Published in final edited form as:

J Health Care Poor Underserved. 2010 February ; 21(1): 287–300. doi:10.1353/hpu.0.0273.

Impact of Perceived Racial Discrimination on Health Screening in Black Women

Dr. Charles P. Mouton, MD, MS,

Department of Community and Family Medicine at Howard University College of Medicine

Dr. Pamela L. Carter-Nolan, PhD, MPH,

Department of Community and Family Medicine at Howard University College of Medicine

Dr. Kepher H. Makambi, PhD,

Lombardi Comprehensive Cancer Center at Georgetown University Medical Center

Dr. Teletia R. Taylor, PhD,

Division of Cancer Prevention, Control, and Population Sciences at the Howard University Cancer Center

Dr. Julie R. Palmer, ScD,

Slone Epidemiology Center at Boston University

Dr. Lynn Rosenberg, ScD, and

Slone Epidemiology Center at Boston University

Dr. Lucile L. Adams-Campbell, PhD

Lombardi Comprehensive Cancer Center at Georgetown University Medical Center

Abstract

Perceived discrimination has been shown to be related to health screening behavior. The present study examines the effect of discrimination on cancer screening among women in the Black Women's Health Study. Five self-report items measured discrimination in everyday life and three items measured experiences of major discrimination. Logistic regression was used to test associations of discrimination with Pap smear, mammography, or colonoscopy utilization. At the start of follow-up, 88.8% had a Pap smear in the previous year, 52.7% had a mammogram, and 20.0% had received a colonoscopy. Both everyday and major discrimination were associated with not having received a Pap smear, even after adjusting for other variables. Discrimination was not associated with mammography or colonoscopy utilization. In conclusion, perceived everyday and major discrimination is associated with poorer utilization of Pap smears for cervical cancer screening among Black women.

Keywords

Racism; cancer screening; Black; women's health

Cancer screening behaviors are important to the health of women in the United States (U.S.). Overall in the past decade, screening for breast cancer has been shown to decrease breast cancer mortality by 20–30% in women older than 50 years.[1] Colon cancer screening has been shown to lead to a 33% reduction in the 13-year cumulative colon cancer mortality

rate.[2,3] Cervical cancer screening has reduced cervical cancer mortality by 67% over the past three decades.[4] In addition to reduction in mortality, cancer screening has led to an 86% five-year survival rate for these cancers.[4]

While mortality rates for cancer have declined, the overall cancer death rate for African American women is about 17% higher than for their White counterparts.[5] Specifically, African American women have a 35% higher breast cancer mortality rate, a 44.5% higher colorectal cancer mortality rate, and two-fold higher cervical cancer mortality rate.

Given the higher cancer mortality rates among Black women from breast cancer, colorectal cancer, and cervical cancer, and in view of evidence that screening increases survival from these cancers, it is important to examine the barriers to cancer screening in African Americans. Anderson and Aday have provided conceptual models of health care utilization which help to explain cancer screening behaviors. This model has been modified by Williams to focus on African Americans.[6,7] Determinants of health care utilization are grouped as either predisposing or enabling factors. Barriers to utilization among the predisposing factors typically are individually-driven, while barriers to enabling factors are typically system-driven. Personal barriers include lack of knowledge of cancer prevention, socioeconomic status, and personal health beliefs.[6] System barriers include cost of screening, lack of insurance, lack of a physician's recommendation, and access to care.[8] An additional system barrier that has recently been identified is racism and its discriminatory effects.[9]

Discrimination is defined as a process in which a member or members of a socially defined group are treated differently due to their membership in the group. Trivedi reported discrimination being reported by 4.7% of the population, with the reason for discrimination being race or ethnicity in 13.7% of cases.[10] With respect to utilization of cancer screening, the impact of racism has been understudied. Borrell et al. showed substantially higher rates of perceived discrimination (73.1% for urban African American women) being associated with worse physical and mental health.[11] People who reported discrimination were also less likely to receive preventive services. Van Houtven showed that discrimination was associated with delays in medical testing and delays in prescriptions.[12] Examining the effects of perceived discrimination on health utilization, Blanchard and Lurie found that people who felt that they were treated differently due to race were less likely to receive chronic disease screening and more likely to put off care recommended by their physicians.[13] Tilson et al. showed that discrimination was a barrier to screening for sexually transmitted diseases in adolescents and young adults.[14]

