Discrimination, Symptoms of Depression, and Self-Rated Health Among African American Women in Detroit: Results From a Longitudinal Analysis

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Objectives. Our understanding of the relationships between perceived discrimination and health was limited by the cross-sectional design of most previous studies. We examined the longitudinal association of self-reported everyday discrimination with depressive symptoms and self-rated general health.

Methods. Data came from 2 waves (1996 and 2001) of the Eastside Village Health Worker Partnership survey, a community-based participatory survey of African American women living on Detroit's east side (n = 343). We use longitudinal models to test the hypothesis that a change in everyday discrimination over time is associated with a change in self-reported symptoms of depression (positive) and on self-reported general health status (negative).

Results. We found that a change over time in discrimination was significantly associated with a change over time in depressive symptoms (positive) (b = 0.125; $P < .001$) and self-rated general health (negative) (b = –0.163; $P < .05$) independent of age, education, or income.

Conclusions. The results reported here are consistent with the hypothesis that everyday encounters with discrimination are causally associated with poor mental and physical health outcomes. In this sample of African American women, this association holds above and beyond the effects of income and education. (*Am J Public Health.* 2006;96:1265–1270. doi:10.2105/AJPH.2005.064543)

A growing body of evidence from population-based studies indicates that the experience of everyday discrimination is associated with multiple indicators of poorer physical and mental health status.[1–10] This evidence is especially clear for mental health status, as self-reported everyday discrimination is consistently associated with poorer mental health across multiple racial or ethnic groups (Whites, Latinos, African Americans) and for both women and men. Evidence for the relationship between discrimination and physical health is more complex. Some studies find a negative effect of discrimination on physical health, some find an effect only under certain conditions, and some find no effect.[1] There is evidence suggesting that everyday experiences of discrimination may contribute to persistent racial inequalities in health, above and beyond that associated with institutional forms of racism such as race-based segregation.[7,10]

Yet the understanding of the relationship between perceived discrimination and health remains limited by shortcomings of research design and measurement. In their recent literature review, Williams et al. noted that "we do not know the extent to which exposure to perceived discrimination leads to increased risk of disease, the conditions under which this might occur, or the mechanisms and processes that might be involved."[1(p202)] In part, this uncertainty stems from the fact that previous studies of discrimination and health are overwhelmingly cross-sectional in design. In this article, we address this limitation by examining longitudinal relationships between self-reported everyday discrimination and health among African American women in Detroit, Mich.

Previous studies provided limited but suggestive evidence that perceived discrimination may be associated with poorer health status over time. Brown and colleagues analyzed 2 waves of data from the National Survey of Black Americans (NSBA) and found that baseline racial discrimination was associated with subsequent poor mental health.[3] They also reported that baseline mental health status was not associated with subsequent reports of racial discrimination. This finding suggests that the cross-sectional association between discrimination and health reflects more than a tendency for people with poorer mental health to perceive themselves as having been treated unfairly.

A separate analysis of NSBA data found that perceived discrimination was associated with poorer mental health and, weakly and surprisingly, with better physical health over a 13-year period. Significantly, these patterns varied with both the measure of health and the measure of discrimination that was used.[4] Both NSBA studies used a single-item measure of perceived discrimination that assessed whether individuals or their families had been treated badly in the past month. Jackson et al.[4] also used a second single-item measure that asked respondents to select from 3 choices: "Whites want to keep Blacks down."; "Whites want to see Blacks get a better break."; or "Whites just don't care one way or the other about Blacks."

We used longitudinal data from a survey of African American women residing in Detroit to examine the relationships between a change over time in experiences of perceived discrimination and change over time in symptoms of depression and general self-reported health. Our measure of perceived discrimination was a 5-item scale assessing everyday discrimination.[9] Our health outcome measures were the short-form Center for Epidemiologic Studies Depression Scale (CES-D) to assess symptoms of depression,[11] and a single-item indicator assessing general self-reported health status.[12] Previous analyses from the first wave of this study demonstrated that perceived discrimination is associated with poorer health cross-sectionally in this sample.[7,13] We used change or conditional models to test the hypothesis that a change over time

in discrimination is associated with a change over time in self-reported symptoms of depression (positive) and in self-reported general health status (negative).

