Acute Chest Pain in African Americans: Factors in the Delay in Seeking Emergency Care

ABSTRACT

Objectives. African Americans have been shown to have longer delay times than the majority population in seeking care for acute cardiac problems. The purpose of this study was to determine whether socioeconomic factors affect delay times.

Methods. Structured interviews were administered to 254 African Americans admitted to a public hospital and 194 African Americans admitted to a private hospital for suspected acute myocardial infarction.

Results. Patient characteristics found by multiple regression analysis to affect decision-making and travel time for care-seeking were structural access to care, persistence of symptoms, degree of incapacitation, consultation with a layperson, consultation with medical professionals, and mode of transportation.

Conclusions. Within-group differences were found to be related to socioeconomic status. Strategies to increase knowledge about heart attack symptoms, improve access to care, and improve the socioeconomic status of at-risk African Americans are indicated. (*Am J Public Health.* 1994;84:965–970)

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Introduction

According to many studies, African Americans have higher rates of morbidity and mortality from ischemic heart disease than US Whites, both as inpatients and as outpatients.[1–11] Treatment delay blunts the effectiveness of new therapies,[12,13] and African Americans have been shown to receive less specialized care, including coronary artery bypass graft surgery.[14–17] Inordinately long delay times have been documented in this population group,[18] and socioeconomic status (SES) may be an added factor.[19–22] Symptom response is said to be influenced by social and psychological factors including demographic characteristics,[23] previous experience with the medical care system,[24] perceptions of symptom quality and severity,[25] beliefs about care-seeking appropriateness[23] and effectiveness,[24] and accessibility of care. Whether African-American patients who seek prompt care have different characteristics than those who do not is not clear.

We report results from a large study of health care–seeking behavior for acute chest pain. We compare the duration of care-seeking behavior in African Americans of lower and middle SES. We examine associations between demographic and medical care utilization characteristics and the duration of care-seeking behavior among African-American patients who sought care in an emergency room and were subsequently hospitalized for acute chest pain. Duration of care-seeking refers to the length of time between symptom onset and arrival at the hospital. Consistent with the perspective that patients engage in social and psychological processes in deciding to seek emergency medical care,[25] the duration between symptom onset and the decision to seek emergency care (decision phase) is examined separately from the time between decision to seek care and hospital arrival (travel logistics phase).

Methods

Study Sample

Between August 1988 and July 1990, three consecutive case series of African-American, Latino, and non-Latino White patients hospitalized for acute chest pain were recruited from two Los Angeles medical centers: a large urban public hospital where the majority of patients had no insurance and often no other source of medical care, and a large urban private health maintenance organization (HMO) hospital where virtually all patients had insurance and a regular source of care. In this report we examine the African-American sample, which consisted of 254 patients from the public hospital and 194 patients from the private hospital. Because they were recruited consecutively, these patients are presumed to be representative of those receiving care at each medical center. Exclusionary criteria for patients of all three racial/ethnic groups were the following: unwillingness to give consent, severity

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TABLE 1—Demographic and Medical Care Utilization Characteristics (%) of African-American Patients, by Type of Hospital

	Public Hospital (n = 254)	Private (n = 194)	P
Sex			
Male	52	51	NS
Female	48	49	
Marital status			
Married/living together	23	58	.0001
Unmarried	77	42	
Age, y			
<44	26	13	.0001
45–64	56	50	
≥65	18	37	
Education, y			
≤8	19	10	.0001
9–12	55	37	
≥13	26	53	
Hollingshead Index[a]			
1–3	25	59	.0001
4–5	75	41	
Employment			
Full-time	18	47	.0001
Part-time	17	4	
Unemployed	5	1	
Retired	11	32	
Disabled	42	12	
Homemaker	6	4	
Monthly income			
<$1000	97	19	.0001
>$1000	3	81	
Health insurance			
Yes	25	99	.0001
No	75	1	
Medical care utilization			
Regular source of care	72	96	.0001
Waiting time ≥1 h	62	0	.0001
Physician spends enough time	86	92	.04
Regular physician visits	58	54	NS
Previous emergency room visits	46	31	.001

