

Do Blacks and Whites Differ in Their Use of Health Care for Symptoms of Coronary Heart Disease?

ABSTRACT

Objectives. The purpose of this study was to identify the role of race in seeking and receipt of care for symptoms of coronary heart disease.

Methods. Data on medical care, sociodemographic characteristics, symptoms, risk factors, income, and insurance were collected in a telephone interview for a random sample of 2030 Black and White adults in inner-city Boston. Rates of care-seeking for symptoms, amounts of delay in seeking care, and rates of receipt of care were compared for Blacks and Whites after adjustment for other characteristics.

Results. Before and after adjustment for other factors, Blacks and Whites were equally likely to seek care. Average delay time was shorter for Blacks, particularly Black women. With the exception of a lower rate of referral to cardiologists among Blacks, receipt of care was similar for Blacks and Whites who sought medical attention for symptoms.

Conclusions. In an urban population of Blacks and Whites who were similar in socioeconomic status and access to medical care, there were few racial differences in coronary heart disease-related care patterns. (*Am J Public Health.* 1994;84:957-964)

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Introduction

Recent research suggests that Blacks are less likely than Whites to seek and to receive appropriate medical care for coronary heart disease, the leading cause of death in US Blacks.^{1,2} In the Edgecombe County Study, nearly half of all Blacks with repeated chest pain never discussed this pain with a doctor, compared with 27% of Whites.³ In another study, Blacks admitted to a municipal hospital with documented acute myocardial infarction had waited almost twice as long as Whites before seeking medical care.⁴ Other research suggests that Blacks make less use of ambulatory care, including office visits for coronary heart disease and other circulatory system diseases.⁵⁻⁸ Additional work indicates that Blacks seeking medical care related to coronary heart disease receive lower levels of treatment such as coronary angiography or coronary artery bypass grafting, even after disease severity is controlled,⁹⁻¹⁴ and that they receive fewer general and coronary heart disease-related diagnostic and treatment services.^{15,16}

Differences in coronary heart disease-related health care use may account for the observed similar or lower prevalence of coronary heart disease¹⁷⁻¹⁹ but higher case-fatality rates and excess mortality¹⁹⁻²⁷ in Blacks than in Whites. Delays in seeking care, which are negatively associated with prognosis and survival,^{4,28,29} could contribute to higher mortality among Blacks with coronary heart disease. Alternatively, reported incidence and prevalence rates, which are often derived from hospital discharge records rather than from population-based studies, may reflect underdetection of coronary heart disease among Blacks owing to their lower

rates of help-seeking.¹ Lower levels of care received by Blacks could contribute to both underdetection of coronary heart disease and a higher mortality rate.

These hypotheses underscore the importance of population-based samples, since studies based on unrepresentative samples (e.g., hospital discharge records) can miss persons with coronary heart disease who are not in the medical care system, who may be disproportionately Black. Moreover, non-population-based samples may lead to a biased assessment of help-seeking and care patterns. For example, one study of delay based on hospitalized patients excluded subjects who failed to reach the hospital, some of whom may have been sudden deaths who did not delay in seeking medical assistance.⁴ In addition, if Blacks who seek care are less likely than Whites to receive assistance, estimates of rates of help-seeking by Blacks based on hospital or other medical records will be too low, and lower levels of receipt of care in Blacks may be attributed incorrectly to failure to seek care. Thus population-based sampling is critical in studying racial differences in various stages of health care patterns.

A complete assessment of racial differences in utilization or receipt of health care involves identifying not only the extent of such differences, but their sources as well. That is, if there are Black-White differences in patterns of

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care, can they be explained by factors related to race? For example, past studies have found that income and insurance coverage explained racial differences in care received.^{15,30} Thus racial differences in coronary heart disease-related care patterns may be due in large part to factors related to race, such as socioeconomic status (SES), rather than to race per se.

