

THE ASSOCIATION BETWEEN INCOME, EDUCATION, AND EXPERIENCES OF DISCRIMINATION IN OLDER AFRICAN AMERICAN AND EUROPEAN AMERICAN PATIENTS

Objective: Racial/ethnic discrimination has adverse effects on health outcomes, as does low income and education, but the relationship between discrimination, income, and education is not well characterized. In this study, we describe the associations of discrimination with income and education in elderly African Americans (AA) and European Americans (EA).

Design: Cross-sectional observational study involving computer-assisted telephone survey.

Setting: Southeastern United States.

Participants: AA and EA Medicare managed care enrollees.

Main Outcome Measures: Discrimination was measured with the Experience of Discrimination (EOD) scale (range 0–35). We used zero-inflated negative binomial models to determine the association between self-reported income and education and 1) presence of any discrimination and 2) intensity of discrimination.

Results: Among 1,800 participants (45% AA, 56% female, and mean age 73 years), EA reported less discrimination than AA (4% vs. 47%; $P < .001$). AA men reported more discrimination and more intense discrimination than AA women (EOD scores 4.35 vs. 2.50; $P < .001$). Both income and education were directly and linearly associated with both presence of discrimination and intensity of discrimination in AA, so that people with higher incomes and education experienced more discrimination. In adjusted models, predicted EOD scores among AA decreased with increasing age categories (3.42, 3.21, 2.99, 2.53; $P < .01$) and increased with increasing income (2.36, 3.44, 4.17; $P < .001$) and education categories (2.31, 3.09, 5.12; $P < .001$).

Conclusions: This study suggests future research should focus less on differences between racial/ethnic groups and more on factors within minority populations that may contribute to healthcare disparities. (*Ethn Dis.* 2011;21(2):223–229)

Key Words: Discrimination, Income, Education, African American, Age

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INTRODUCTION

A health disparity has been defined as a difference in environment, access and utilization, quality of care, health status, or health outcome that deserves scrutiny.¹ In the United States, racial/ethnic disparities are associated with disease severity, quality of care, and mortality. For example, compared with European Americans (EA), African Americans (AA) present with cancer at a later stage, are less often offered coronary artery revascularization, and have higher mortality for diseases such as cancer, cerebrovascular disease, and AIDS.² These disparities persist after adjusting for confounding factors such as income, education, and health insurance.³

Racial/ethnic discrimination directly influences local, national, and global policy and plays a prominent role in social discourse. Important strides were made during the American Civil Rights era, and public opinion appears to be making a slow progression toward more tolerance. However, even milder forms of discrimination may impose considerable burdens on prosperity, happiness, and health.⁴ While reports linking racial/ethnic discrimination to health effects are growing, few studies have examined the complex relationship between discrimination, income, and education, specifically in individuals with chronic diseases.⁵ This may be especially relevant among the elderly, who suffer

disproportionately from chronic conditions and who also tend to have lower income and education.

Due to slavery's legacy, the issues of disparity and discrimination bear special relevance to the Southeastern United States. Forty-one percent of US AA population reside in the Southeast, and this region has the highest proportion of AA living in poverty.⁶ In regard to health disparities, the prevalence of obesity, diabetes, and hypertension as well as mortality due to heart disease and stroke are highest in the South, particularly among AA. Older adults bear most of the chronic disease burden, yet most studies examine discrimination and socioeconomic factors in middle-aged and working adults.^{7,8}

Therefore, we examined factors associated with self-reported discrimination in older Americans living in the South. All participants were members of a Medicare managed care health plan. The questions that we posed included: What is the prevalence of discrimination among EA compared with AA in this group? What characteristics are associated with discrimination among them? More specifically, how are income and education associated with the experience of discrimination? Answering these questions are important steps in understanding mechanisms underlying health disparities and the promotion of equitable health outcomes.

METHODS

Population and Participation

Study participants were enrolled in a Medicare managed care health insurance plan providing coverage in Ala-

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bama, Florida, and North Carolina. Eligible patients included those who: 1) were AA or EA, 2) were aged ≥ 65 years, 3) were enrolled with the health plan continuously from January 1, 2003 through December 31, 2003, and 4) provided informed consent for a telephone interview. Of the 2,710 eligible individuals, 66.4% agreed to participate, yielding a sample of 1,800 participants who were interviewed between April 2006 and June 2007. The Western Institutional Review Board approved this study.