[a]Hollingshead Two-Factor Index of Social Position.[26]

of illness, inability to cooperate because of mental status, and alternative clinical diagnoses (i.e., acute pneumonia with pleuritic chest pain, acute costrochondritis). The most common reason for nonparticipation of eligible patients was discharge prior to being interviewed. Participation rates were 58% for African-American patients screened at the public hospital and 65% for those at the private hospital.

Data Collection

All patients were interviewed in the hospital by a bilingual, bicultural interviewer. A detailed structured questionnaire incorporating instruments previously used in surveys of health care behavior and access to care was completed for each study subject. In this report we analyze data from the questionnaire that pertain to the lengths of the decision and travel logistics phases: the former includes time spent in interpreting symptoms, trying self-care methods, and consulting laypersons or medical professionals, and the latter includes time spent in obtaining transportation and actually traveling to the hospital. To record the duration of the care-seeking phases, interviewers verified times by using a benchmark technique whereby the patient was asked to verify the times reported with an event occurrence, daily routine, or break in routine.

Patient characteristics previously shown or hypothesized to influence the duration of care-seeking behavior for acute symptoms were also examined. These included sex, age, marital status, previous history of coronary heart disease, perceived general health status, experience of a prodromal episode prior to the time of acute onset, having regularly seen a doctor within the past year, having had an emergency room visit within the past 6 months, and patients' reported perception and causal attribution of the acute symptoms. These data were obtained with an existing instrument.[25] SES indicators include education and the Hollingshead Two-Factor Index of Social Position.[26] Measures of access to care include health insurance, a regular source of care, and hospital site.

Data Analysis

Bivariate associations were examined with chi-square Wilcoxon and Kruskal-Wallis rank sum statistics and two-way analysis of variance to assess relationships between duration phases and other variables. Multiple regression modeling methods (including both forward inclusion and backward elimination) were used to compare results between study cohorts.[27,28] In view of the wide ranges and skewed distributions of duration measurements, the median test is reported along with mean difference in bivariate analyses; log transformations for the duration variables were used in the multivariate analyses. If care-seeking duration exceeded 1 week, or if the subject reported travel time to the hospital as 0 hours, the subject was deleted from the analyses (n = 9 public hospital and 3 private hospital patients).

Results

The sampling design was expected to yield significantly different patient populations with respect to SES and access to care as well as overall experiences with medical care and previous encounters with health care systems. The data presented in Table 1 show that compared with African-American patients in the private hospital, those in the public hospital were disadvantaged with respect to all measured SES indicators (income, Hollingshead Index, and education), less likely to have health insurance or a regular source of care, and more likely to have had a previous emergency room visit. The public-hospital patients also reported less satisfaction with previous encounters with the health care system. These results support the hypothesis that hospital site is an indicator of access to care.

The total study population mean, median, and range for the time between onset of symptoms and the decision to seek emergency care were 9.14 hours, 1.90 hours, and 0 to 122 hours, respectively; corresponding values for the time to arrive at the hospital following the decision to seek care (i.e., the travel logistics phase) were 5.74 hours, 0.75 hours, and 0.2 to 169 hours. The mean and median durations of the decision and travel logistics phases were compared by SES and access-to-care indicators, sex, previous health status, characteristics of the acute symptoms, and patient behaviors (Table 2). The results demonstrate significant within-group differences among African-American patients. Public hospital patients, those without health insurance, and those who reported usual waits of 1 hour or more to see a physician reported longer times in reaching the decision to seek care. Women experienced a significantly longer travel logistics phase and a longer, but not significantly longer, decision phase than men. Care-seeking durations did not vary between patients having a regular source of care and those not having a regular source of care. The results indicate a trend toward longer times before seeking care among the less educated and lower-SES patients, but these differences were not significant.