This study examined patterns of coronary heart disease-related care in a community-based random sample of Black and White adults with similar levels of SES and geographic access to care. First, racial differences in care-seeking in response to coronary heart disease symptoms, both in whether care was sought and in the amount of delay, were assessed before and after controlling for other factors. Second, among those who sought medical assistance, the extent of unadjusted and adjusted racial differences in care received were identified.

Methods

Subject Selection

Data were from a random-digit-dialed telephone survey conducted in three inner-city Boston neighborhoods. The sample was drawn from the community rather than from hospital discharge records to include persons not in regular contact with the health care system. The study's target area consisted of seven zip codes encompassing the Dorchester, Roxbury, and Mattapan neighborhoods. These neighborhoods were selected for their relative homogeneity of household income and geographic access to care, with four major hospitals within the study boundaries and five teaching hospitals bordering the study area. Study respondents were identified through random-digit dialing in the 11 telephone exchanges serving the target area. The same number of dialings was made in each exchange to ensure that all households with telephones in the area had the same probability of being contacted. Eligibility for the study was restricted to Black and White adults born in the United States who were aged 44 to 75 years at the time of the interview. All eligible adults in a household were asked to complete a telephone interview approximately 20 minutes in length. Interviews were conducted between September 1988 and December 1989.

Outcome Measures

Respondents were asked about occurrence of the following coronary heart disease-related symptoms: chest pain, discomfort, pressure, or heaviness, collectively referred to below as "chest pain," and shortness of breath. For the purposes of this study, subjects who reported *ever* experiencing one or more of these symptoms were considered to be symptomatic. Subjects reporting a symptom were asked if they had ever seen a physician or other health care professional in response to the symptom, and if so, the time between first noticing the symptom and contacting the health care professional. Symptomatic respondents who reported ever contacting a medical person in response to chest pain or shortness of breath were considered to have sought help. Delay in help-seeking, measured separately for chest pain and shortness of breath, was defined as the amount of time (in hours) between the onset of the symptom and contact with a medical person. Receipt of care involved eight types of coronary heart disease-related care in three areas: (1) physician-recommended diagnostic procedures: electrocardiogram, treadmill or bicycle exercise test, and echocardiogram; (2) treatment: physician-recommended invasive procedures (coronary artery bypass grafting, angioplasty, and cardiac catheterization), current cardiovascular medication, and hospitalization for myocardial infarction; and (3) other coronary heart disease-related contacts with the health care system: referral to a cardiologist and diagnosis of a heart problem (large heart, heart disease, heart valve problem or heart murmur as an adult, and angina or hardening of the arteries).

Predictor Measures

Predictor information included the following sociodemographic characteristics: race, sex, age, and living situation (with someone or alone). SES measures included high school completion; amount of difficulty in paying for basic necessities, including health care; and current employment status. Respondents were asked about coverage by private insurance, Medicaid, and Medicare. Coronary heart disease risk factors included diabetes, family history of heart disease or stroke, smoking status (current, stopped in past 10 years, never smoked/stopped over 10 years ago), body mass index, diagnosed hypertension, and diagnosed elevated cholesterol. The severity of coronary heart disease symptoms at the time of first

occurrence was also noted. Questions about access to and satisfaction with the medical care system were adapted from items used in previous studies of help-seeking^{3,31} and included having a usual source of care other than a hospital emergency room, travel time to usual care source, amount of difficulty in traveling to care, level of satisfaction with the amount of time spent with the doctor, level of satisfaction with care received, and need for care not being received. General propensity to seek care was assessed by asking whether the respondent would seek help for six conditions: swelling of the ankles, chronic fatigue, shortness of breath, fainting spells, chest pain, and persistent coughing.³² Myocardial infarction symptom knowledge was defined as the number of symptoms mentioned in free recall, including chest pain, arm pain, shortness of breath, sweating, nausea, fatigue, dizziness, fainting, and loss of consciousness.