Income and Education

Income was determined by the response to "Which of these categories best describe your total combined family income for the past 12 months? This should include income (before taxes) from all sources, wages, veteran's benefits, and help from relatives, rent from properties, and so on." Based on the data, we categorized income into three groups with roughly equal numbers of participants: $< \$12,000$, $\$12,000$ to $\$15,999$, and $\geq \$16,000$. These ranges reflect the low incomes common in retired populations.^{6,9}

Education was determined by the response to "What is the highest grade (or year) of regular school you have completed?" Responses were combined into $<$ high school, high school," and $>$ high school.

Discrimination

Discrimination was measured using the Experience of Discrimination (EOD) scale. "Have you ever experienced discrimination, been prevented from doing something, or been hassled or made to feel inferior in any of the following seven situations because of your race or color?" The seven situations include: at school, at work, at home, in public, getting work, getting housing, and getting medical care.^{10,11} Individuals with affirmative responses were further asked whether this occurred rarely, sometimes, or often.

We operationalized discrimination dichotomously indicating whether any discrimination was reported and continuously as discrimination intensity. We classified participants who reported discrimination in any of the seven situations as experiencing any discrimination. We determined discrimination intensity by assigning a value of 0 to none, 1 to rarely, 2.5 to sometimes, and 5 to often for each of the seven situations queried.¹¹ The scale ranged from 0 to 35.

Other Covariates

Participant age, sex, and race were self-reported. We included a measure of depressive symptoms, as assessed by the Center for Epidemiologic Studies Depression Scale (CES-D). Depressive symptoms can alter a person's outlook and affect the perception of discrimination.¹² We used a score ≥ 16 to indicate a high likelihood of clinically significant psychological distress.¹³

Analysis

After examining univariate distributions of all variables, we compared the characteristics of AA and EA using the chi-square test for categorical variables and one-way analysis of variance for continuous variables. We determined the proportion of AA and EA that experienced any discrimination with exact binomial 95% confidence intervals (95% CI). To examine discrimination intensity, we calculated the mean EOD score of the entire study population (overall discrimination intensity) and in the subset of participants who reported any discrimination (contingent discrimination intensity). We assumed asymptotic normality to calculate the 95% CI for both contingent and overall discrimination intensity. We also looked for important interactions for race/ethnicity with income and education.

Due to few EA reporting any discrimination ($n=40$), multivariable modeling was conducted only in AA. Our modeling strategy was determined by the distribution of the outcome

(EOD scores), which: 1) had discrete categories, 2) had a large number of zeroes, and 3) was heavily right skewed. Therefore, we used a zero-inflated negative binomial multivariable model with EOD score as the outcome and independent variables of sex, age, education, and income. Within the AA group, we examined independent variables for all possible interactions and found none. We found no evidence of important multicollinearity as reflected in variance inflation factors or variance decomposition.

The zero-inflated negative binomial model included separate equations reflecting: 1) the probability of experiencing any discrimination, and 2) the contingent discrimination intensity. Iterative algorithms determined the best solutions to the equations using a common maximum likelihood procedure. The appropriateness of the negative-binomial variance assumption was assessed by the magnitude and significance of the over dispersion parameter, and the appropriateness of the zero-inflation component was examined using the Vuong statistic.^{14,15}

Finally, in the AA group, we calculated predicted values for each independent variable based on the multivariable model. Three sets of predicted values were based on the following: 1) probability of any discrimination, 2) contingent discrimination intensity, and 3) overall discrimination intensity. Non-parametric P -values determined the significance of the overall discrimination intensity across each ordinal independent variable. All analyses were conducted using STATA/SE 10.0 (College Station, TX).

RESULTS

Study participants were elderly (mean age 73) and mostly women (64%) (Table 1). Proportionately, fewer AA men participated than EA men. On average, AA had lower education and

Table 1. Characteristics of 1,800 African Americans (AA) and European Americans (EA)

Characteristics*: n:	All 1800		AA 801		EA 999		P
Age, mean years (SD)	73.0	(5.2)	73.2	(5.3)	72.9	(5.2)	.206
Female, %	1146	(63.7)	571	(71.3)	575	(57.6)	<.001
Education, %							
<High school	790	(43.9)	410	(51.2)	380	(38.1)	
High school	585	(32.5)	242	(30.2)	343	(34.4)	
>High school	424	(23.6)	149	(18.6)	275	(27.6)	<.001
Income categories, %							
<\$12,000	548	(37.3)	326	(51.3)	222	(26.6)	
\$12,000–\$15,999	318	(21.6)	143	(22.5)	175	(21.0)	
≥\$16,000	605	(41.1)	137	(26.3)	438	(52.5)	<.001
Depressive symptomst, %	267	(14.8)	119	(14.9)	148	(14.8)	.980

* Values are N (%), unless otherwise indicated.

