Original article

Black−white difference in long-term predictive power of self-rated health on all-cause mortality in United States

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A R T I C L E   I N F O

A B S T R A C T

Purpose: Despite the well-established association between self-rated health (SRH) and mortality, limited information exists on Black−White differences in this link. Using a nationally representative sample of adults in the United States, the present study had four aims: (1) to assess whether the association between baseline SRH and all-cause mortality over a long follow-up differs for blacks and whites, (2) to test whether any race difference in the SRH−mortality link depends on how the SRH variable is treated (e.g., nominal, dichotomous, continuous), (3) to test if the SRH−mortality link or any differences in the association by race are explained by differences in objective health measures (chronic medical conditions [CMC]), and (4) to assess whether these associations vary by gender.
Methods: Data came from the Americans' Changing Lives Study, a nationally representative longitudinal cohort of U.S. adults 25 years and older with up to 25 years of follow-up. The study followed 3361 blacks or whites for all-cause mortality between 1986 and 2011. The predictor of interest was a single-item measure of SRH in 1986, treated as a nominal, dichotomous (fair/poor vs. excellent/very good/good), and continuous variable. Confounders included baseline age, education, income, depressive symptoms, and CMC. Race (black vs. white) was the focal effect modifier. We ran Cox proportional hazard models for the pooled sample and also stratified by race and gender, before and after adjusting for CMC.
Results: Regardless of how SRH was treated and for both men and women, we found significant interactions between race and SRH, indicating a stronger predictive role of SRH for all-cause mortality among whites compared to blacks. Before adjustment for chronic medical conditions, lower SRH was associated with higher risk of mortality among blacks and whites, but after adjustment, the SRH−mortality association was no longer significant among blacks.
Conclusions: Baseline SRH continues to predict long-term mortality among white but not black Americans after adjustment for chronic medical conditions at baseline, and these patterns are similar for men and women. Future research should test whether the differential predictive validity of SRH across race groups arises because SRH reflects different aspects of health of black and white Americans.

Use of single-item self-rated health (SRH) measures has a long history, going back to community surveys in the 1950s, such as a U.S. study of occupational retirement [1] and the U.S. Federal Civil Defense Administration Survey [2]. Such single-item measures are brief and efficient tools for estimating the overall health of individuals, groups, and populations in community and clinical settings [3,4]. Owing to feasibility [5] and low cost [6], SRH has been widely applied in national surveys in most countries [6,7]. In the United States, the Institute of Medicine (IOM) has recommended use of single-item SRH measures to monitor population health [8,9].

Existing studies have shown SRH to be strongly correlated with a wide range of health outcomes including health care use [6,10], quality of life [11], physical health [12], medical conditions [13], morbidity [14], and mortality[8]. The SRH−mortality link has been supported by considerable evidence suggesting that the association

exists across populations, geographic regions, and study follow-up durations [8,15–19]. Individuals who perceive their health to be poor have two to seven times higher risk of mortality compared to those who perceive themselves to be in excellent health, after adjustment for objective health measures [5,6,15–18,20]. The magnitude of the SRH–mortality association has been generally regarded as evidence that SRH is a valid tool for monitoring population health [21,22].

Despite the well-established link between the SRH and mortality, there is some evidence suggesting that the reliability and validity of SRH may depend on social factors such as social class [23,24], gender [25–27], and ethnicity [28–32]. Some studies report a weaker association between SRH and mortality among those of higher social class [23], whereas others find a similar association between SRH and mortality across all socioeconomic groups [33], but most studies have shown that the SRH–mortality link is weaker among individuals with lower social class [34–36]. However, it is not yet clear whether blacks and whites differ in the magnitude of the relationship between SRH and mortality overall [18,28], or furthermore, if any such difference varies depending on the way SRH is measured, whether racial differences in objective health status are addressed, and/or whether any of these findings depend on an individual's gender.

Among studies that have compared the predictive power of SRH on mortality across ethnic groups [18,21], a subset have compared blacks and whites. McGee showed that in an ethnically diverse sample, fair and/or poor SRH was associated with at least a two-fold increased risk of mortality for all racial and/or ethnic groups [18]. There are, however, studies suggesting black–white differences in the predictive power of SRH for all-cause mortality [24,32,34].