Statistical Analyses

Predictors of help-seeking in response to chest pain were identified by estimating a multivariate logistic regression model for the probability of seeking care by subjects with chest pain. A corresponding model was estimated for the probability of seeking care for shortness of breath by subjects with shortness of breath. For subjects who sought care for chest pain, a multivariate linear regression model was estimated for the amount of delay in seeking care. A similar model was estimated for delay in help-seeking for shortness of breath. Because hours of delay was highly skewed for both symptoms, a log transformation was applied.³³ For receipt of care by symptomatic persons who sought help, separate logistic regression models were estimated for each of the eight types of care. Unadjusted racial differences for each of the outcomes were assessed by including only race as a predictor. Corresponding adjusted racial differences were obtained by adding the remaining predictors. For ease of interpretation, nonoverlapping insurance categories were defined as any private insurance, any Medicare without private insurance, Medicaid only, and uninsured. Because previous analyses of coronary heart disease incidence^{1,34} and help-seeking³ indicated that racial differences vary by sex, the interaction between race and sex was included as a predictor.

Stepwise and backward elimination procedures^{33,35} (with $P \leq .05$) were employed to eliminate redundant or unre-

lated covariates from the multivariate models in order to better estimate the effects of the remaining predictors. Model fit was assessed with the Hosmer-Lemeshow statistic³⁶ for logistic regression models and residual diagnostics for the linear regressions.³³ Computations were performed with SAS³⁷ and BMDP³⁸ software. Potential nonresponse bias was examined by comparing study respondents and nonrespondents with regard to demographic characteristics from the household screening. The effect on standard errors of clustering of respondents within households was assessed by calculating design effects for each outcome.³⁹

Results

Participants

Random-digit dialing in the target area exchanges identified 2310 adults meeting the study's eligibility criteria. Eligibility status could not be determined for an additional 545 persons who did not complete an individual screening. Telephone interviews were successfully completed with 1222 Black and 808 White respondents (overall response rate = 87.9% among known eligible persons). Of the eligible persons who were not interviewed, 232 refused to participate and 48 could not be recontacted after the initial screening. Because the composition of the respondent sample (39.8% White, 37.8% male) differed very little from that of the full potential sample of 2310 persons (41.2% White, 39.2% male), no adjustments were made for nonresponse. Estimated design effects were very close to 1.00 (ranging from 0.99 to 1.06), indicating that adjustment for household clustering was not necessary.

Of the respondents, 627 Blacks (51.3%) and 380 Whites (47.0%) reported ever experiencing at least one coronary heart disease symptom. Although household income was generally low, Blacks tended to have lower levels of SES than Whites, as seen in education, difficulty in paying for basic necessities, and insurance coverage (Table 1). Blacks had higher rates of diabetes and hypertension but a lower rate of family history of coronary heart disease. Body mass index was slightly lower on average in Whites. The two groups were similar in perceived seriousness of symptoms. With the exception of longer travel times for Blacks, access and satisfaction with care were similar in the two groups. Blacks had a higher propensity to seek care, whereas

TABLE 1—Characteristics of Symptomatic Respondents

	Blacks (n = 627)	Whites (n = 380)
Demographics		
Female, %	66.2*	54.7
Mean age, y (SD)	56.0 (8.1)*	58.8 (8.7)
Living alone, %	28.0	24.2
Socioeconomic status		
Completed high school, %	56.6*	79.2
Very difficult paying for basics, %	37.3*	18.3
Currently employed, %	53.1	53.4
Insurance		
Private, %	62.2*	79.8
Medicaid, %	21.8*	6.4
Medicare, %	29.5**	35.5
Uninsured, %	11.7***	6.6
Risk factors		
Current smoking, %	36.1	38.4
Diabetes, %	19.4**	14.2
Family history, %	42.2*	52.8
Mean body mass index (SD)	28.7 (6.7)*	26.8 (5.6)
Diagnosed hypertension, %	64.1*	48.2
Diagnosed elevated cholesterol, %	30.9	34.4
Symptoms		
No chest pain, %	22.1	24.0
Somewhat/very serious chest pain, %	43.4	40.9
No SOB, %	40.5	37.9
Somewhat/very serious SOB, %	29.8	30.8
Access/satisfaction		
> 30 min travel time, %	18.9*	10.0
Enough time with physician/nurse, %	93.5	93.0
No difficulty in getting to care, %	83.5	85.5
Usual source of care %	86.6	85.0
Very satisfied with care, %	77.7	81.2
Not getting needed care	21.7***	14.8
Propensity/knowledge		
Would seek care for six symptoms, %	65.7*	47.6
Mean no. of myocardial infarction symptoms known (SD)	2.5 (1.3)*	3.0 (1.4)
Help-seeking		
Sought care for chest pain, ^a %	69.5	70.5
Sought care for SOB, ^a %	63.8	59.0
Median delay in seeking care for chest pain, ^b h (SD)	49.0 (388 565)	73.0 (176 799)
Median delay in seeking care for SOB, ^b h (SD)	96.0 (176 964)**	336.0 (573 968)