With specific regard to cancer, Facione found that perceived discrimination (called *prejudice*) was associated with failing to adhere to cancer screening guidelines and fewer physician office visits. Perceived prejudice also explained the variance in access to care.[15,16] Concerning breast cancer, Mandelblatt found that perceived discrimination based on race was associated with diminished satisfaction with care in survivors.[17] However, Facione found that perceived discrimination based on race did not significantly influence seeking medical attention for breast cancer symptoms.[16] Among Hispanic women, Byrd found ethnic insensitivity was a barrier to cervical cancer screening.[18] However, Hoyo et al. showed that perceived discrimination based on race was not associated with non-adherence to cervical cancer screening in African American women.[19] In this study, we examined the association of perceived discrimination with utilization of three cancer screening methods in African American women—Pap screening, mammography, and colonoscopy. We hypothesize that African American women who perceive exposure to discrimination will have lower utilization of cancer screening.

Methods

Study population

Study participants were part of the Black Women's Health Study (BWHS), an ongoing prospective cohort study designed to examine the risk factors for major illnesses in African American women. In 1995, women aged 21 to 69 years were enrolled through questionnaires mailed to subscribers of *Essence* magazine, members of Black professional organizations, and friends and relatives of respondents. The survey instrument obtained information on a variety of personal and health characteristics, including reproductive and contraceptive histories, cigarette and alcohol use, physical activity and nutrition, health care utilization, and medical conditions. Black Women's Health Study respondents represent various geographic regions of the United States, with the majority of respondents residing in California, New York, Illinois, Michigan, Georgia, and New Jersey. The Black Women's Health Study cohort comprises the 59,000 women who completed baseline questionnaires and whose addresses were found to be valid one year later. Updated information has been obtained by postal questionnaire every two years from an average of 80% of the initial cohort through 2005. The study protocol was approved by the institutional review boards of Howard University and Boston University.

Ascertainment of discrimination

The 1997 questionnaire included questions adapted from a questionnaire by Williams and colleagues used to examine the extent to which differences in perceived discrimination explained Black-White differences in self-reported physical and mental health. They found responses to these questions to be associated with perceived mental and physical health problems in their study population.[20] Five items were intended to measure the frequency of racial discrimination in everyday life (*everyday discrimination*). These questions asked about the frequency with which participants experienced the following: *You receive poorer service than other people in restaurants or stores*, *People act as if they think you are not intelligent*, *People act as if they are afraid of you*, *People act as if they think you are dishonest*, and *People act as if they are better than you*. Possible responses were: *Never* (coded 1), *A few times a year* (coded 2), *Once a month* (coded 3), *Once a week* (coded 4), and *Almost every day* (coded 5). An everyday discrimination summary score was devised by taking the average of the five everyday discrimination items. This summary score was divided into quartiles. Respondents were also asked about experiences of *major discrimination*—i.e., if they had ever been treated unfairly due to their race on the job, in housing, or by the police (*yes* = 1, *no* = 0). A summary variable for major discrimination was devised: 1) *yes* to none, 2) *yes* to one, 3) *yes* to two, and 4) *yes* to three.

Health screening behavior

In the 1997 BWHS assessment, participants were asked about their health care utilization and screening practices over the past two years. Specifically, the study participants were asked if they: 1) had health insurance; 2) had their own regular physician or nurse practitioner; 3) visited a doctor or nurse practitioner for a general physical; 4) had had their blood pressure checked; 5) had undergone a mammogram; and 6) had received a Pap smear. They were asked again about mammography on the 1997, 1999, 2001 and 2003 questionnaires, about Pap smear on the 1997, 1999 and 2003 questionnaires, and about colonoscopy on the 1999 and 2003 questionnaires. Recommendations are that Pap smear and mammography screening should occur yearly.

Analysis

The analysis was restricted to the 47,228 women who completed the 1997 questionnaire. We assessed these outcomes longitudinally with Generalized Estimating Equations (GEE).[21] The GEE allows for analysis with repeated measures and corrects for the fact that characteristics of a single individual over time are likely to be correlated with one another. That is, GEE accounts for the structure of the covariances of the response outcomes through its specification in the estimation process. Further, GEE takes into account the status and changing nature of covariates at each questionnaire cycle.