Previous history of angina, acute myocardial infarction, or experience of a prodromal symptom phase did not result in significant differences in care-seeking duration; however, care-seeking times were shorter for those with a positive history. In contrast, self-reported health status and being alone at the time of acute symptom onset were associated with a longer decision-phase time. Whether patients attributed their symptoms to a particular cause or did not know the possible cause did not affect the decision-phase duration but appeared to influence the duration of the travel logistics phase. However, when patients perceived their chest pain to be continuous and incapacitating, the duration of care-seeking was significantly shorter than when patients perceived the pain to be intermittent or nonincapacitating (Table 2).

The following specific patient behaviors also influenced care-seeking duration: engaging in self-care by taking medications, informing other members of one's social network about the symptoms, calling a physician or paramedics for consultation, and mode of transportation.

To examine the relative contribution of factors found to distinguish care-seeking duration, multiple regression analyses were conducted. With the variables found to be significant in Table 2 (the variable "waiting time more than 1 hour" was excluded from this analysis because it was not applicable to patients without a regular source of care), the results of analyses using forward inclusion and backward elimination techniques were identical (Table 3). Hospital site, severity of acute symptoms, informing a layperson, consulting a medical professional, and mode of transportation were significant predictors of the duration of the decision phase; having informed a layperson and transportation mode were significant predictors of the duration of the travel logistics phase. Separate analyses for each hospital site (not shown) found that being alone, degree of incapacitation, and transportation were significant predictors of decision-phase duration among public hospital patients ($R^2 = .24$); having told a layperson, symptom pattern, degree of incapacitation, and having taken medication were significant predictors of decision-phase duration among private patients ($R^2 = .18$). Mode of transportation predicted the travel time for each site.

Discussion

This study is the first reported detailed examination of African-American care-seeking behavior for acute chest pain in which comparisons are made between lower- and middle-SES patients and between patients with different levels of structural access to medical care. These results enhance our knowledge about the duration of prehospital behavior, including time spent in deciding to seek medical care and time spent traveling to the hospital, among African Americans who decide to seek emergency care and are subsequently hospitalized. Our findings for African-American patients are similar to other researchers' findings for predominantly White populations,[13,25] but we also uncovered differences specific to the care-seeking behavior of African Americans by access to care, SES, and sex.

The total prehospital median duration found in this study of 2.65 hours (decision phase time = 1.90 hours, travel logistics phase time = 0.75 hours) is longer than the 2.00 hours reported in a study conducted in a predominantly White population.[13] In contrast, an earlier study of African-American patients at Cook County Hospital reported a mean prehospital duration of 20.2 hours, compared with 16.22 for public hospital patients in this study, and a median of 6.4 hours for hospitalized patients with acute myocardial infarction.[18] It is noteworthy that in our study, the mean and median durations of the decision phase were significantly longer for patients receiving care at the public hospital than for those receiving care at the private hospital. We also found that patients without health insurance had a significantly longer decision phase time than those with health insurance. These results are consistent with results from a survey of 12 068 patients hospitalized for various reasons in which it was found that delay in obtaining medical care was 40% to 80% greater for patients who were African-American, poor, uninsured, or without a regular physician.[29]

As found in previous studies,[13,18,25] the time patients spend in reaching the decision to seek emergency medical care accounts for the largest proportion of the total duration of care-seeking behavior. Results from the bivariate analyses shown in Table 2 also indicate a trend in which lower socioeconomic class and limited education further define African Americans who delay the decision to obtain medical care. In addition, our results indicate that African-American women experienced longer prehospital durations following symptom onset than did men. This finding is noteworthy (as well as consistent with results from other studies[18,30]) because women, particularly African-American women, are at greater risk than men for poor coronary heart disease outcomes.[4,5,8,18,29]

The results of the multivariate analyses demonstrate that structural access to care, as indicated by hospital site, was a significant predictor of duration of the decision phase. Our findings provide evidence that socioeconomic factors may influence the care-seeking behavior of African Americans, primarily through a relationship to access to care.