Note. SOB = shortness of breath.

^aRespondents with this symptom only.

^bHelp-seeking respondents only.

*Racial difference significant, $P \leq .001$.

**Racial difference significant, $P \leq .05$.

***Racial difference significant, $P \leq .01$.

Whites' knowledge of myocardial infarction symptoms was slightly higher.

Help-Seeking in Response to Coronary Heart Disease Symptoms

There were no racial differences in rates of help-seeking for chest pain or shortness of breath for either sex. The

unadjusted odds ratio for Black men vs White men was 0.69 (95% confidence interval [CI] = 0.42, 1.14) for chest pain subjects and 1.08 (95% CI = 0.64, 1.81) for shortness of breath subjects. The corresponding odds ratios for women were 1.12 (95% CI = 0.74, 1.72) and 1.28 (95% CI = 0.82, 2.00). Adjusted racial

TABLE 2—Predictors of Help-Seeking in Response to Symptoms (Logistic Regression) and Delay by Help-Seekers (Linear Regression)

Predictor	Help-Seeking				Log of Hours Delayed			
	Chest Pain (n = 754)		Shortness of Breath (n = 585)		Chest Pain (n = 468)		Shortness of Breath (n = 303)	
	OR	95% CI	OR	95% CI	Coefficient	95% CI	Coefficient	95% CI
Demographics								
Black race								
Men only	0.80	0.46, 1.40	1.13	0.62, 2.03	0.80	-0.22, 1.82	-0.95	-2.36, 0.46
Women only	1.06	0.66, 1.71	1.08	0.65, 1.81	-0.57	-1.41, 0.27	-1.62	-2.74, -0.50
Female sex								
Whites only	1.14	0.65, 1.98	1.29	0.72, 2.33	0.65	-0.35, 1.65	-0.22	-1.59, 1.15
Blacks only	1.50	0.96, 2.36	1.24	0.76, 2.04	-0.70	-1.54, 0.14	-0.90	-2.06, 0.26
Socioeconomic status								
Currently employed	...	...	...	...	0.97	0.35, 1.59	...	...
Very difficult paying for basics	...	...	1.67	1.12, 2.48	...	...	...	...
Insurance coverage: uninsured	0.43	0.25, 0.64	...	...	...	...	...	...
Risk factors								
Current smoking	...	...	0.47	0.32, 0.68	...	...	...	...
Hypertension	1.71	1.22, 2.40	...	...	...	...	...	...
Elevated cholesterol	...	...	...	...	0.86	0.21, 1.50	...	...
Symptoms								
Serious chest pain	4.51	3.20, 6.36	...	...	-1.72	-2.39, -1.05	-0.90	-1.78, -0.02
Serious shortness of breath	...	...	3.34	2.30, 4.85	...	...	-1.92	-2.82, -1.02
Access/satisfaction								
Very difficult to reach care	...	...	...	...	...	...	-1.95	-3.71, -0.19
Very satisfied with care	...	...	1.67	1.07, 2.59	...	...	...	...
Propensity/knowledge								
Would seek care for six symptoms	...	...	1.56	1.08, 2.26	-0.95	-1.60, -0.30	-1.00	-1.88, -0.12
Myocardial infarction knowledge	1.24	1.09, 1.41	1.29	1.12, 1.49	...	...	...	...