The GEE extension of the logistic regression using PROC GENMOD in SAS® software was used to estimate the odds ratios and Wald statistic-based 95% confidence intervals for the associations between perceived discrimination and lack of utilization of Pap smear screening and mammography.[22] In our analysis, we adjusted for baseline variables, including education, marital status, number of chronic conditions and health insurance coverage; and the time-varying covariates: age, smoking, alcohol consumption, oral contraceptive use, and hormonal replacement therapy. In these longitudinal analyses, the binary variable indicating the response variables at years 1997, 1999, 2001, or 2003 provided repeated measures for the responses. For instance, responses to the Pap smear question during follow-up were available for 1997, 1999, and 2003. The GEE procedure with exchangeable correlation structure was used to adjust standard errors for correlation between multiple observations on the same subject, assuming that observations from questionnaire cycles are equally correlated. The GEE repeated measures model was used to evaluate trends in cell counts, allowing adjustment for the correlation among repeated measures on the same subject over time. We specified an unstructured correlation structure underlying intra-class correlations. The GEE analysis allows one simultaneously to assess the significance of covariates at the cluster (i.e., individual woman) level. We used PROC GENMOD in SAS version 9.1.[22] It is recommended that colonoscopy screening occur every 10 years in the absence of a finding of polyps. Colonoscopy use was defined as having had a colonoscopy in 1999 or 2003. Standard logistic regression models rather than repeated measures methods were fit using PROC LOGISTIC to estimate odds ratios and the corresponding 95% confidence interval (CI) for the association between racism and nonparticipation in colonoscopy, adjusting for age, body mass index (BMI), oral contraceptive use, hormone replacement use, educational status, marital status, health insurance, cigarette smoking, and alcohol consumption.[22] To test whether there is linear trend in the relationship between screening and summary discrimination variables, we performed trend tests across categories of summary variables of discrimination by including the variables in the models as single quantitative variables. All tests were two-sided and significance was determined at the .05 level.

Results

Of the 47,228 women in 1997, the mean age was 40.7 years, 84.2% had some college education or were college graduates, and 38.7% were married. Over 92% had health insurance and 88.3% had their own health provider, with almost 90% having had a physical exam in the past year. Over 84% were nonsmokers and 72.9% were non-drinkers.

Women's utilization of cervical cancer screening, mammography, and colonoscopy at baseline for the present analyses is shown in Table 1. Of the women surveyed, 88.8% received a Pap smear in the previous year. Over 90% of women who had a Pap smear in 1997 had visited a health care provider in the past, compared with 69.5% of women who did not receive a Pap smear. Women who did not receive a Pap smear were more likely than those who had to be uninsured (18.6% vs. 5.8%). A mammogram in the past year was reported by 52.7% of women in the 1997 questionnaire. Women who had a mammogram

were more likely to have insurance than non-users. Of the women surveyed, 20.0% reported having received a colonoscopy on the 1999 questionnaire. All the variables considered were significantly associated with Pap smear and mammography use (chi-squared test, $p < .0001$). However, colonoscopy use was significantly associated with all the variables (chi-squared test, $p < .0001$), except cigarette smoking which was not associated with colonoscopy use (chi-squared test, $p = .20$).

Table 2 shows the relation of the everyday and major discrimination summary variables to selected characteristics. Relative to women in the lowest quartile of the everyday summary discrimination variable, women in the highest quartile were younger, more educated, and more likely to be single than those in the lowest quartile. Relative to women who reported no major discrimination (housing, job, and police) women who reported discrimination in all three domains were younger, less educated, and more likely to be single. There were significant associations between everyday discrimination and the variables considered. Similar significant results were observed for the association between major discrimination and the other variables, with the exception of marital status (chi-squared test, $p = .51$).

Table 3 describes the relationship of everyday discrimination to utilization of Pap smears, mammography, and colonoscopy. The multivariate odds ratios (OR) for the various categories of everyday discrimination and lack of Pap smears were generally greater than 1.0, demonstrating that as exposure to everyday discrimination increased, the use of Pap smear screening decreased. For the summary variable, the OR for each successive quartile from two to four relative to the lowest quartile increased from 0.99 (95% CI 0.99, 1.14) to 1.12 (95% CI 1.04, 1.20). The ORs for various categories of everyday discrimination in relation to lack of mammography were generally not significantly different from 0. This was also the case for lack of colonoscopy.