METHODS

Sample

Data for this study were drawn from the Eastside Village Health Worker Partnership survey conducted with women aged 18 and older living in Detroit. The first wave of the study was conducted in 1996 (n=700), and follow-up interviews were conducted with the women who were still residing in Detroit in 2001 (n=365). This community survey was conducted by the Eastside Village Health Worker Partnership under the auspices of the Detroit Community-Academic Urban Research Center, with funding from the Centers for Disease Control and Prevention.

The Eastside Village Health Worker Partnership is a community-based participatory research partnership that uses a lay health adviser approach to understand and intervene to address stressful life conditions and health protective factors for women and children on Detroit's east side.[14,15]

The Village Health Worker Partnership survey (hereafter referred to as "the survey") was conducted in a geographically defined area on the east side of Detroit, which is highly segregated by race (97% African American) and where 37% of all families and 65% of female-headed families with children live below the poverty line.[16,17] The first wave of the data collection used a 2-stage random sampling process. Households were randomly selected from a listing of all households in the defined area. If more than 1 woman in a selected household met the eligibility criteria (women aged 18 years or older with responsibility for the care of children younger than 18 years), respondents were randomly selected from the eligible members within the household. The response rate for the first wave of the survey was 81%, with 97% of respondents self-reporting their race/ethnicity as African American (n=679).

In 2001, we attempted to interview all 456 respondents who were still living in Detroit, and completed interviews with 80% of those who remained in the respondent pool (n=365). The analyses reported in this paper are restricted to African American respondents who had no missing data for the study variables and who participated in both waves of data collection (n=343).

Measures

Dependent variables included a single-item indicator of general self-reported health status that has been shown to be a reliable predictor of future population mortality[12]: "In general, would you say your health is: excellent, very good, good, fair, or poor?" with response categories ranging from 1=poor to 5=excellent. Our second dependent variable was the short-form CES-D scale,[11] a sum of 11 items assessing symptoms associated with depression, such as "I felt depressed." and "I felt that everything I did was an effort." with response categories ranging from 1=never to 5=always (Cronbach α: 1996=0.83; 2001=0.82).

The independent variables were: age in years, education (1=<high-school graduation, 2=high-school graduation, 3=some college, 4=college graduate), and total family income (0=<$10,000 and 1=≥$10,000).

Everyday perceived discrimination was measured as the mean of 5 items that assessed the frequency of experiences of perceived discrimination in the previous 12 months. Two representative scale items are: "How often have you been treated with less courtesy than others?" and "How often have other people acted as if they were better than you?"[9] Response categories ranged from 1=never to 5=very often (Cronbach α: 1996 =0.82; 2001=0.82), with a dichotomous version of this scale used for these analyses (0=never and 1=ever) because of the distribution of responses.

Data Analysis

We tested the longitudinal relationships between discrimination and symptoms of depression and general self-reported health status using longitudinal models that include baseline indicators of everyday discrimination and CES-D or general self-reported health and a change score for everyday discrimination as independent variables. In this model, the dependent variable is modeled as a function of the response at an earlier time (i.e., lagged), and covariates at that earlier time. This approach examines the effects of a change in everyday discrimination on a change in symptoms of depression (*model a*) and general self-reported health status (*model b*) from one time to another. The equations for these models are:

$$(1)\quad [\text{CES-D}_2 - \text{CES-D}_1] = \alpha + \text{age}_1 + \text{education}_1 + \text{income}_1 + \text{discrimination}_1 + [\text{discrimination}_2 - \text{discrimination}_1] + \text{CES-D}_1 + \varepsilon \text{ (a)}$$

$$(2)\quad [\text{GH}_2 - \text{GH}_1]_j = \alpha + \text{age}_1 + \text{education}_1 + \text{income}_1 + \text{discrimination}_1 + [\text{discrimination}_2 - \text{discrimination}_1] + \text{GH}_1 + \varepsilon \text{ (b)}$$