Patients' symptom perceptions and whether they told others in their social network and/or consulted medical professionals were also significant predictors of the duration of the decision phase. These results are consistent with previous research[25,30–32] and indicate that the decision to seek medical care by African Americans is influenced by factors similar to those found to influence the decision in predominantly White populations.[13]

Public education[33–35] about the importance of cardiac symptomatology may have helped influence the care-seeking behavior of patients in our sample. On the

TABLE 2—Duration of Care-Seeking Behavior, by Demographic, Utilization, Clinical History, Symptom, and Patient Behavior Characteristics

	Decision Phase[a]				Travel Logistics Phase[b]			
	Mean, h	95% CI	Median, h	95% CI	Mean, h	95% CI	Median, h	95% CI
Demographics								
Hospital								
Public	11.02*	8.1, 13.9	2.50*	1.8, 3.2	4.20	2.1, 6.3	0.83	0.7, 1.0
Private	6.99	4.9, 9.1	1.07	0.4, 1.7	7.50	4.1, 10.9	0.67	0.6, 0.8
Health insurance								
Yes	7.83**	5.6, 10.0	1.00**	0.6, 1.4	6.54	3.8, 9.3	0.67	0.6, 0.8
No	11.15	8.0, 14.3	2.67	1.5, 3.8	4.63	2.0, 7.3	1.00	0.9, 1.1
Hollingshead Index[c]								
1–3	5.79	4.2, 7.4	1.50	0.7, 2.3	6.35	3.2, 9.5	0.68	0.4, 0.9
4–5	11.58	8.7, 14.5	2.00	1.2, 2.8	5.30	2.9, 7.7	0.75	0.6, 0.9
Education, y								
≤8	12.26	5.5, 19.1	1.96	0.1, 3.8	4.93	−0.1, 9.9	1.00	0.8, 1.2
9-12	9.39	6.8, 12.0	2.00	1.4, 2.6	4.77	2.2, 7.3	0.75	0.6, 0.9
>12	7.68	5.2, 10.2	1.50	0.7, 2.3	7.16	3.7, 10.6	0.68	0.4, 0.9
Sex								
Male	7.12	4.9, 9.3	1.67	1.0, 2.4	5.20	2.8, 7.6	0.67*	0.6, 0.8
Female	11.36	8.4, 14.4	2.00	1.1, 2.9	6.34	3.3, 9.4	0.92	0.8, 1.1
Age, y								
<65	10.21	7.9, 12.5	2.00	1.4, 2.6	6.15	3.8, 8.5	0.75	0.7, 0.8
≥65	5.73	3.7, 7.7	1.29	0.2, 2.4	4.45	1.5, 7.4	0.79	0.6, 1.0
Medical care utilization								
Regular source of care								
Yes	8.02	6.2, 9.8	1.05	0.7, 1.4	5.36	3.4, 7.3	0.60	0.5, 0.7