Results for major discrimination and cancer screening utilization are shown in Table 4. For non-use of Pap smears, the ORs ranged from 1.01 to 1.10 for *yes* to one and *yes* to three, respectively, relative to *no* to all. Discrimination by police had the highest OR (1.09, 95% CI 1.03, 1.15). The OR increased as the number of domains in which there was discrimination increased: for women who reported experiencing discrimination in housing, by police, and in the workplace relative to women who reported no discrimination in any of those three domains, the OR was 1.10 (95% CI 1.02, 1.19) (P trend = .003). For non-use of mammography, the ORs for the summary variable ranged from 0.94 (*yes* to one versus *no* to all) to 1.00 (*yes* to three versus *no* to all). As with Pap smears, discrimination by police had the highest (OR 1.06, 95% CI 1.01, 1.11). There was a significant trend in the ORs across levels of the summary variable (P trend = 0.01). For colonoscopy, the ORs for the summary variable exhibited no significant trend.

Discussion

We have previously reported an association of perceived racial discrimination with increased incidence of breast cancer.[23] In this study, we demonstrate an association of perceived discrimination with reduced use of cervical cancer screening but no effect on breast cancer screening. Our findings that racial discrimination is associated with lower utilization of cervical cancer screening supports previous research on the effects of racial discrimination on screening and health care utilization. Facione found that perceived prejudice was associated with failing to adhere to cancer screening guidelines and fewer physician office visits. Perceived prejudice also explained the variance in access to care.[16] Among Hispanic women, Byrd found ethnic insensitivity by clinicians was a barrier to cervical cancer screening.[18] However, these findings contradict the results of Hoyo et al., showing that perceived discrimination based on race was not associated with non-adherence

to cervical cancer screening in African American women.[19] In other cancers, Mandelblatt found that perceived discrimination based on race was associated with diminished satisfaction with care in breast cancer survivors.[17] However, in this study we found that perceived discrimination was not associated with mammography utilization. Our findings support previous research that found perceived discrimination did not significantly influence seeking medical attention for breast cancer symptoms.[22]

The barrier of perceived racism and discrimination on cervical cancer screening is analogous to the findings regarding barriers to cancer screening in obese women. Amy et al. found that, in obese women, barriers to cervical cancer screening included disrespectful treatment and negative attitudes of providers.[24] If similar attitudes are experienced by Black women and attributed to racism, a similar effect may be found on their willingness to undergo cervical cancer screening. We found no association of perceived discrimination with use of mammography or colonoscopy. The process of cervical cancer screening may be perceived as more intimate, and concerns over racism might have a greater impact on women's willingness to allow pelvic examinations and receive Pap tests.[25,26]

Perceived discrimination does not seem to have the same effect on breast cancer screening. While we previously found perceived discrimination is related to an increase incidence of breast cancer, the lack of impact of discrimination on mammography utilization may represent greater community-based efforts at breast cancer awareness. Blanchard et al. and other investigators have found similar findings.[13] Additionally, these outreach efforts may allow African American women to avoid the encounters with health providers where they can be exposed to discrimination.

Our results should be interpreted with the following limitations in mind. First, we rely on self-reported information. Participants may inaccurately report their utilization of cancer screening. While colorectal screening may be the least well-understood experience, the receipt of an annual Pap smear is less likely to be inaccurately reported. Because we relied on a woman's self-report of screening utilization behavior, the longer recommended screening interval for colonoscopy (up to 10 years) versus Pap smears (one-to-two years in most cases) may have led to misclassification. To the extent that there was random misclassification, our findings on the impact of racial discrimination may be an underestimate. Second, the participants in our study were of a higher socioeconomic status (education and insurance) than the general population. Thus, they may engage in cancer screening more frequently than the African American population overall, and therefore the impact of perceived discrimination on utilization that we report here may be an underestimate. Third, the participants in this study were self-selected and their health care utilization is likely to be greater than that of the general population. This may have reduced our power to detect an association. Finally, there is no gold standard for the measurement of racism and the lack of one must be taken into account when interpreting our results.