Note. OR = odds ratio; CI = confidence interval.

differences (Table 2) tended to be even smaller. Results in terms of relative risk⁴⁰ (not shown here) were similar. Help-seeking was associated with insurance coverage but also with greater difficulty in paying for basics. Symptom severity and hypertension also were positively related to help-seeking, as were satisfaction with care and greater myocardial infarction knowledge. Smokers were less likely to seek care for shortness of breath. No other factors were predictive of help-seeking after these variables were controlled. Model fits were satisfactory.

Among those who sought care, Black women had a lower average (log) delay time than White women. Unadjusted effects were -0.86 (95% CI = -1.74, 0.02) and -1.84 (-3.00, -0.67) for chest pain and shortness of breath, respectively. Corresponding unadjusted effects in men were not significantly different from 0 at 0.59 (95% CI = -0.48, 1.65) and -1.14 (95% CI = -2.61, 0.34). Adjusted racial differences (Table 2) were similar in magnitude. Delay time was negatively associated with severity of symptoms and

general propensity to seek care. Subjects with elevated cholesterol and current employment had longer delays in seeking care for chest pain. Subjects reporting great difficulty in reaching care had shorter delay times in seeking care for shortness of breath. Model fits were satisfactory.

Care Received by Those Who Sought Medical Attention

Among those who sought care, the relationship between race and care received differed by sex (Table 3). White men tended to have the highest rates of care and White women the lowest, particularly for recommended invasive procedures and cardiac medication, whereas rates for Black men and Black women tended to be similar. An exception was referral to a cardiologist, for which rates were significantly lower for Blacks than for Whites regardless of sex. Controlling for factors other than race did not substantially alter these patterns. The only statistically significant adjusted racial

difference occurred for referral to a cardiologist (Table 4), for which the adjusted odds of referral for Blacks were roughly half the corresponding odds for Whites, regardless of sex. For recommended diagnostic procedures (Table 5) and treatments (Table 6), adjusted rates tended to be somewhat higher for Whites among men and lower for Whites among women. Results in terms of relative risk were consistent.

Adjusted differences by sex were more pronounced in Whites than in Blacks, particularly in rates of recommended treadmill tests, recommended invasive procedures, and cardiac medication. Other demographic factors related to care included age, which was positively associated with cardiac medication and diagnosis of a heart problem. Those living alone had a higher rate of hospitalization for myocardial infarction. Symptom severity and risk factors, particularly hypertension, elevated cholesterol, and diabetes, were consistently positively associated with care received, with the exceptions of current smoking and increased body mass

index. Except for current employment, which was negatively related to receipt of care, SES and insurance coverage had little consistent effect on receipt of care after other factors were controlled. Subjects reporting no difficulty in paying for basic necessities had higher rates of recommended invasive procedures. Completion of high school was negatively associated with hospitalization for myocardial infarction, and being uninsured was negatively associated with recommended electrocardiogram. Measures of access, satisfaction, and knowledge also played a small role in predicting care received among help-seekers. Having a usual source of care other than a hospital emergency room was positively associated with recommended treadmill tests but negatively associated with recommended invasive procedures. Adequate time with the doctor or nurse was positively related to being told of a heart problem. Higher levels of myocardial infarction knowledge were linked with higher rates of care. Model fits were satisfactory.

Discussion

We found that, in an urban low-SES population of Blacks and Whites who were similar with respect to SES and access to care, there were few racial differences in coronary heart disease-related care patterns, either in help-seeking behavior or in care received. Although racial differences varied by sex, rates of help-seeking and care received generally did not differ significantly for Blacks and Whites. Exceptions were delay in seeking care (delays were somewhat shorter for Blacks, particularly for women) and referral to a cardiologist (rates were lower for Blacks). These racial differences persisted after other factors were controlled. The general lack of racial differences in care patterns even before adjustment for other factors may have resulted from the similarity of Black and White subjects with regard to important predictors such as severity of symptoms and employment status.