However, we still do not know whether baseline SRH similarly predicts mortality of whites and blacks over a very long follow-up. We also push the literature forward in three additional ways. First, we explore the nature of the association between SRH and mortality more explicitly. Although most studies of the SRH–mortality link have used a dichotomous specification, SRH could have gradient, threshold, or other nonlinear associations with the risk of all-cause mortality [8,15,16]. Some studies have shown that each incremental decline from excellent to poor baseline SRH increases subsequent mortality risk, indicative of a dose-response pattern of association [8,15,16]. We explore the possibility that gradient, threshold, and/or nonlinear associations are present, and whether the choice of specifications matters for capturing potential black–white differences in the association. Second, we consider the possibility that racial differences in the burden of health conditions may influence the long-term predictive power of SRH for mortality. Finally, we consider whether gender acts as a further moderator of all these associations. Some prior studies have found that SRH is a stronger predictor in men than in women, possibly due to the greater influence of non–life threatening conditions on SRH reports of women [27]. However, in a 6-year study of survival among the 1209 African-American respondents in the Longitudinal Study on Aging, after adjustment for all three objective health measures, SRH was an independent predictor of mortality for women, but not for men [37]. However, this study was not designed to explore whether gender differences in the association might vary by race.

In sum, although there is some evidence suggesting lower validity of SRH as a predictor of mortality among minorities and blacks in the United States [21], and those of lower socioeconomic status [23], we know relatively little about black-white differences in the predictive role of SRH. We conducted the present study with four aims: to (1) assess whether the association between SRH and all-cause mortality over a long follow-up differs for blacks and whites, (2) test whether race differences in the SRH–mortality link depend on how the SRH is treated (e.g., nominal, dichotomous, continuous), (3) test if the SRH–mortality link or any differences in the association by race are explained by differences in objective health measures (chronic medical conditions [CMC]), and (4) assess whether these associations vary by gender.

Methods

Design and setting

The Americans' Changing Lives (ACL), 1986–2011 is a nationally representative U.S. study of U.S. adults 25 years old and older [38]. More information on the sampling and data collection has been published elsewhere [39,40].

Sampling and participants

The ACL used a stratified multistage probability sample of noninstitutionalized U.S. adults and oversampled older adults (age > 60) and blacks. The study enrolled 3617 adults who were 25 years or older and were living in the continental United States in 1986 (representing 70% of sampled households and 68% of sample individuals at baseline). Current analysis is limited to non-Hispanic whites and blacks (analytic $n = 3361$, composed of 2205 whites and 1156 blacks).

Process

Data were collected via face to face interviews. Death certificates and National Death Index (NDI) information were used to assess date of death (discussed below).

Measures

Sociodemographics

Demographic characteristics included gender (male as the referent category) and age (a continuous variable). Socioeconomic characteristics included educational attainment (years of schooling) and an 11 category measure of the income of the respondent (and spouse if present), used here as a continuous variable, both collected in 1986. Race was the moderator, defined as black versus white (with white respondents as the referent category).

Race

ACL collected data on participant's race at baseline in 1986 with multiple survey items. Participants were asked about Hispanic origin, gave an open-ended response to the question, "In addition to being American, what do you think of as your ethnic background or origins?" and then were asked: "Are you white, black, American Indian, Asian, or another race?" and allowed to answer with multiple categories. Individuals who responded with more than one nonwhite group were asked to identify which "best described" their race. ACL also assessed the state or foreign country of birth. Together, these items were used to construct race categories of "Non-Hispanic white", "Non-Hispanic black", "Non-Hispanic Native American", "Non-Hispanic Asian", and "Hispanic". We only include non-Hispanic whites and non-Hispanic blacks in this study.

Depressive symptoms

Depressive symptoms were measured with an 11-item version of the Center for Epidemiological Studies-Depression scale (CES-D) [41]. CES-D items measure the extent to which respondents felt