Conclusion

Despite these limitations, our result showing that experiences of racism, whether in the form of everyday or major discrimination, are associated with poorer utilization of cervical cancer screening has important implications for understanding the barrier to cancer screening facing African American women. Developing new methods for improving utilization of cancer screening need to incorporate strategies to address concerns over discrimination. As Shinagawa writes, "Unless we acknowledge and redress institutionalized racism ... advances in cancer research ... will continue to evade our nation's minority and medically underserved communities." [27, pp. 1217-1222]

Notes

1. American Cancer Society. Breast cancer facts and figures 2007–2008. Atlanta, GA: American Cancer Society, Inc.; 2007.
2. Mandel JS, Bond JH, Church TR, et al. Reducing mortality from colorectal cancer by screening for fecal occult blood. Minnesota Colon Cancer Control Study. *N Engl J Med*. 1993 May 13; 328(19): 1365–71. [PubMed: 8474513]
3. Brosnan CA. Review: colorectal cancer screening with the faecal occult blood test reduced colorectal cancer mortality. *Evid Based Nurs*. 2007 Oct.10(4):112. [PubMed: 17905764]
4. American Cancer Society. Cancer prevention and early detection facts and figures 2007. Atlanta, GA: American Cancer Society, Inc.; 2007.
5. American Cancer Society. Cancer facts and figures 2007. Atlanta, GA: American Cancer Society, Inc.; 2007.
6. Aday LA, Andersen RM. Equity of access to medical care: a conceptual and empirical overview. *Med Care*. 1981 Dec; 19(12):4–27.
7. Williams DR. Race, socioeconomic status, and health. The added effects of racism and discrimination. *Ann N Y Acad Sci*. 1999; 896:173–88. [PubMed: 10681897]
8. Ogedegbe G, Cassells AN, Robinson CM, et al. Perceptions of barrier and facilitators of cancer early detection among low-income minority women in community health centers. *J Natl Med Assoc*. 2005 Feb; 97(2):162–70. [PubMed: 15712779]
9. Madhere S, Harrell J, Royal CD. Social ecology, genomics, and African American health: a nonlinear dynamical perspective. *J Black Psychol*. 2009; 35(2):154–79. [PubMed: 19672481]
10. Trivedi AN, Ayanian JZ. Perceived discrimination and use of preventive health services. *J Gen Intern Med*. 2006 Jun; 21(6):553–8. [PubMed: 16808735]
11. Borrell LN, Kiefe CI, Williams DR, et al. Self-reported health, perceived racial discrimination, and skin color in African Americans in the CARDIA study. *Soc Sci Med*. 2006 Sep; 63(6):1415–27. Epub 2006 Jun 5. [PubMed: 16750286]
12. Van Houtven CH, Voils CI, Oddone EZ, et al. Perceived discrimination and reported delay of pharmacy prescriptions and medical tests. *J Gen Intern Med*. 2005 Jul; 20(7):578–83. [PubMed: 16050850]
13. Blanchard J, Lurie N. R-E-S-P-E-C-T: patient reports of disrespect in the health care setting and its impact on care. *J Fam Pract*. 2004 Sep; 53(9):721–30.
14. Tilson EC, Sanchez V, Ford CL, et al. Barriers to asymptomatic screening and other STD services for adolescents and young adults: focus group discussions. *BMC Public Health*. 2004 Jun 9.4:21. [PubMed: 15189565]
15. Facione NC. Breast cancer screening in relation to access to health services. *Oncol Nurs Forum*. 1999 May; 26(4):689–96. [PubMed: 10337647]
16. Facione NC, Facione PA. Perceived prejudice in healthcare and women's health protective behavior. *Nurs Res*. 2007 May-Jun;56(3):175–84. [PubMed: 17495573]
17. Mandelblatt JS, Edge SB, Meropol NJ, et al. Predictors of long-term outcomes in older breast cancer survivors: perception versus patterns of care. *J Clin Oncol*. 2003 Mar 1; 21(5):855–63. End Page 299. [PubMed: 12610185]
18. Byrd TL, Chavez R, Wilson KM. Barriers and facilitators of cervical cancer screening among Hispanic women. *Ethn Dis*. 2007 Winter;17(1):129–34. [PubMed: 17274222]
19. Hoyo C, Yarnall KS, Skinner CS, et al. Pain predicts non-adherence to Pap smear screening among middle-aged African American women. *Prev Med*. 2005 Aug; 41(2):439–45. [PubMed: 15917039]
20. Williams DR, Yu Y, Jackson JS, et al. Racial differences in physical and mental health: socioeconomic status, stress and discrimination. *Journal of Health Psychology*. 1997; 2(3):335–51. [PubMed: 22013026]
21. Zeger SL, Liang KY. Longitudinal data analysis for discrete and continuous outcomes. *Biometrics*. 1986 Mar; 42(1):121–30. [PubMed: 3719049]
22. SAS Institute Inc. SAS 9.1.3 help and documentation. Cary, NC: SAS Institute Inc.; 2000–2004.