Although help-seeking behavior was similar for symptomatic men and women, help-seeking women received less care, particularly among Whites. As might be expected, the strongest and most consistent predictors of health care outcomes were risk factors and perceived seriousness of symptoms. The positive relation-

TABLE 3—Rates (%) of Coronary Heart Disease Care Received by Subjects Who Sought Medical Care, by Race and Sex

Type of Care	Black Men (n = 136)	White Men (n = 120)	Black Women (n = 305)	White Women (n = 142)
Recommended diagnostic procedures				
Electrocardiogram	88.0	86.7	91.4	92.2
Treadmill test	43.0	50.8	42.8	38.7
Echocardiogram	29.7	28.4	32.1	25.7
Treatments				
Recommended invasive procedures	20.3*	31.1	16.9	14.1
Medication	19.1	28.3	17.7	16.9
Hospitalization for myocardial infarction	18.4	22.5	9.8	13.4
Other contacts				
Referral to a cardiologist	26.9*	40.0	19.3*	29.8
Received diagnosis of heart problem	42.9	43.3	42.6	41.6

*Within-sex racial difference significant, $P < .05$.

TABLE 4—Predictors of Care Received by Help-Seeking Respondents: Other Contacts with Health Care System

Predictor	Referral to Cardiologist (n = 686)		Received Diagnosis of Heart Problem (n = 677)	
	AOR	95% CI	AOR	95% CI
Demographics				
Black race				
Men only	0.56	0.31, 0.99	1.12	0.65, 1.96
Women only	0.54	0.33, 0.91	1.12	0.71, 1.78
Female sex				
Whites only	0.56	0.32, 0.98	0.90	0.52, 1.54
Blacks only	0.54	0.32, 0.91	0.90	0.57, 1.42
Age ^a	...	...	1.22	1.09, 1.36
Socioeconomic status: currently employed	0.49	0.33, 0.72	0.65	0.44, 0.94
Risk factors				
Diabetes	...	...	1.87	1.22, 2.55
Hypertension	1.67	1.10, 2.53	1.67	1.17, 2.37
Elevated cholesterol	1.99	1.36, 2.93	...	...
Symptoms				
No chest pain	0.36	0.21, 0.64	0.33	0.21, 0.54
No shortness of breath	0.46	0.30, 0.71	0.65	0.45, 0.94
Satisfaction with care: time with physician/nurse	...	...	2.50	1.16, 5.38
Propensity/knowledge: myocardial infarction knowledge	1.26	1.10, 1.43	1.15	1.02, 1.30

Note. AOR = adjusted odds ratio; CI = confidence interval.

^aEffect of 5-year increase.

ship between difficulty in paying for basic necessities and help-seeking was consistent with Aday and Andersen's⁵ finding that low-income subjects had more hospital admissions and physician visits than

those with high incomes, partly because of poorer health. Respondents who were currently employed, and hence likely to be younger or healthier than others, also had longer delays. Shorter delays among those

TABLE 5—Predictors of Care Received by Help-Seeking Respondents: Recommended Diagnostic Procedures

Predictor	Recommended Electrocardiogram (n = 687)		Recommended Treadmill Test (n = 692)		Recommended Echocardiogram (n = 668)	
	AOR	95% CI	AOR	95% CI	AOR	95% CI
Demographics						
Black race						
Men only	1.59	0.71, 3.53	0.74	0.43, 1.26	1.08	0.59, 1.97
Women only	1.03	0.48, 2.23	1.16	0.75, 1.79	1.30	0.80, 2.14
Female sex						
Whites only	1.78	0.76, 4.17	0.57	0.34, 0.97	0.88	0.49, 1.61
Blacks only	1.59	0.57, 2.35	0.90	0.58, 1.38	1.07	0.66, 1.74
Socioeconomic status: currently employed	0.40	0.23, 0.70	0.68	0.49, 0.94	0.53	0.37, 0.77
Insurance coverage: uninsured	0.43	0.20, 0.94	...	...	...	...
Risk factors						
Current smoking	0.45	0.26, 0.75	0.57	0.40, 0.80	...	...
Hypertension	...	...	...	...	1.64	1.11, 2.43
Elevated cholesterol	2.08	1.09, 3.97	2.11	1.51, 2.94	2.26	1.57, 3.26
Symptoms						
No chest pain	...	...	0.45	0.29, 0.70	0.34	0.20, 0.58
No shortness of breath	...	...	0.43	0.30, 0.61	0.43	0.29, 0.65
Access to care: usual source of care	...	...	1.86	1.11, 3.11	...	...
Propensity/knowledge: myocardial infarction knowledge	1.44	1.16, 1.80	...	...	...	...

