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Perceived Discrimination and Mortality in a Population-based Study of Older Adults

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Abstract

Objectives—Increasing evidence indicates that discrimination may be a risk factor for poor health, but few studies have focused on established clinical outcomes.

Methods—We examined perceived discrimination and mortality in a population-based study of over 4000 older adults, who underwent up to two interviews during 4.5 years. Discrimination was measured at baseline with a 9-item measure.

Results—During follow-up 1,166 deaths occurred. Persons reporting more perceived discrimination had a higher relative risk of death (Hazard Ratio (HR) = 1.05; 95% confidence interval: 1.01, 1.09). This association was independent of differences in negative affect or chronic illness, and appeared to be stronger in whites than blacks (HR for whites = 1.12; 95% CI: 1.04, 1.20; HR for blacks = 1.03; 95% CI: 0.99, 1.07). Secondary analyses revealed that the relation to mortality was related to discriminatory experiences of a more demeaning nature, and that racial differences were no longer significant when the sample was restricted to respondents interviewed by someone of the same race.

Conclusion—This study adds to a growing literature documenting discrimination as an important social determinant of health.

There is growing interest in the adverse health effects of discrimination (for reviews, see (1; 2). Although the mechanisms are not clear, hypotheses include restricted access to socioeconomic resources, poor health behaviors, and increased stress responses (3-7). The empiric evidence for the health consequences of discrimination is mixed, which may be due, in part, to the variation in the conceptualization and measurement of discrimination across studies, the different study methodologies and populations, and the broad variety of outcomes that have been considered (1;2). Overall, however, it appears that the results have generally been stronger for mental health than for physical health outcomes.

Only a few studies have focused on well-established clinical outcomes, in particular hypertension. Although some studies have reported that discrimination increases risk for hypertension (8;9), others have failed to find evidence for such an association (10;11).

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Discrimination has also been linked with subclinical cardiovascular disease, in particular, carotid intima-media thickness (12) and coronary artery calcification (13).

The purpose of this study is to examine perceived discrimination in relation to all-cause mortality for two reasons. First, this endpoint has rarely been considered in relation to discrimination (14;15). Second, mortality serves as the common endpoint of many chronic disease processes that affect adult populations. Because the negative health effects of discrimination are thought to be non-specific, that is, they are not restricted to a particular disease process; this endpoint may be particularly suitable to capture much of the spectrum of adverse outcomes due to this risk factor.

Racism, racial discrimination, and perceived discrimination have been used interchangeably in the research literature. We focus on perceived discrimination, defined as the subjective experience of common forms of unfair treatment (16), and its relation to mortality in a population-based study of older blacks and whites. Because the weight of the current evidence shows that discrimination is associated with poorer health among minorities, we hypothesize that perceived discrimination is related to an increased risk for mortality, and that this risk is stronger for blacks than for whites.

Methods

Participants are from an ongoing, population-based longitudinal study of risk factors for Alzheimer's disease and other common conditions of aging. The study has the advantages of having large numbers of non-Hispanic blacks and whites living in a single geographically defined area and a broad representation in socioeconomic status (SES) in both blacks and whites.

Details of the cohort and study design have been described previously. Briefly, staff conducted a complete census of all of the households of a geographically defined community in an urban city, and residents age 65 and older were asked to participate. Of the 7,813 eligible residents, 6,158 were enrolled for an in-home, face-to-face baseline interview, for an overall participation rate of 78.9% (blacks, 81.4%; whites, 75.1%). Interviews were conducted face-to-face at the participant's home with baseline interviews occurring 1993 to 1997, and three follow-up interviews conducted to date at approximate 3-year intervals. Questions on perceived discrimination were added to the second (first follow-up) interview, which therefore serves as baseline for these analyses.

Perceived Discrimination

Perceived discrimination was assessed with a previously established nine-item measure (16). The scale assesses the subjective experience of being treated unfairly without reference to racism, discrimination, prejudice, or to any demographic characteristics such as race, gender, or age. Respondents indicated how often they experienced a series of nine instances of maltreatment. The frequency of each experience was rated on a four-point scale (3=often, 2=sometimes, 1=rarely, and 0=never). Following previous work with this measure (11;17), we recoded the responses to a binary format (often or sometimes=1, rarely or never=0) and then summed across items to get the total score (range 0 to 9), with higher scores indicating more discrimination.