23. Taylor TR, Williams CD, Makambi KH, et al. Racial discrimination and breast cancer incidence in U.S. Black women: the Black Women's Health Study. *Am J Epidemiol*. 2007 Jul 1; 166(1):46–54. Epub 2007 Mar 30. [PubMed: 17400570]
24. Amy NK, Aalborg A, Lyons P, et al. Barriers to routine gynecological cancer screening for White and African-American obese women. *Int J Obes (Lond)*. 2006 Jan; 30(1):147–55. [PubMed: 16231037]
25. Glasgow RE, Whitlock EP, Valanis BG, et al. Barriers to mammography and pap smear screening among women who recently had neither, one or both types of screening. *Ann Behav Med*. 2000 Summer;22(3):223–8. [PubMed: 11126467]
26. Jacobs EA, Karavolos K, Rathouz PJ, et al. Limited English proficiency and breast and cervical cancer screening in a multiethnic population. *Am J Public Health*. 2005 Aug; 95(8):1410–6. [PubMed: 16043670]
27. Shinagawa SM. The excess burden of breast carcinoma in minority and medically underserved communities: application, research, and redressing institutional racism. *Cancer*. 2000 Mar 1; 88(5 suppl):1217–23. [PubMed: 10705358]

Cancer Screening Status for Pap Smear in 1997, Mammography in 1997, and Colonoscopy in 1999 By Selected Study Characteristics

Table 1

Characteristic	Pap smear status (%) (N=46,956)		Mammography (%) (N=46,804)		Colonoscopy (%) (N=23,924)	
	No (N=5,004)	Yes (N=41,952)	No (N=22,093)	Yes (N=24,711)	No (N=19,132)	Yes (N=4,792)
Age (years)						
<30	2.5	3.0	5.6	0.5	0.1	0.0
30-39	19.4	30.7	55.8	5.8	29.1	6.1
40-49	32.0	33.9	29.3	37.6	36.4	16.6
50-59	27.5	22.3	7.3	36.8	24.4	37.4
60	18.6	10.1	2.0	19.3	10.0	39.9
p-value (chi-square test)	<.0001		<.0001		<.0001	
Education (years)						
12	20.6	15.1	13.6	17.5	13.3	16.4
13-16	37.6	36.3	38.6	34.6	36.9	32.8
17	41.8	48.6	47.8	47.9	49.8	50.8
p-value (chi-square test)	<.0001		<.0001		<.0001	
Cigarette smoking (# per day)						
0	78.5	84.9	85.5	83.2	85.9	87.4
1-14	14.9	11.5	11.4	12.3	10.9	8.8
15+	6.6	3.5	3.1	4.5	3.2	3.8
p-value (chi-square test)	<.0001		<.0001		.20	
Alcohol (# drinks/week)						
<1	73.1	72.9	73.4	72.5	71.8	72.9
1-6	21.1	23.5	23.2	23.2	23.9	22.6
7+	5.8	3.6	3.4	5.2	4.3	4.5
p-value (chi-square test)	<.0001		<.0001		<.0001	
Health insurance						
No	18.6	5.8	10.4	4.2	7.3	3.6
Yes	81.4	94.2	89.6	95.8	92.7	94.4
p-value (chi-square test)	<.0001		<.0001		<.0001	
Have own physician or nurse practitioner						
No	30.5	9.5	18.1	6.0	13.1	4.6