In these models, each individual acts as its own control. The coefficient for discrimination at baseline (discrimination_1) is interpreted as the cross-sectional effect of discrimination at baseline on a change in the symptoms of depression (*model a*) or general health (*model b*). The coefficient for the change in discrimination over time [$\text{discrimination}_2 - \text{discrimination}_1$] is interpreted as the effect of a change in discrimination over time on a change in the health indicator of interest over time.[18,19]

RESULTS

Descriptive statistics for the main study variables are shown in Table 1. Two comparisons are relevant: (1) the longitudinal study sample at T_1 (1996) with those lost to attrition after the 1996 survey, and (2) the longitudinal sample at both waves of data collection. Table 1 shows mean age, everyday discrimination, symptoms of depression, self-reported general health status, percent who had completed high school or higher levels of education, and percent with incomes greater than or equal to $10 000 per year for women who completed the survey in 1996 but not in 2001, and for those who completed both waves of the survey. Age is the only variable that differs significantly in 1996 between those who completed the survey only in 1996 (mean=36.78 years) and those who completed both waves of the survey (mean=40.71 years).

There was no difference in the percent of respondents who had completed high school between those lost to attrition and those

TABLE 1—Age, Education, Income, Everyday Discrimination, Depressive Symptoms, and General Self-Reported Health Status for Those Who Completed Only the First Wave of the Survey (1996) and Longitudinal Participants (1996 and 2001) in the Eastside Village Health Worker Partnership Survey (n = 343), Detroit, Mich.

	1996-Only Respondents (n = 330)	Longitudinal Sample (n = 343)	
	1996	1996	2001
Mean age, years (SD)	36.78* (15.54)	40.71 (16.16)	46.61** (16.15)
Education: ≥ high school graduation, %	68.5	68.4	68.4
Income: ≥ $10 000, %	69.7	69.8	69.8
Everyday discrimination,[a] mean (SD)	2.36 (0.77)	2.25 (0.80)	2.07** (0.81)
Depressive symptoms,[b] mean (SD)	1.51 (0.38)	1.48 (0.39)	1.51 (0.39)
Self-rated general health,[c] mean (SD)	3.28 (1.03)	3.31 (1.04)	3.07** (1.11)

Note. Significance value reported for 1996-only respondents indicate difference between them and the longitudinal sample in 1996. Significance scores reported in last column reflect change in mean scores between 1996 and 2001 for those who participated in both waves of the survey. SD = standard deviation.
[a]Five-item scale that assessed the frequency of experiences of perceived discrimination in previous 12 months.[9]
[b]Short-form Center for Epidemiologic Studies Depression Scale.[11]
[c]Single-item indicator of general self-reported health status: "In general, would you say your health is: excellent, very good, good, fair, or poor?" with response categories ranging from 1 = poor to 5 = excellent.[12]
*P < .01; **P < .001.

who completed both waves of the survey, and the percent of respondents with annual incomes of $10 000 or more also did not differ across groups. Mean levels of everyday discrimination reported at baseline were 2.36 for respondents lost to attrition, and for the longitudinal sample, 2.25 at baseline and 2.07 at follow-up (with 2 = "hardly ever" and 3 = "sometimes"). For the longitudinal sample, mean age and income increased significantly in the 5 years between the 2 waves of the survey (P<.001 for both variables), whereas self reports of everyday discrimination and general self-reported health status declined significantly (P<.001 for both variables). There was no significant change in mean levels of education or symptoms of depression.