The results of a previous factor analysis of the 9-item scale produced 2 factors (18). The first factor, consisting of four items, was called “unfair treatment” and represented a generic perception of rudeness (e.g., you are treated with less courtesy than other people). The other factor was called “personal rejection” because the items represented a more overt form of

demeaning character insults (e.g., you are threatened or harassed). We created summary measures of unfair treatment and personal rejection using the same method as described above.

Control Variables and Mortality

Other variables include age (based on date of birth), sex, race (non-Hispanic black or non-Hispanic white), and SES. A composite measure of lifetime SES was constructed based on four components of SES that characterize different stages of the life course, as previously described (19). Briefly, the four components included 1) a measure of childhood SES and was based on parents' years of education, father's occupational prestige score, and financial status during childhood (20), 2) the participant's level of education, 3) occupational status at age 30, and 4) current income. We then calculated z-scores for each of the four components and computed the average of the nonmissing values of each component.

We considered two additional control variables, depressive symptoms and overall physical health status. Both variables have been found to be predictive of mortality in older adults (21-23), and to vary by race (24-26), and may be either potential confounders of the relation between perceived discrimination to mortality or lie in the causal chain between discrimination and mortality. Data on depressive symptoms and medical conditions were derived from the same (first follow-up) interview as the perceived discrimination data. Depressive symptoms were assessed with a 10-item short form (27) of the Center for Epidemiological Studies Depression scale (CES-D; (28), a self-report measure of current depressive symptoms, designed for use in community-based studies. The score was the number of symptoms experienced in the past week. Seven chronic medical conditions were reported by at least 5% of the population at baseline: heart disease, stroke, hypertension, diabetes, cancer, thyroid disease, and herpes zoster. We used the number of these conditions as an indicator of overall physical health, as previously described (29). Information on vital status was obtained at each follow-up interview and all reported deaths through December 31, 2003 were verified through the National Death Index.

Data Analysis

We used survival models to analyze time to death as a function of perceived discrimination and other covariates. Time-to-death data were modeled using Cox proportional hazards models (30). In the primary analysis, we tested the relation of perceived discrimination on risk of mortality after adjustment for age, sex, race, and lifetime SES. This model also included a term for the interaction of race and age to allow for the commonly observed attenuation of racial differences in mortality at older ages (e.g., (31;32). In a subsequent model, we added a term for the race by perceived discrimination interaction to test whether the relation of discrimination to mortality differed for blacks and whites.

We also conducted a series of secondary analyses. First, we explored potential bias in the relation between perceived discrimination and mortality due to interviewer influence on discrimination responses. In a previous analysis, we found that participants reported significantly higher levels of perceived discrimination when paired with an interviewer of the same race (18). We therefore repeated the primary analysis after restricting the sample to respondents interviewed by someone of the same race. Next, we added CES-D and number of chronic medical conditions to the primary model as potential confounders of the association between perceived discrimination and mortality. Finally, we examined the relation of the two discrimination subscales, unfair treatment and personal rejection, to mortality after adjustment for demographics. Additional models tested whether the relation of the subscales to mortality differed for blacks and whites by adding terms for the interaction of each subscale and race, and whether the results changed after restricting the sample to the race-matched subset. All

analyses were programmed in SAS software (33). Model assumptions were evaluated graphically and analytically and judged to be adequately met (34).

Results

Of the original 6,102 non-Hispanic black or white participants, 4,282 participated (86.9% of survivors) in the first follow-up interview. Of these, 128 were excluded due to missing data on perceived discrimination (114 persons) or dates of death (14 persons), leaving a total of 4,154 persons (61.8% women, 61.8 % black). The mean age of the sample was 77.14 years (SD=6.34). On average, Blacks were younger than Whites (Blacks=76.2 years SD=5.9; Whites=78.7 years SD=6.7; p<.001), and had a lower z-score on the lifetime measure of SES (−0.23 vs. 0.52; p<. 001). There were no differences in chronic health conditions between the two groups, but Blacks reported more perceived discrimination and more depressive symptoms than Whites (both p's < .001).