† Score ≥16 on the Center for Epidemiological Studies for Depression scale.

income than EA. Depressive symptoms were similar in both groups.

The prevalence of any discrimination among AA was 47% compared with 4% among EA. Contingent discrimination intensity, for those who experienced any discrimination, was 6.13 (95% CI 5.74–6.95) for AA and 4.10 (2.41–5.79) for EA, $P<.05$. Over-

all Discrimination Intensity was 3.02 (2.66–3.38) for AA and 0.16 (.08–.25) for EA, $P<.05$.

We found strong interactions between race, socioeconomic indicators, and any discrimination (Figure 1). Among EA, education and income were not associated with discrimination. Among AA, reports of discrimination

increased in a monotonic pattern among groups with more education and income.

Based on multivariable models in the AA population ($n=636$ due to missing data), the predicted probability of any discrimination and both contingent and overall discrimination intensity followed similar trends across all cate-

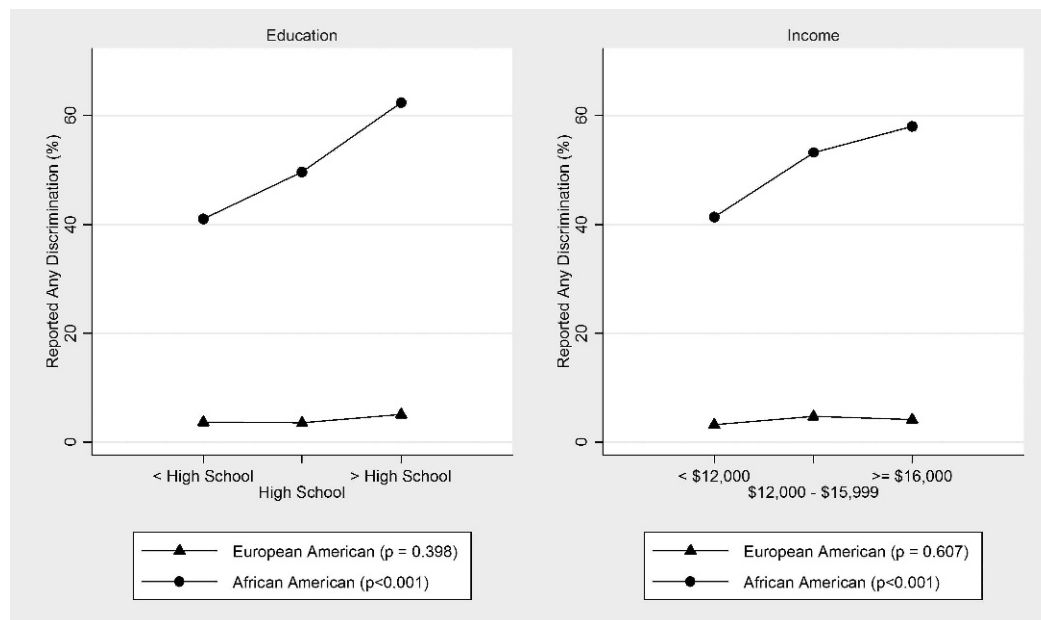


Fig 1. Experience of any discrimination by education and annual household income for 636 African Americans enrolled in Medicare managed care within the Deep South. Any discrimination was defined as score >0 on Experience of Discrimination scale. Significance was determined by non-parametric P values for trend

Table 2. Predicted probability of any discrimination and predicted mean contingent Discrimination Intensity Score* among 636 African Americans