Note. AOR = adjusted odds ratio; CI = confidence interval.

reporting great difficulty in reaching care may reflect the need to compensate for longer times to reach care. The lack of association between help-seeking and measures of access and satisfaction may have been due in part to respondents' seeking care from sources other than their usual source (e.g., hospital emergency rooms). Negative associations between care received and current employment may reflect the "healthy worker effect"; that is, subjects who received care may have been less likely to be healthy enough to continue working than were subjects who did not receive care. Similarly, those who received care may have been instructed to stop smoking or to lose weight and hence were less likely to continue these behaviors than were those who did not receive care.

Adjustment for socioeconomic factors and insurance coverage had little impact on Black-White differences in care, possibly because racial differences in SES in our sample were somewhat smaller than in the general population: 1980 median census tract annual household income averaged approximately \$14 000 for Whites and \$11 000 for Blacks in our sample, compared with average annual household income of approximately

\$19 000 for Whites and \$11 000 for Blacks nationally.⁴¹ Although racial differences in SES in this sample were statistically significant, the gap may not have been large enough to yield SES-related racial differences in care patterns, particularly given the similarities of Blacks and Whites with respect to other predictors. In more heterogeneous study populations, SES and insurance coverage may account for more racial differences in coronary heart disease care than we found in our sample. The longer delay times for Blacks than for Whites found by Cooper and colleagues,⁴ for example, may have resulted in part from the comparison of poor and working-class Blacks admitted to an inner-city hospital with Whites in more affluent communities. Oberman and Cutter proposed racial differences in education, income, and occupation as possible explanations for lower rates of coronary artery bypass grafting among Blacks.¹⁰ Much of the racial difference in rates of surgery found in the Coronary Artery Surgery Study was due to Whites for whom medical therapy was recommended but who chose surgical treatment,¹³ perhaps reflecting Black-White differences in ability to pay for care.

Previous work on help-seeking found lower rates of help-seeking for chest pain³ and higher rates of delay among nonobstetric and nonpsychiatric hospital admissions²⁹ in Blacks than in Whites. Neither study, however, adjusted these racial differences for perceived severity of symptoms. Consistent with past research,⁹⁻¹³ we found lower adjusted rates of recommended invasive procedures in Black men than in White men, although the difference was not statistically significant ($P = .15$). As in recent studies of care patterns by sex,^{42,43} the women in our sample, particularly White women, were less likely than men to have recommended invasive procedures even after other relevant factors were controlled. Recommended invasive procedures were positively associated with reporting no difficulty in paying for basics, similar to previous findings that privately insured patients had higher rates of cardiac surgery.⁴⁴ In addition, Blacks were significantly less likely than Whites to be referred to a cardiologist, consistent with past findings that Blacks had lower rates of referral to specialists.⁴⁵

Our findings must be interpreted with caution. First, outcome and predictor measures were self-reported and hence