Relation between Perceived Discrimination and Mortality

There were 1,168 deaths during a mean of 4.8 (SD=1.8) years. Table 1 shows the distribution of key characteristics of those who died during follow-up compared to those who lived. On average, the deceased had higher perceived discrimination scores at baseline compared with survivors (mean = 1.13 vs. 0.99, $p < .01$).

After adjustment for age, sex, race and lifetime SES, perceived discrimination was significantly associated with mortality risk (Hazard Ratio [HR] = 1.05; 95 % confidence interval [CI]: 1.01 − 1.09), with each additional point on the discrimination scale conferring an approximately 5% increase in risk of death (see Table 2, Full Cohort, Model 1). To illustrate the magnitude of this effect, we calculated the cumulative hazard of death during the 5-year period for persons with discrimination scores at the 50^{th} and 95^{th} percentiles using the results of Model 1 shown in Table 2 (Full Cohort). As shown in Figure 1, those who scored at the 95^{th} percentile (dotted line) had about a 21% increased risk of death compared with those who scored at the 50^{th} percentile (solid line) after adjustment for age, sex, race, and lifetime SES.

The next model revealed that discrimination appeared to be related differently to mortality among blacks and whites. Contrary to our expectation, the relation was stronger among whites than blacks (Table 2, Full Cohort, Model 2). Among whites, each additional point on the discrimination scale was related to a 12% increase in mortality risk (HR = 1.12; 95% CI: 1.04 − 1.20). Among blacks, each additional point on the discrimination scale was related to only a 3% increase in risk of death that was of borderline significance (HR = 1.03; 95% CI: 0.99 − 1.07).

Interviewers were of the same race for 3,070 (74%) of the 4,154 participants. In this subset the increase in mortality due to perceived discrimination remained significant (HR = 1.07; 95% CI: 1.03−1.12; Table 2, Race-Matched Cohort, Model 1). However, when the interaction between race and perceived discrimination was added, the term for the interaction was no longer significant (Table 2, Race-Matched Cohort, Model 2), indicating that the relation between discrimination and mortality did not differ significantly between blacks and whites in this subset.

The overall association between perceived discrimination and mortality remained unchanged after adjustment for number of medical conditions (HR = 1.04, 95% CI: 1.01, 1.08). Adjustment for depressive symptoms lead to a slight decrease in the mortality risk due to discrimination (HR = 1.07, 95% confidence interval: 0.99, 1.15). Furthermore, the differential effect of perceived discrimination by race was no longer significant ($p = 0.11$ and $p = 0.13$, respectively) in either model (data not shown).

Unfair Treatment, Personal Rejection, and Mortality

We found a nonsignificant increase in mortality risk related to unfair treatment (HR = 1.05, CI: 0.99, 1.11), and no differential effect of unfair treatment by race (Table 3, Models 1 and 2). In contrast, personal rejection was associated with a significantly increased risk of mortality (HR = 1.12, 95% CI: 1.05, 1.20). In a separate model that included an interaction term for race and personal rejection, the relation of personal rejection to mortality was found to differ significantly by race (Table 3, Model 2). Taking the interaction term into account revealed a stronger relation among whites than blacks (White HR = 1.29, 95% CI: 1.12, 1.48; Black HR = 1.09, 95% CI: 1.01, 1.17).

In secondary analyses restricted to the subset matched by race to the interviewer, both unfair treatment and personal rejection were significantly related to increased risk of mortality (Unfair treatment HR = 1.09, 95% CI: 1.02, 1.16; Personal rejection HR = 1.16, 95% CI: 1.07, 1.25). In subsequent models, these effects did not vary by race (Table 3, Models 3 and 4).