	Probability of any discrimination		Contingent discrimination intensity	
	Point estimate	95% CI	Point estimate	95% CI
Sex				
Female	.49	.43–.55	4.88	4.17–5.71
Male	.68	.59–.75	6.24	5.20–7.49
Age Quartiles				
53–72 years	.61	.53–.68	5.37	4.26–6.32
73–75 years	.57	.51–.63	5.25	4.60–5.99
76–79 years	.53	.47–.59	5.24	4.57–6.01
80–99 years	.45	.37–.54	5.19	4.15–6.50
Annual household income				
<\$12,000	.47	.40–.54	4.81	4.01–5.78
\$12,000–\$15,999	.61	.50–.70	5.45	4.34–6.84
≥\$16,000	.66	.56–.74	6.12	5.01–7.47
Education				
<High school	.47	.40–.54	4.75	3.96–5.71
High school	.58	.49–.67	5.18	4.21–6.37
>High school	.70	.59–.79	7.15	5.74–8.90

* Two-part estimates derived from a zero-inflated negative binomial model, taking the Experience of Discrimination scale as the outcome and includes all listed variables.

† Discrimination intensity is contingent upon experiencing any discrimination.

gorical variables (Table 2 shows any discrimination and contingent discrimination intensity). Figure 2 presents the results for overall discrimination intensity across the independent variables on the EOD scale. Men reported greater discrimination intensity than women (4.35, 2.50; non-parametric trend $P<.001$). Discrimination intensity decreased with increasing age quartile (3.42, 3.21, 2.99, 2.53; $P<.01$). Patients with depressive symptoms reported more intense discrimination than those without (3.60, 2.99; $P<.001$). Higher discrimination intensity was also found with increasing income categories (2.36, 3.44, 4.17; non-parametric trend $P<.001$) and education categories (2.31, 3.09, 5.12; non-parametric trend $P<.001$).

DISCUSSION

Within this large group of community-dwelling elderly individuals in the Southeastern United States, AA had lower

education, lower income, and reported more racial/ethnic discrimination than EA. In addition, as age increased, there was a corresponding decrease in reported discrimination. Importantly, among older AA, higher educational attainment and greater income were associated with a higher likelihood of reporting any discrimination, and when they did report discrimination, it was more intense. Multivariable analyses confirmed that AA men reported more intense discrimination than AA women.

Our findings differ from some past reports. For example, Watson and colleagues found that AA women in Memphis, Tennessee with lower income reported more discrimination, but found no association between education and discrimination.⁸ In another study of 754 ethnically diverse young women attending a family planning clinic in northern California, education was not related to reports of racial/ethnic discrimination, but financial difficulty was associated with more reported discrimination.¹⁶ Our findings are similar to

results from the Black Women’s Health Study, which included a wider age range than our study (half the women were <40). Among the 30,330 participants, women with higher education were more likely to report lifetime discrimination.¹⁷

Compared with other studies, participants in our study reported relatively low rates of perceived discrimination (47% in AA and 4% in EA). In contrast, 80% of participants in the Black Women’s Health Study reported an episode of lifetime discrimination.¹⁷ In a sample of working AA adults in Boston, aged <65 years, 67% reported experiencing discrimination.¹¹ In the CARDIA study, 77% of AA women and 84% of AA men aged 25–37 years reported experiencing discrimination.¹⁸ It has been demonstrated that older AA report less discrimination than younger AA.¹⁹ In addition, the results from a study in Chicago was consistent with our findings when it found that 42% of AA >65 years old reported discrimination.²⁰

In our study, as age increased, there was also a corresponding decrease in reported discrimination. We suspect that elderly patients may report less discrimination, because their experiences from the turbulent Civil Rights era may lead them to rate the current times as more desirable. Furthermore, the ubiquity of racism in the pre-Civil Rights era may lead individuals who experienced it first-hand to accept discrimination as a social norm.²⁰ Further studies of the mechanisms underlying our findings are warranted.

Reasons that wealthier and more educated AA experience more discrimination may be due to greater opportunity for exposure to discrimination. Highly educated AA may acquire higher profile, competitive occupations dominated typically by EA. Wealthier AA may live and shop in areas where there are few other AA, while AA with lower education and incomes may work, live, and shop in areas where their minority status is less marked or in areas where they are the majority racial/ethnic group.