Bivariate correlations and variance inflation factors were examined to assess multicollinearity among the main study variables. The results indicate a modest correlation between baseline discrimination and the change in discrimination over time (r=–0.56; P<.001). The correlation between depressive symptoms over time was relatively small (r=0.197; P=.0002) with a stronger association between self-reported general health over time (r=0.49; P<.001; data not shown). Examination of bivariate correlations also indicates a bivariate, cross-sectional association between perceived discrimination and depressive symptoms. This association holds after control for the effect of age, education, and income at T_1 (partial r=0.27; P<.001; data not shown). There is no evidence of a bivariate association between perceived discrimination and self-reported general health at baseline or follow-up. Regression models were used to assess variance inflation factors using some combination of the independent variables. The variance inflation factors for all regression models ranged from 1.09 to 1.54, well below the values that would indicate concern about multicollinearity. Because of relatively high correlations between education and income at the 2 points in time, and because age is essentially a constant, we used only T_1 data for these variables in our models (*model a* and *model b*).

Results from the longitudinal models are shown in Table 2. Estimates of the coefficients in *model a* show that there is a positive relationship between a change in discrimination over time and a change in symptoms of depression (b=0.125; P<.001). In other words, an increase in discrimination over time is associated with an increase in symptoms of depression over time. This relationship is significant control for the effects of discrimination (b=0.132; P<.001) and symptoms of depression (b=–0.872; P<.001) at baseline. These results may be interpreted as indicating an expected difference in symptoms of depression of 0.125 for each 1-unit change in discrimination over time, holding constant age, income, education, discrimination, and symptoms of depression at baseline.

Estimates of the coefficients for *model b* show that there is a negative relationship between a change in discrimination over time and a change in self-reported health status (b=–0.163; P<.05). That is, a 1-unit increase in discrimination over time is associated with an expected 0.163 decrease in self-reported general health status, holding constant the levels of all other regressors included in the model. As with symptoms of depression, this relationship is significant control for the effects of discrimination (b=–0.115; P=.1365) and self-reported general health status (b=–0.561; P<.001) at baseline.

DISCUSSION

These results support our hypothesis that a change over time in discrimination is associated with a change over time in depressive symptoms and in self-reported general health status. These findings are consistent with a causal model positing that perceived discrimination contributes to poorer health outcomes over time. In particular, a unit increase in reported encounters with discrimination over time (for example, from "hardly ever" to "sometimes") is associated with a 0.125 unit increase in symptoms of depression and a 0.163 unit decline in self-reported general health status, holding constant age, income, education, discrimination, and health status at baseline. These results are significant after accounting for self-reported health outcomes and levels of discrimination reported at baseline, and thus represent the additional effect of a change in discrimination over time after accounting for baseline measures.

The use of panel data in this analysis allows us to test whether a change in discrimination over time is associated with a change in symptoms of depression and in general health status over time. This represents an advance over prior analyses which have overwhelmingly been cross-sectional. Our use of change or conditional models provide a more

TABLE 2—Change in Symptoms of Depression and General Self-Reported Health Status (Time 2 – Time 1) Regressed on Age, Education, Income, Health Status, and Everyday Discrimination at Baseline, and Change in Everyday Discrimination Among African American Women in Detroit, 1996 and 2001 (n = 343)

	Model A: Symptoms of Depression, Time 2 – Time 1, b (95% Confidence Interval)	Model B: General Self-Reported Health Status, Time 2 – Time 1, b (95% Confidence Interval)
Age	–0.00 (–0.004, 0.003)	–0.01 (–0.020, –0.007)***
Education		
< High school	Reference	Reference
High-school graduation	–0.09 (0.223, 0.042)	–0.02 (–0.273, 0.222)
Some college	–0.17 (–0.322, –0.031)*	–0.10 (–0.381, 0.174)
College graduation	–0.13 (–0.356, 0.078)	0.030 (–0.347, 0.406)
Income		
< $10 000/year (reference)	Reference	Reference
≥ $10 000/year	–0.12 –0.254, 0.000)*	0.331 (0.103, 0.559)**
Depression[a]	–0.87 –0.980, –0.764)***	.....
Global health[b]	....	–0.56 (–0.663, –0.459)***
Everyday discrimination[c]		
0 (reference)	Reference	Reference
≥1	0.132 (0.051, 0.213)***	–0.11 (–0.267, 0.036)
Change in everyday discrimination	0.125 (0.062, 0.188)***	–0.16 (–0.287, –0.038)*