Discussion

Our findings suggest that perceived discrimination is associated with increased mortality risk in community-dwelling older adults. The magnitude of this effect amounts to about a 21% increase in risk in the 95^{th} versus the 50^{th} percentile of the perceived discrimination measure. The association was independent of differences in SES, negative affect, or chronic illnesses. Contrary to our expectation, the association between discrimination and mortality appeared stronger in whites than blacks, even though blacks reported twice as many instances of perceived discrimination. Experiences of a more demeaning nature, such as those related to personal rejection, appeared to be related to mortality, as opposed to more generic perceptions of rudeness.

These results add to a growing understanding of the potentially harmful effects of perceived discrimination for physical health and well-being. Previous studies suggest that perceived discrimination is associated with physical and mental health (12;13;16;35-37), although negative findings have also been reported (10;11;38). Few studies have focused on clinical outcomes (11-13), and only one published prospective study has investigated mortality in relation to discrimination. Among African Americans exposed to perceived racism, respondents with a system-blaming orientation had a higher survival rate than those with a self-blaming orientation (15). The present study is the first prospective study of which we are aware that compares the relation of perceived discrimination to mortality among blacks and whites.

Our data suggest that discrimination may have a more adverse effect on survival among older whites than blacks. Although this difference is contrary to our prior hypothesis, a similarly harmful effect due to perceived discrimination among whites but not blacks has been noted previously for psychological distress and well-being (39;40). Among older whites, perceived discrimination may reflect relatively new experiences of maltreatment associated with ageism (41). Such perceptions may have an adverse effect on psychological mood states, which may increase mortality risk (42;43). In our own data, perceived discrimination was strongly correlated with depressive symptoms (18), and adjustment for these symptoms appeared to slightly reduce the relation of discrimination to mortality, suggesting that a part of this relation may be mediated by depressive symptoms. Among older blacks, on the other hand, experiences with maltreatment may be more normative, with maltreatment likely to have been much more common throughout life. Older blacks may therefore have developed strategies of coping and adaptation (44-46), that enable them to more effectively offset the harmful effects due to discrimination, even if they face more instances of maltreatment than older whites. We did not assess coping orientation or particular cognitive styles that may influence the interpretation of

perceived negative treatment or the personality characteristics associated with these perceptions.

There are two reasons why the unexpected greater adverse effect among whites may be an artifact of our data. First to administer the assessment of perceived discrimination uniformly among blacks and whites, we did not pair instances of maltreatment with attributions about the source of maltreatment, such as race or skin color. Although we controlled for other individual characteristics typically associated with discrimination, such as sex and age, it is possible that a more specific measure for racism-based discrimination would have shown greater adverse effects among older blacks. In addition, racism or discrimination may exist at three broad levels: individual (experienced on a personal level), institutional (embedded in the policies of a given institution), and cultural (arising from cultural practices at a group level) (47). The measure we used focused only on individual-level discrimination. Information on other forms of discrimination may have provided a more complete picture of experiences of discrimination that have deleterious health effects in the black population.

Second, our data suggest that the results of the primary analysis may have been affected by interviewer-participant mismatches by race. Previous research has shown that responses to sensitive survey questions may be influenced by the degree of correspondence between respondents and interviewers on key demographic characteristics, particularly race and gender (48-50). In a previous analysis of data from this cohort, older blacks reported significantly higher levels of perceived discrimination when matched to a black interviewer than to a white interviewer (18). In this study, restricting the analysis to race-matched interviewers reduced the differential effect by race to a non-significant level, suggesting that there is no racial difference in mortality risk due to perceived discrimination, and that humiliating experiences are equally toxic for both groups. Overall, we are inclined to give greater credence to the results of the race-matched analysis given the sensitive nature of discrimination-related questions and the clear interviewer effects in the responses. Yet we recognize that this was a secondary analysis which should be interpreted with more caution than the primary analysis.

Analyses in the full sample suggested that personal rejection had a particularly adverse effect on mortality. The scale items that reflect personal rejection include demeaning experiences of judgment and criticism that undermine one's character or more overt acts of passive violence (e.g., called names or threatened). In contrast, the scale items that measured unfair treatment captured more generic perceptions of rudeness or discourteousness (18). These results are consistent with a previous study with this cohort, in which personal rejection had a stronger association with depressive symptoms than unfair treatment and suggest that more overt indicators of maltreatment are related to the pathway by which perceived discrimination affects adverse health outcomes, in this case mortality.