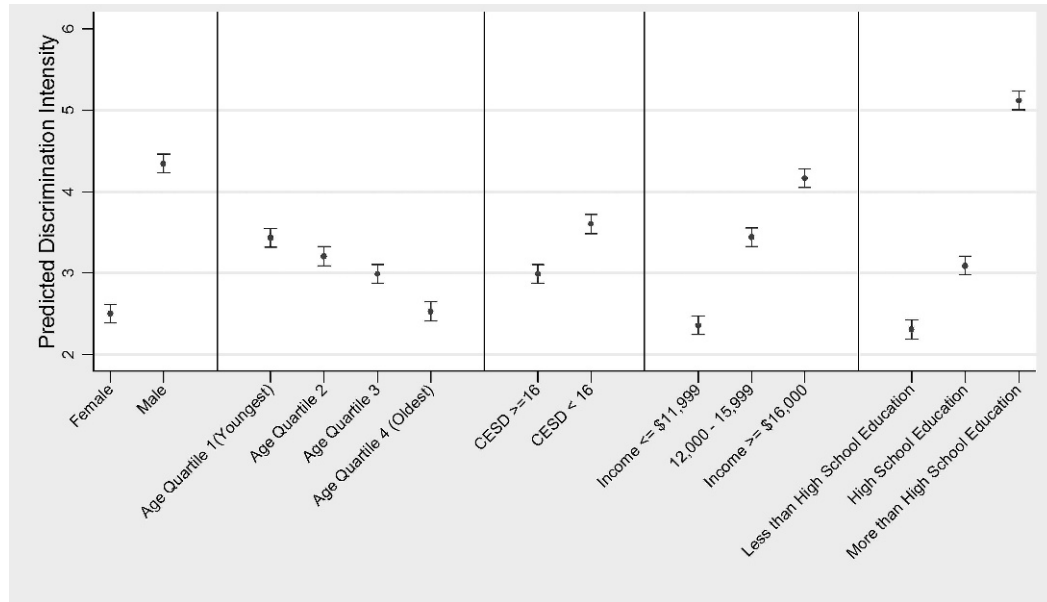


Fig 2. Overall reported discrimination intensity for 636 African Americans enrolled in Medicare managed care within the Deep South. Values represent the predicted joint estimates of discrimination intensity taken as the product of the predicted probability of any discrimination and the predicted intensity of discrimination from a zero-inflated negative binomial model with the Experience of Discrimination score (range 0–35) as the outcome. All variables in this graph were entered as independent variable. Non-parametric *P* values for trend across each category were all <.01

Both the univariate and multivariable analyses confirmed that AA men reported more intense discrimination than AA women. In our society, AA men are perceived as more threatening than EA men or women of any ethnicity.^{21–24} This may lead to more intense discrimination. Our study was unable to unmask the underlying reasons for this observation.

Several studies have examined the role of income and education in relation to health outcomes.²⁵ Lower income and/or education have been associated with multiple negative health outcomes including smoking, diabetes, depression, hip fractures, hypertension, cancer, cardiovascular disease, and premature mortality.^{26–34} Simultaneously, many studies demonstrate that discrimination has harmful consequences for physical and mental health.^{10,35–37} Our study’s findings highlight the complex relationship that income and education have with discrimination, but we were unable

to examine the association of this relationship with health outcomes.

Our work has some limitations worth noting. First, discrimination and other covariates of interest were self-reported. Self-report may be subject to recall bias; however, self-report is the best approach for gathering information about the perception of discrimination. Second, the income range in this retired population is limited, and the poverty threshold for a two-person household >65 years falls in the middle category.³⁸ The categories we used were based on the data and were as close as we could get to tertiles. However, other studies conducted in elderly populations used similar ranges. The highest income category used by Bassuk was >\$15,000, and Lindblad used ≥\$8,500.^{9,39} Third, study participants were recruited from a Medicare managed care plan in one geographic area, and results may not be generalizable to other regions or age groups. With the paucity of informa-

tion about the experience of discrimination in elderly AA, our work fills an important gap. Fourth, although the survey provided a rich array of covariates for inclusion in the multivariable models, undoubtedly some important covariates remained unmeasured. Last, the cross-sectional, observational study design warrants caution in drawing inferences about the association described, especially causal links. However, given the currently evolving state in our knowledge of racial/ethnic discrimination, observational studies can provide insight and new direction for additional primary data collection and intervention design.

In conclusion, we found that AA with higher income and education were more likely to experience discrimination and, when experienced, experienced it more intensely than AA with lower income and education. Additionally, we found perceived discrimination was less likely with increasing age. Further study

is needed to determine if these differences translate into differences in health outcomes. Our study, along with the growing body of scientific literature, suggests future research should focus less on differences between racial/ethnic groups and more on factors within minority populations that contribute to healthcare disparities.

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