Characteristic	Pap smear status (%) (N=46,956)		Mammography (%) (N=46,804)		Colonoscopy (%) (N=23,924)	
	No (N=5,004)	Yes (N=41,952)	No (N=22,093)	Yes (N=24,711)	No (N=19,132)	Yes (N=4,792)
Yes	69.5	90.5	81.9	94.0	86.9	95.4
p-value (chi-square test)		<.0001		<.0001		<.0001
Had general physical						
No	37.3	7.0	16.3	4.8	12.1	4.2
Yes	62.7	93.0	83.7	95.2	87.9	95.8
p-value (chi-square test)		<.0001		<.0001		<.0001
Marital status						
Married or living as married	34.5	42.8	38.0	45.3	42.8	47.1
Separated, widowed, or divorced	33.6	26.8	18.4	35.8	26.2	39.2
Single	31.9	30.4	43.6	18.9	31.0	13.7
p-value (chi-square test)		<.0001		<.0001		<.0001

Table 2

Association of Racism Variables with Selected Study Characteristics

Characteristic	Everyday discrimination (%)		Major discrimination (%)	
	1st quartile (N=8,735)	4th quartile (N=11,818)	No to all (N=5,378)	Yes to three (N=14,262)
Age (years)				
<30	11.1	20.8	10.7	18.8
30–39	28.0	36.5	31.0	33.2
40–49	30.1	30.0	37.8	27.4
50–59	18.9	10.6	16.1	13.6
60	11.9	2.1	4.4	7.0
p-value (chi-square test)		<.0001		<.0001
Education (years)				
12	21.5	14.3	12.2	21.1
13–16	35.8	38.4	36.0	36.2
17	42.6	47.3	51.8	42.7
p-value (chi-square test)		<.0001		<.0001
Cigarette smoking (# per day)				
0	84.2	82.9	82.2	85.1
1–14	11.9	12.7	13.4	11.4
15+	3.9	4.4	4.4	3.5
p-value (chi-square test)		<.028		<.0001
Alcohol (# drinks/week)				
<1	74.2	71.5	71.1	74.2
1–6	21.9	24.2	23.9	22.6
7+	3.8	4.3	5.0	3.2
p-value (chi-square test)		<.001		<.0001
Health insurance				
No	7.6	8.1	8.3	7.3
Yes	92.4	91.9	91.7	92.7
p-value (chi-square test)		<.17		<.030
Have own physician or nurse practitioner				
No	10.6	13.6	12.9	11.9
Yes	89.4	86.4	87.1	88.1
p-value (chi-square test)		<.0001		<.048
Had general physical				
No	8.9	11.1	10.1	10.4
Yes	91.1	88.9	89.9	89.6
Marital status				
p-value (chi-square test)		<.0001		.51
Married or living as married	44.1	38.0	41.6	41.4
Separate, widowed, or divorced	30.7	25.8	32.6	25.9
Single	25.2	36.2	25.8	32.7

Characteristic	Everyday discrimination (%)		Major discrimination (%)	
	1st quartile (N=8,735)	4th quartile (N=11,818)	No to all (N=5,378)	Yes to three (N=14,262)
p-value (chi-square test)		<.0001		<.0001

Table 3

Multivariate Adjusted Odds Ratios (OR), and 95% Confidence Intervals (CI) for Nonuse of Pap Smear, Mammography, and Colonoscopy According to Everyday Discrimination