No	7.83	3.9, 11.7	1.90	0.2, 3.6	3.38	1.0, 5.7	0.80	0.5, 1.1
Waiting time ≥1 h								
Yes	13.35*	8.5, 18.2	3.38**	2.1, 4.7	5.33	1.0, 9.6	1.00**	0.9, 1.1
No	7.68	5.5, 9.8	1.25	0.8, 1.7	6.67	3.9, 9.4	0.67	0.6, 0.8
Physician spends enough time								
Yes	9.46	7.2, 11.7	1.50	0.8, 2.2	6.52	4.0, 9.0	0.72	0.7, 0.8
No	7.60	3.3, 11.9	2.50	0.4, 4.6	4.45	−0.7, 9.6	1.00	0.6, 1.4
Regular physician visits								
Yes	9.97	7.2, 12.7	2.00	1.2, 2.8	7.39	4.2, 10.6	0.83	0.7, 1.0
No	8.16	5.8, 10.5	1.67	1.0, 2.4	3.81	2.0, 5.6	0.67	0.6, 0.8
Previous emergency room visit								
Yes	9.25	6.3, 12.2	1.96	1.3, 2.7	3.82	1.4, 6.3	0.71	0.6, 0.8
No	9.10	6.7, 11.5	1.83	1.0, 2.7	6.96	4.2, 9.7	0.83	0.6, 1.0
Clinical history								
Acute myocardial infarction								
Yes	7.89	4.8, 11.0	1.37	0.7, 2.1	4.47	1.7, 7.3	0.75	0.6, 0.9
No	9.90	7.5, 12.3	2.00	1.3, 2.7	5.78	3.5, 8.1	0.75	0.6, 0.9
Angina								
Yes	7.09	5.0, 9.1	1.54	0.8, 2.2	5.86	3.1, 8.6	0.76	0.6, 1.0
No	11.91	8.7, 15.1	2.00	0.7, 3.3	5.71	3.0, 8.4	0.67	0.4, 0.9
Prodromal phase								
Yes	7.92	5.8, 10.1	2.00	1.2, 2.8	5.09	2.6, 7.6	0.88*	0.7, 1.0
No	10.13	7.3, 13.0	1.67	0.9, 2.5	6.28	3.4, 9.1	0.67	0.6, 0.8
Self-reported health status								
Good	7.13*	5.2, 9.1	1.23*	0.6, 1.8	5.82	3.1, 8.6	0.65*	0.5, 0.8
Poor	11.39	8.2, 14.6	2.78	1.9, 3.6	5.66	3.0, 8.3	1.00	0.9, 1.1
Acute symptoms								
Attribution								
Yes	7.88	5.7, 10.0	2.00	1.2, 2.8	5.07*	2.6, 7.5	0.92*	0.8, 1.1
No	10.09	7.2, 13.0	1.67	0.9, 2.5	6.32	3.4, 9.2	0.67	0.6, 0.8
Pattern								
Intermittent	12.29***	8.7, 15.9	3.38**	1.5, 5.3	4.50	2.3, 6.7	0.83	0.6, 1.0
Continuous	5.23	3.7, 6.8	1.33	0.9, 1.8	6.52	3.3, 9.7	0.72	0.6, 0.8
Intensity								
Increasing, stable	6.49	4.2, 8.7	1.83	1.2, 2.5	4.63	2.5, 6.7	0.75	0.6, 0.9
Decreasing	7.14	4.6, 9.7	2.25	0.5, 4.0	7.87	3.1, 12.7	0.68	0.4, 0.9
Incapacitation								
Little, none	11.37***	8.4, 14.3	2.92***	1.8, 4.1	5.32	2.7, 7.9	0.83	0.7, 1.0
Severe	4.15	2.9, 5.4	1.00	0.6, 1.4	6.18	2.7, 9.6	0.62	0.5, 0.8

(Continued)