[a]Five-item scale that assessed the frequency of experiences of perceived discrimination in previous 12 months.[9]
[b]Short-form Center for Epidemiologic Studies Depression Scale.[11]
[c]Single-item indicator of general self-reported health status: "In general, would you say your health is: excellent, very good, good, fair, or poor?" with response categories ranging from 1 = poor to 5 = excellent.[12]
*P < .05; **P < .01; ***P < .001.

specific test of the hypothesized longitudinal relationships by examining whether a change in self-reported discrimination is associated with a change in health status over time.

Our findings are consistent with previous studies in 2 ways. First, we found longitudinal relationships between discrimination and both mental and physical health outcomes.[3–4] Second, we observed that the pattern of association between discrimination and mental well-being differs from that between discrimination and self-reported general health.

Our results differ from those of at least 1 previous study that found a positive longitudinal effect of perceived discrimination on reported physical health. In a longitudinal analysis of NSBA data, Jackson et al.[4] found a small but positive effect of discrimination on self-reported physical health. In contrast, we observed a significant negative association between a change in perceived discrimination and a change in self-reported general health.

There are several potential explanations for these discrepant findings. These include that the studies: (1) used different measures of everyday discrimination (a single-item global 30-day measure in the NSBA vs the 5-item everyday discrimination scale used in this study) and mental health (a 10-item psychological distress scale and depression assessed using the Diagnostic Interview Schedule[3,4] vs the 11-item CES-D scale used in this study); (2) had different lags between waves of data collection (1 year vs 5 years in this study); (3) addressed different study populations (i.e., NSBA's national sample compared with the sample of adult women living on Detroit's east side); and (4) covered different time spans (13 years in the study by Jackson et al.[4] vs 5 years in this study).

Each of these factors may have contributed to differential findings across studies. Differences in analytic strategies described above may also contribute to these differences. In contrast to previous studies using ordinary least squares regression analyses to predict health outcomes at Time 2[3] or repeated measures analyses of variance,[4] the change models used in this analysis provide a more powerful statistical test of the effect of a change in discrimination on a change in the health outcomes of interest over time by allowing each individual to act as its own control.[18]

Our results must be tempered by several limitations. First, the 2 waves of the survey were carried out with a 5-year interval between interviews. Different periods between interviews may influence the strength, statistical significance, and associations of variables over time. Following individuals over a greater span of the life course and determining the appropriate time lag between waves of data collection will contribute further to our understanding of the long-term effects of discrimination on health.

Second, the measures of everyday discrimination used here are self-reported and suffer the same challenges as all self-report data: specifically, the difficulty of disentangling the extent to which relationships are causal, or the extent to which they may reflect some other underlying factor. Our results partially address this issue by providing evidence that a change over time in everyday discrimination is associated with a change over time in symptoms of depression (positive) and in general self-reported health status (negative), above and beyond the effects of baseline measures of discrimination and health indicators. However, these results do not rule out the possibility that the perception of everyday discrimination is influenced by prior mental health status. Future efforts to establish the direction of causality are important for our understanding of not only mental but also physical health, because the physiological consequences of varying sensitivity to acts of discrimination are unknown.

A third limitation of this study is that the study design called for follow-up only with those women still living in Detroit in 2001. This resulted in the loss of approximately half the original sample to follow-up. This concern is allayed somewhat by data shown in Table 1, which indicate no significant differences in demographic characteristics at Time 1, except for age, between respondents lost to attrition and the longitudinal sample. Furthermore, the study sample includes only African American women living on Detroit's east side, a racially segregated community

with relatively limited economic resources. The extent to which the longitudinal relationships reported here apply beyond this sample—for example, to African American men, to residents of more racially diverse communities, or to African Americans with access to a wider range of economic resources—are questions for further exploration.