This study has several limitations. First, as stated previously, our measure of perceived discrimination did not assess the perceived reason for discrimination (e.g., race, age, sex, etc.). However, this limitation is offset, at least in part, by our multivariate analysis in which we controlled for characteristics typically related to discrimination, in particular, age, sex, and SES. Second, we examined the relation between discrimination and mortality in adults over the age of 68 years. Psychosocial predictors tend to be less strongly associated with mortality in older adults, possibly because other factors have a stronger influence on mortality patterns, such as poor health and other common conditions of aging. Third, we did not assess the cause of mortality. It is possible that stronger racial differences may have emerged for vascular related causes of mortality. Finally, our follow-up time was a little less than five years. A longer follow-up interval would have produced more deaths and may have resulted in a stronger association between discrimination and mortality.

In summary, perceived discrimination was associated with an increased risk of mortality in a prospective population-based study of older adults. Contrary to our expectations, we did not find the relationship to be stronger in blacks. Further, the association seemed to be related to discriminatory experiences of a more demeaning nature. The results support the idea that perceived discrimination has an adverse influence on health. Although older blacks experience higher levels of discrimination than whites, it is possible that discrimination among blacks in this age group may have lost some of its potency.

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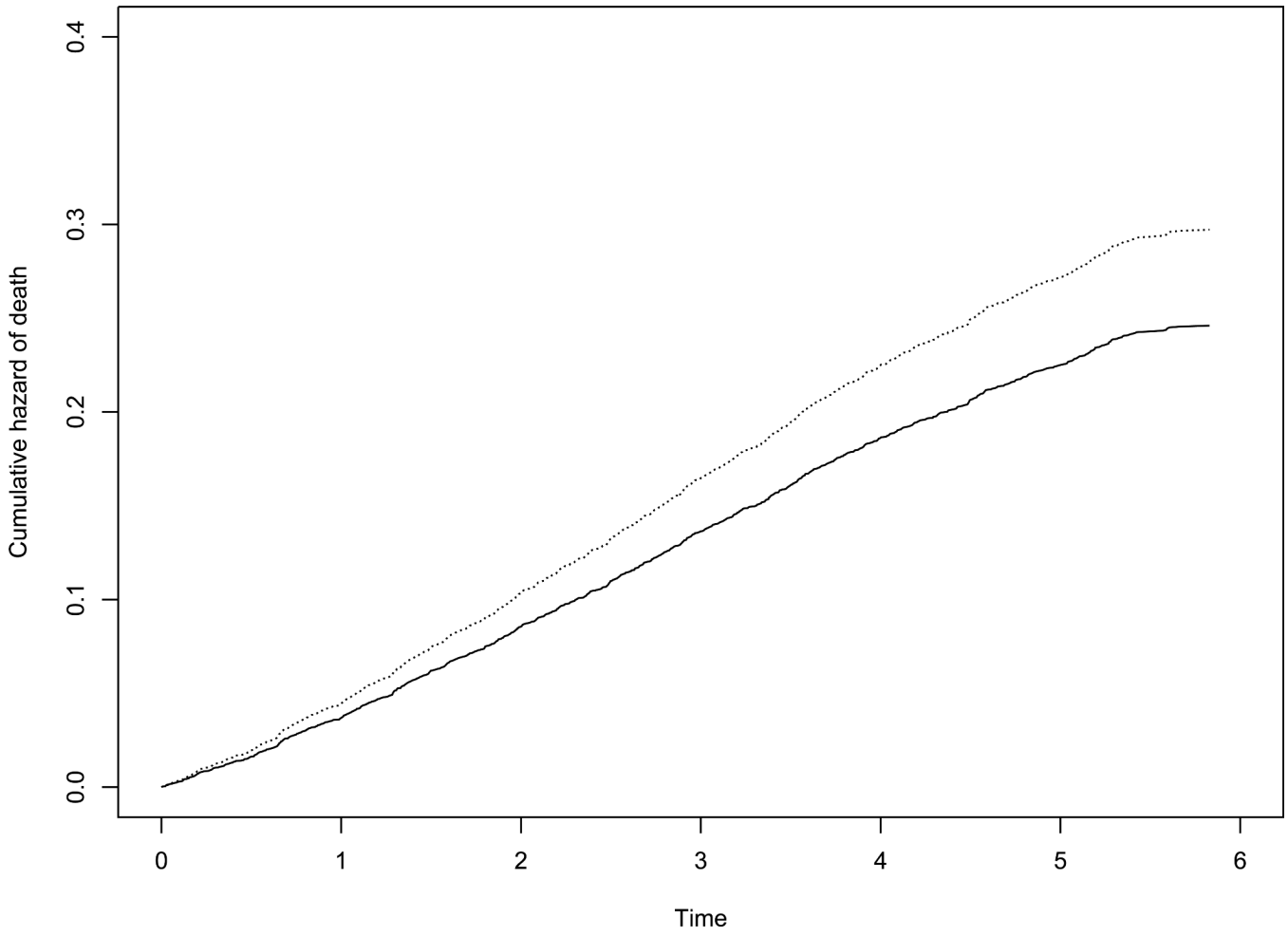

