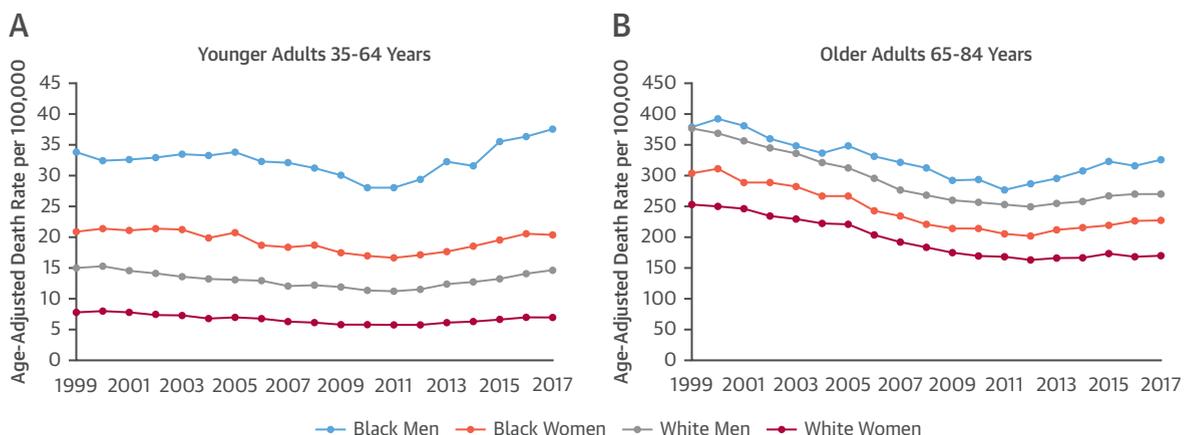
HF-related CVD mortality rates were ascertained using the multiple cause of death files from the Centers for Disease Control and Prevention’s Wide-Ranging Online Data for Epidemiologic Research, which includes the underlying and contributing cause of death from all death certificates in the United States (2). HF-related CVD deaths were identified whereby CVD (I00-I78) was listed as underlying cause

of death and HF (I50) listed as contributing cause of death among black and white adults, 35 to 84 years of age. Age-adjusted mortality rates were calculated using weighted averages with the 2000 U.S. Census as the default population.

Overall, age-adjusted rates for HF-related CVD death declined significantly from 1999 through 2012 (78.7 [95% confidence interval [CI]: 78.2 to 78.2] vs. 53.7 [95% CI: 53.3 to 54.1] per 100,000; $p < 0.05$), but subsequently increased through 2017 (59.3 [95% CI: 58.9 to 59.6] per 100,000; $p < 0.05$). Similar patterns in HF-related CVD death rates were observed between blacks and whites marked by an inflection point in 2011 to 2012 when death rates began to increase. Black men had a 1.16-fold versus 1.43-fold higher age-adjusted HF-related CVD death rate compared with white men, and black women had a 1.35-fold versus 1.54-fold higher age-adjusted HF-related CVD death rate compared with white women in 1999 versus 2017 ($p < 0.05$). These disparities were more pronounced among younger adults (35 to 64 years) compared with older adults (65 to 84 years). Age-adjusted HF-related CVD death rates were 2.60-fold and 2.97-fold higher in young black versus white men and women, respectively, in 2017 (Figure 1).

These results are consistent with recent data that found that HF-related mortality did not change

FIGURE 1 Age-Adjusted HF-Related CVD Mortality Rates in the United States, 1999 to 2017



Death rates per 100,000 are shown for younger and older adults by sex and race. CVD = cardiovascular disease; HF = heart failure.

meaningfully between 2009 and 2014 among hospitalized HF patients (3). Our results highlight a significantly higher burden of HF-related CVD mortality among young and middle-aged blacks, resulting in premature deaths and significant years of life lost before age 65 years. Prior reports from the CARDIA (Coronary Artery Risk Development in Young Adults) study identified a 20-times higher incidence of HF among black men and women compared with whites before the age of 50 years with HF diagnosis associated with higher rates of antecedent risk factors (4).