TABLE 2—*Continued*

	Decision Phase[a]				Travel Logistics Phase[b]			
	Mean, h	95% CI	Median, h	95% CI	Mean, h	95% CI	Median, h	95% CI
Patient behaviors								
Took medication								
Yes	12.58**	8.6, 16.6	3.44*	1.3, 5.6	9.42	3.4, 15.4	1.00*	−0.3, 2.3
No	7.34	5.0, 9.7	1.50	0.8, 2.2	5.26	2.9, 7.7	0.67	0.5, 0.8
Took medication after telling others								
Yes	9.60	6.6, 12.6	2.00	1.4, 2.6	5.14	2.5, 7.8	0.67	0.5, 0.8
No	8.98	2.6, 15.4	4.10	0.3, 7.9	4.38	−3.0, 11.7	0.50	0.3, 0.7
Told layperson								
Yes	9.36*	7.1, 11.6	2.08	1.2, 3.0	7.57*	4.6, 10.6	0.75	0.5, 1.0
No	8.82	5.7, 11.9	1.75	0.9, 2.6	3.18	1.3, 5.0	0.75	0.7, 0.8
Called physician or paramedics								
Yes	8.30*	5.3, 11.3	1.33	0.7, 2.0	6.23***	3.4, 9.0	0.52***	0.4, 0.6
No	9.80	7.5, 12.1	2.50	1.1, 3.9	5.36	2.7, 8.0	1.00	0.9, 1.1
Alone								
Yes	10.45**	7.2, 13.7	2.75*	1.6, 3.9	5.68	2.8, 8.6	0.75	0.6, 0.9
No	8.50	6.3, 10.7	1.25	0.7, 1.8	5.77	3.3, 8.3	0.75	0.6, 0.9
Transportation to hospital								
Paramedics	3.01***	0.9, 5.1	0.65***	0.4, 1.0	4.79***	1.5, 8.1	0.50***	0.5, 0.5
Other	10.79	8.2, 13.4	2.67	1.5, 3.8	5.38	2.9, 7.9	1.00	0.9, 1.1

[a]Time between symptom onset and decision to seek medical help.
[b]Time between decision to seek help and arrival at medical facility.
[c]Hollingshead Two-Factor Index of Social Position.[26]
*$P < .05$; **$P < .01$; ***$P < .001$.

other hand, we found that attributing acute chest pain to a heart attack or other hypothesized cause vs making no causal attribution did not predict the duration of decision making, consistent with previously reported results.[13] Furthermore, our findings raise questions about whether knowledge about cardiac symptomatology is similar among all African Americans. For example, patients receiving care at the public hospital and those without health insurance were more likely to take medication before telling others about their symptoms; this self-care behavior was associated with longer care-seeking durations.

Efforts to locate a family member for advice may forestall prompt action, and consultation with others could result in delaying the decision to obtain emergency care. Previous research found that the delay in obtaining care for acute myocardial infarction was longer when a spouse or others initiated the decision to seek medical care than when the decision was the patient's.[32] On the other hand, a family member could strongly encourage or initiate the decision to seek immediate aid. Similarly, consultation with medical professionals could result in speeding or delaying the decision to seek emergency care.[36] In this study, as in previous research, involving others in the decision-making process prolonged the time African Americans spent in reaching the decision to seek care and lengthened the travel logistics phase. Interestingly, being alone also lengthened care-seeking duration, perhaps because there was no one to act on the behalf of the patient. The wide range in the duration of the travel logistics phase suggests that many patients experience delays in getting to the hospital after deciding to seek care. Perhaps the process of enlisting non–health professionals in travel plans enhances this delay.

TABLE 3—Stepwise Multiple Regression Analyses of Decision[a] and Travel Logistics[b] Phases (Log-Transformed Data)

	Coefficient	SE	*P*
Decision phase			
Hospital (0 = public, 1 = private)	−1.0953	0.3329	.0011
Symptom pattern (0 = continuous, 1 = intermittent)	0.7435	0.2723	.0067
Degree of incapacitation (0 = severe, 1 = little or none)	0.9788	0.2752	.0004
Told layperson (0 = no, 1 = yes)	1.1171	0.3148	.0004
Consulted physician or paramedics (0 = no, 1 = yes)	0.7245	0.3224	.0253
Transportation (0 = paramedics, 1 = other)	1.8480	0.3621	.0001
Alone (0 = no, 1 = yes)	0.5410	0.2888	.0620
$R^2 = .2101$			
Travel logistics phase			
Told layperson (0 = no, 1 = yes)	0.4106	0.2072	.0483
Transportation (0 = paramedics, 1 = other)	0.9926	0.2278	.0001
$R^2 = .0581$			

[a]Time between symptom onset and decision to seek medical help.
[b]Time between decision to seek medical help and arrival at medical facility.