Figure Caption.
Cumulative hazard of death in typical participants with high (95th percentile, dotted line) and low (50th percentile, solid line) levels of perceived discrimination, adjusted for age, sex, race, and lifetime SES.

Table 1

Characteristics of those who died compared to those who did not die during follow-up.

Average Characteristics	**Dead (N = 1168)**	**Alive (N = 2986)**
Mean age in years (SD)	80.2 (7.34)	76.0 (5.45)
Sex (%)		
Female	26.3	73.7
Male	31.0	69.0
Race (%)		
Black	26.6	73.4
White	30.5	69.5
Lifetime SES	−0.04 (.76)	0.09 (.76)
Mean score CES-D[a] (SD)	2.31(2.34)	1.58 (2.02)
Mean no. medical conditions	1.22 (1.04)	0.99 (0.93)
Perceived discrimination	1.13 (1.72)	0.99 (1.58)

[a]CES-D = Center for Epidemiologic Studies Depression Scale – Short Form

Table 2

Relative risk of mortality associated with perceived discrimination

Variable	Full Cohort (N = 4101)	
	Model 1	**Model 2**
Discrimination score (range = 0 − 9)	1.05 (1.01, 1.09)	1.12 (1.04, 1.20)
Discrimination × Black		0.92 (0.85, 0.99)
	Race-Matched Cohort (N=3070)	
	Model 1	Model 2
Discrimination (range = 0 −9)	1.07 (1.03, 1.12)	1.11 (1.03, 1.20)
Discrimination × Black		0.95 (0.87, 1.04)

Hazard ratios and 95% confidence interval; Hazard ratios are estimated from separate models adjusted for age, sex, race, race*age, and lifetime SES.

Table 3

Relative risk of mortality associated with unfair treatment and personal rejection

Variable	Unfair Treatment		Personal Rejection	
	Full Cohort (N = 4098)		Full Cohort (N = 4099)	
	Model 1	Model 2	Model 1	Model 2
Discrimination score (range = 0 − 4)	1.05 (0.99, 1.11)	1.12 (1.00, 1.24)	1.12 (1.05, 1.20)	1.29 (1.12, 1.48)
Discrimination × Black		0.92 (0.81, 1.04)		0.84 (0.72, 0.99)
	Race-Matched Cohort (N = 3069)		Race-Matched Cohort (N = 3068)	
	Model 1	Model 2	Model 1	Model 2
Discrimination score (range = 0 − 5)	1.09 (1.02, 1.16)	1.14 (1.02, 1.28)	1.16 (1.07, 1.25)	1.22 (1.04, 1.43)
Discrimination × Black		0.94 (0.82, 1.07)		0.93 (0.78, 1.12)

Hazard ratios and 95% confidence interval; Hazard ratios are estimated from separate models adjusted for age, sex, race, race*age, and lifetime SES.