A final limitation of the study is that everyday discrimination was the only aspect of interpersonal discrimination assessed. Everyday discrimination, with a focus on the minor but recurrent aspects of perceived unfair treatment, is a neglected and important aspect of racism. At the same time, the interpersonal experience of discrimination is a complex, multidimensional phenomenon,[1] and the findings reported here should not be generalized to acute and more traumatic aspects of discrimination that were not assessed in this study.

Prior studies suggest that sociodemographic factors, including age and education, predict everyday discrimination as we have measured it.[9] Other measures of racial discrimination vary by age, gender, income, and education[1,20,21] but there is also evidence that socioeconomic position does not afford African Americans substantial protections from interpersonal discrimination.[7,22] To advance our understanding of how discrimination harms health, it will be important to develop a clearer understanding of the contextual and individual-level factors that influence reports of everyday discrimination and to elucidate the relationships among multiple dimensions of interpersonal and institutionalized racism.[23,10] Findings based only on interpersonal indicators of everyday discrimination are most appropriately interpreted as a partial and conservative measure of the impacts of discrimination on health

Despite these limitations, the results reported here offer further evidence that experiences of everyday discrimination have detrimental effects on health over time, above and beyond the effects of racism and other forms of discrimination on material well-being. We show that increasing reports of exposure to discrimination over time are related to increasing reports of depressive symptoms and to declining self-rated general health status. The relative consistency of the effects reported here with previous studies carried out at different periods of time, using different measures of everyday discrimination and mental health, different study populations, and different analytic methods contributes to the robustness of these findings.

Racial disparities in health are shaped by the multiple mechanisms through which racism shapes life chances and access to material resources that are necessary to maintain health.[2] The results reported here indicate that one manifestation of racism, everyday discrimination, has implications for health that extend beyond effects on household income and educational opportunities. Furthermore, these effects are visible even within this sample of women residing in a racially segregated community, suggesting that they supersede protective effects that might be anticipated by residing in predominantly African American neighborhoods. Previous analyses have indicated that women in this sample do not report significantly different levels of exposure to discrimination when compared with Black women living in the more racially heterogeneous Detroit metropolitan area.[7,8] However, it is possible that women in this community experience protective factors associated with identity-preserving symbols or access to socially supportive relationships that may afford protection against negative effects of exposures to discrimination on health over time.[24] These results draw attention to the urgency of understanding the processes and contexts that generate and maintain racism, as well as the development of strategic actions to disrupt those processes, if we are to address the underlying causes of racial disparities in health. ■

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This article was accepted July 17, 2005.

Contributors

A.J. Schulz originated the study, provided oversight for the analysis, and took the lead in writing the article. C.C. Gravlee helped to conceptualize the research questions and analysis, conducted the literature review for the article, and wrote portions of the article. D.R. Williams reviewed results from the analysis and contributed to the interpretation of results. B.A. Israel helped to conceptualize the study, reviewed results from the analyses, and contributed to the interpretation of the results. G. Mentz assisted with specification of the statistical models, ran the analyses, and assisted with interpretation of results. Z. Rowe contributed to the interpretation of results.

Human Participant Protection

This project was granted approval by the institutional review board of the University of Michigan.

Acknowledgments

The research reported here was supported in part through a cooperative agreement with the Centers for Disease Control and Prevention (grant U48/CCU515775) and received funding from the W.K. Kellogg Foundation Community Health Scholars program.

The authors wish to acknowledge the contributions of the Eastside Village Health Worker Partnership. The Partnership is a project of the Detroit Community-Academic Urban Research Center and is made up of community members who are Village Health Workers, as well as representatives from the Butzel Family Center (1996–2003), Detroit Department of Health and Wellness Promotion, Friends of Parkside, Henry Ford Health System, Kettering/Butzel Health Initiative (1996–2003), University of Michigan School of Public Health, and Warren Conner Development Coalition.

The authors thank Sue Andersen for her contributions in the preparation of the manuscript.

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