Our study has several limitations to note. Our findings are based on death certificate data, and there is the potential for misclassification of deaths due to ill-defined underlying cause of death and lack of appropriate inclusion of HF as a contributing cause of death. By contrast, increasing awareness of HF as a diagnosis may be contributing to increasing reporting of HF as a contributing cause of death. Although there is a possibility that miscoding may affect race-sex groups differently, this is unlikely to fully explain the disparities observed (5). Finally, racial differences in competing risk for non-CVD deaths (e.g., homicide, opioid overdose, and HIV) may also contribute to the observed trends in HF-related CVD death.

These data highlight the changing dynamics of CVD burden in the United States. The dramatic declines in CVD mortality achieved between the 1970s and 2010 reflected success of policy measures focused on control of blood pressure and cholesterol, as well as increased rates of smoking cessation and use of cardioprotective medications. However, the prevalence of obesity and diabetes has increased dramatically, decline in overall CVD death rates has stalled, and HF-related CVD mortality rates are rising. Given the substantial mortality burden of HF, population-wide policy measures are urgently needed to eliminate racial disparities and target individuals earlier in life for HF prevention.

Peter Glynn, MD

Donald M. Lloyd-Jones, MD, ScM

Matthew J. Feinstein, MD, MSc

Mercedes Carnethon, PhD

*Sadiya S. Khan, MD, MSc

*Division of Cardiology

Department of Medicine and Preventive Medicine
Northwestern University Feinberg School of Medicine
680 North Lake Shore Drive, 14-002
Chicago, Illinois 60611

E-mail: s-khan-1@northwestern.edu

Twitter: [@HeartDocSadiya](https://twitter.com/HeartDocSadiya)

<https://doi.org/10.1016/j.jacc.2019.02.042>

© 2019 by the American College of Cardiology Foundation. Published by Elsevier.

Please note: This study was supported by grants from the National Institutes of Health/National Heart, Lung, and Blood Institute to Dr. Khan (KL2TR001424). Research reported in this publication was supported, in part, by the National Institutes of Health's National Center for Advancing Translational Sciences, grant number KL2TR001424 (to Dr. Khan). The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. The funding sponsor did not contribute to design and conduct of the study, collection, management, analysis, or interpretation of the data or preparation, review, or approval of the manuscript. The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

REFERENCES

1. Sidney S, Quesenberry CP Jr., Jaffe MG, et al. Recent trends in cardiovascular mortality in the United States and public health goals. *JAMA Cardiol* 2016;1:594-9.
2. Centers for Disease Control and Prevention. Multiple Cause of Death, 1999-2017. December 2018. Available at: <http://wonder.cdc.gov/mcd-icd10.html>. Accessed December 18, 2018.
3. Jackson SL, Tong X, King RJ, Loustalot F, Hong Y, Ritchey M. National burden of heart failure events in the United States, 2006 to 2014. *Circ Fail* 2018;11:e004873.
4. Bibbins-Domingo K, Pletcher MJ, Lin F, et al. Racial differences in incident heart failure among young adults. *N Engl J Med* 2009;360:1179-90.
5. Snyder ML, Love SA, Sorlie PD, et al. Redistribution of heart failure as the cause of death: the Atherosclerosis Risk in Communities Study. *Popul Health Metr* 2014;12:10.

Extracorporeal Life Support in Cardiogenic Shock Complicating Acute Myocardial Infarction



Despite multimodal treatment of patients with cardiogenic shock (CS) complicating acute myocardial infarction (AMI), the outcome remains poor. Large retrospective analyses and animal models suggest that extracorporeal life support (ECLS) in CS-complicating AMI improves outcome (1). However, to date, no randomized controlled trials assessing the effectiveness of ECLS in this setting exist, and evidence levels of current guidelines in support of ECLS are low (2).

In this monocentric, open-label, randomized controlled, phase IV study, 42 patients with CS-complicating AMI were randomly assigned to ECLS (SCP, LivaNova, Munich, Germany; ECLS group, n = 21) or no mechanical circulatory support (control group, n = 21). CS was defined according to criteria derived from previous CS trials (3). All patients were expected to undergo early revascularization and to receive the best available medical therapy. The primary endpoint was left ventricular ejection fraction (LVEF) after 30 days. Main secondary endpoints included 30-day all-cause mortality and safety assessments.