TABLE 6—Predictors of Care Received by Help-Seeking Respondents: Treatment

Predictor	Recommended Invasive Procedures (n = 671)		Cardiac Medication (n = 664)		Hospitalized for Myocardial Infarction (n = 678)	
	AOR	95% CI	AOR	95% CI	AOR	95% CI
Demographics						
Black race						
Men only	0.61	0.31, 1.19	0.81	0.43, 1.54	1.02	0.49, 2.11
Women only	1.27	0.67, 2.42	1.36	0.78, 2.39	0.94	0.46, 1.92
Female sex						
Whites only	0.32	0.16, 0.64	0.54	0.29, 1.01	0.44	0.21, 0.92
Blacks only	0.67	0.37, 1.20	0.91	0.52, 1.59	0.40	0.21, 0.78
Age ^a	...	...	1.33	1.18, 1.50	1.36	1.17, 1.58
Living alone	...	...	...	...	2.08	1.24, 3.46
Socioeconomic status						
Completed high school	...	...	...	...	0.57	0.34, 0.95
Currently employed	0.44	0.28, 0.69	...	...	...	...
No difficulty paying for basics	1.63	1.01, 2.62	...	...	...	...
Risk factors						
Current smoking	0.59	0.37, 0.96	...	...	...	...
Stopped smoking	...	...	...	...	2.31	1.31, 4.07
Diabetes	2.33	1.39, 3.91	...	...	...	...
Family history	...	...	1.80	1.21, 2.70	...	...
Log body mass index ^b	0.59	0.48, 0.72	...	...	...	...
Hypertension	1.95	1.19, 3.21	...	...	...	...
Elevated cholesterol	2.12	1.37, 3.27	...	...	2.13	1.32, 3.44
Symptoms						
No chest pain	0.14	0.06, 0.33	0.40	0.22, 0.72	0.10	0.03, 0.30
No shortness of breath	0.48	0.29, 0.78	0.49	0.31, 0.76	0.40	0.23, 0.68
Access to care: usual source of care	0.52	0.28, 0.95	...	...	...	...
Propensity/knowledge: myocardial infarction knowledge	...	...	...	...	1.29	1.08, 1.52

Note. AOR = adjusted odds ratio; CI = confidence interval.

^aEffect of 5-year increase.

^bEffect of increase from 25th percentile (3.18) to 75th percentile (3.46).

subject to problems inherent in a community-based sample, such as recall bias and misunderstanding of survey questions. Moreover, as Strogatz³ points out, perception and report of chest pain and other symptoms may differ for Blacks and Whites and thus may not have been adequately addressed by the survey questions regarding symptoms. Any such racial differences in reporting of symptoms could have affected the estimation of racial differences in care patterns. Self-reports of medical conditions, however, including reports of chronic heart conditions,⁴⁶⁻⁴⁹ have been found to have a fairly high level of agreement with medical records. In addition, the self-reported data collected here did not include clinical measures, which would inform clinical decision making. We note, however, that no judgments were made in this study regarding appropriateness of care received.

Second, it was not feasible to ascertain the timing of outcomes relative to

timing of occurrence of symptoms and other predictors. As noted previously,³ perceptions or reports of symptoms and risk factor status, as well as measures of access, satisfaction, and knowledge, may be results rather than causes of seeking and/or receiving care. When the models for help-seeking and receipt of care were reestimated with measures of access, satisfaction, and knowledge omitted, however, adjusted racial differences changed very little. A related problem is that predictors such as insurance coverage were current measures and hence may not have been relevant to care patterns for symptoms first occurring years earlier. Analyses restricted to subjects with symptom onset less than a year before the interview, however, yielded similar results.

The results presented here raise two main issues needing further examination. First, it is not clear why help-seeking Blacks were significantly less likely than help-seeking Whites to have been re-

ferred to a cardiologist, even after risk factors, severity of symptoms, and ability to pay for care were controlled. This result is particularly surprising considering the lack of Black-White differences in reported treatments and procedures normally associated with cardiology practice. When a low significance level (.01) was substituted for a level of .05 to compensate for multiple hypothesis testing,⁵⁰ this racial difference remained statistically significant. Second, White women had consistently lower rates of receipt of care than the other three race-sex groups, and women of both races had lower rates of referral to a cardiologist than did men, even after other factors were accounted for. Further study is needed to determine whether these differences can be explained by factors not adequately measured in this study, such as clinical data, or whether they reflect true racial and sex differences in receipt of coronary heart disease-related care. □

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