Discrimination variable	Multivariate adjusted ^a OR (CI)		
	Pap smear nonuse	Mammography nonuse	Colonoscopy nonuse
Received poor service than others			
Never	Reference	Reference	Reference
A few times a year	0.94 (0.87–0.99)	0.97 (0.91–1.03)	0.92 (0.85–1.00)
Once a month	1.00 (0.90–1.10)	1.02 (0.95–1.10)	0.91 (0.80–1.03)
At least once a week	0.97 (0.87–1.09)	0.95 (0.87–1.04)	0.87 (0.76–1.00)
Almost every day	1.17 (1.02–1.35)	0.98 (0.87–1.11)	0.78 (0.64–0.94)
People act as if you are less intelligent			
Never	Reference	Reference	Reference
A few times a year	1.04 (0.98–1.11)	0.99 (0.94–1.04)	0.97 (0.90–1.04)
Once a month	1.11 (1.01–1.21)	1.03 (0.96–1.10)	1.06 (0.94–1.19)
At least once a week	1.20 (1.10–1.31)	1.01 (0.94–1.08)	0.97 (0.87–1.09)
Almost every day	1.19 (1.09–1.29)	0.99 (0.92–1.06)	0.88 (0.78–0.98)
People act as if they afraid are of you			
Never	Reference	Reference	Reference
A few times a year	0.99 (0.94–1.04)	0.92 (0.89–0.96)	0.97 (0.91–1.03)
Once a month	1.04 (0.95–1.16)	0.95 (0.89–1.03)	0.95 (0.83–1.09)
At least once a week	1.09 (0.99–1.21)	0.93 (0.86–1.01)	0.96 (0.84–1.09)
Almost every day	1.18 (1.06–1.31)	0.93 (0.85–1.01)	0.87 (0.75–1.01)
People act as if you are dishonest			
Never	Reference	Reference	Reference
A few times a year	1.06 (1.01–1.12)	1.03 (0.99–1.07)	0.98 (0.92–1.04)
Once a month	1.11 (0.99–1.23)	1.04 (0.96–1.13)	1.06 (0.92–1.23)
At least once a week	1.22 (1.09–1.36)	1.02 (0.94–1.11)	1.04 (0.89–1.21)
Almost every day	1.35 (1.20–1.51)	1.04 (0.94–1.14)	0.83 (0.70–0.98)
People act as if they are better than you			
Never	Reference	Reference	Reference
A few times a year	0.99 (0.92–1.06)	0.94 (0.89–1.01)	1.01 (0.93–1.10)
Once a month	1.01 (0.92–1.12)	1.00 (0.92–1.08)	1.01 (0.90–1.13)
At least once a week	1.10 (0.99–1.21)	1.04 (0.96–1.13)	1.02 (0.90–1.15)
Almost every day	1.12 (1.03–1.22)	0.93 (0.87–1.01)	0.93 (0.84–1.03)
Summary variable			
Quartile1	Reference	Reference	Reference
Quartile 2	0.99 (0.92–1.06)	0.96 (0.90–1.02)	1.03 (0.95–1.11)
Quartile 3	1.07 (0.99–1.14)	0.96 (0.91–1.02)	0.96 (0.88–1.04)
Quartile 4	1.12 (1.04–1.20)	0.97 (0.91–1.03)	0.95 (0.87–1.04)
p-trend	.27	.15	.55

^a Adjusted for age, Body Mass Index (BMI), oral contraceptive use, hormone replacement use, educational status, marital status, health insurance, cigarette smoking, and alcohol consumption.

Table 4

Multivariate Adjusted Odds Ratios (OR), and 95% Confidence Intervals (CI) for Nonuse of Pap Smear, Mammography, and Colonoscopy According to Major Discrimination

Discrimination variable	Multivariate adjusted ^a OR (CI)		
	Pap smear nonuse	Mammography nonuse	Colonoscopy nonuse
Discrimination in housing			
No	Reference	Reference	Reference
Yes	1.06 (1.01–1.11)	0.99 (0.95–1.03)	0.98 (0.92–1.04)
Discrimination by the police			
No	Reference	Reference	Reference
Yes	1.09 (1.03–1.15)	1.06 (1.01–1.11)	1.00 (0.93–1.07)
Discrimination in the workplace			
No	Reference	Reference	Reference
Yes	1.02 (0.97–1.07)	0.95 (0.91–0.99)	0.95 (0.90–1.01)
Summary variable of major discrimination			
No to all	Reference	Reference	Reference
Yes to one	1.01 (0.95–1.07)	0.94 (0.90–0.99)	0.99 (0.92–1.07)
Yes to two	1.07 (1.01–1.13)	0.97 (0.92–1.02)	1.00 (0.93–1.08)
Yes to three	1.10 (1.02–1.19)	1.00 (0.93–1.08)	0.92 (0.84–1.01)
p-trend	.64	.01	.80

^a Adjusted for age, Body Mass Index (BMI), oral contraceptive use, hormone replacement use, educational status, marital status, health insurance, cigarette smoking, and alcohol consumption.