This study has limited generalizability because it reports the behavior of persons who successfully obtained emergency medical care. Therefore, this study does not enhance our knowledge about persons who decided not to seek care, who sought care elsewhere, or who did not survive long enough to be hospitalized. Additional limitations include sample bias resulting from the exclusion of patients seen in the emergency room but not admitted, or admitted but not interviewed before discharge; measurement error with respect to self-reported data on duration of care-seeking behavior and patients' perceptions, motivations, and behaviors; and the possibility of a chance finding of a significant association owing to the large number of comparisons made.

The results of this study emphasize the value of measuring multiple dimensions of SES,[37] including structural access to medical care, and underscore the value of conducting within-group studies of African Americans.[19] The care-seeking behavior of African Americans in our sample appears to have been influenced by factors similar to those found to influence the behavior of patients from other cultural groups, including symptom progression, degree of incapacitation, and patients' involvement of others in the decision to obtain emergency care and in arranging travel to the hospital. Assurance of access to a source of medical care as a result of HMO membership also appears to influence the time African Americans spend in deciding to seek emergency care for acute chest pain. □

References

1. Gillum RF. Coronary heart disease in Black populations, I: mortality and morbidity. *Am Heart J.* 1982;104:839–851.
2. *Report of the Secretary's Task Force on Black and Minority Health. Vol. 4: Cardiovascular and Cerebrovascular Disease.* Washington, DC: US Dept of Health and Human Services; 1986;620–638,40716.
3. Chapman JM, Frerichs RR. *Cardiovascular Disease in Los Angeles 1970–79.* Los Angeles, Calif: American Heart Association/ Greater Los Angeles Affiliate; July 1982.
4. Haywood LJ. Coronary heart disease mortality/morbidity and risk in Blacks, I: clinical manifestations and diagnostic criteria: the experience with the Beta Blocker Heart Attack Trial. *Am Heart J.* 1984;108: 787–793.
5. Toffler GH, Stone PH, Muller JE, et al. Effects of gender and race on prognosis after myocardial infarction: adverse prognosis for women, particularly Black women. *J Am Coll Cardiol.* 1987;9:473–482.
6. Sempos C, Cooper R, Kovar MG, McMillen M. Divergence of the recent trends in coronary mortality for the four major race-sex groups in the United States. *Am J Public Health.* 1988;78:1422–1427.
7. Wing S, Casper M, Riggan W, Hayes C, Tyroler HA. Socioenvironmental characteristics associated with the onset of decline of ischemic heart disease mortality in the United States. *Am J Public Health.* 1988;78: 923–926.
8. Polednak AP. Mortality from diabetes mellitus, ischemic heart disease, and cerebrovascular disease among blacks in a higher income area. *Public Health Rep.* 1990;105:393–399.
9. Keil JE, Loadholt CB, Weinrich MC, Sandifer SH, Boyle E Jr. Incidence of coronary heart disease in Blacks in Charleston, South Carolina. *Am Heart J.* 1984;108: 779–786.
10. Keil JE, Saunders DE, Lackland DT, et al. Acute myocardial infarction: period prevalence, case fatality, and comparison of black and white cases in urban and rural areas of South Carolina. *Am Heart J.* 1985;109:776–784.
11. Curry CL. Coronary artery disease in African-Americans. *Circulation.* 1991;83: 1474–1475.
12. Strogatz DS. Use of medical care for chest pain: differences between Blacks and Whites. *Am J Public Health.* 1990;80:290–294.
13. Schmidt SB, Borsch MA. The prehospital phase of acute myocardial infarction in the era of thrombolysis. *Am J Cardiol.* 1990;65: 1411–1415.
14. Oberman A, Cutter G. Issues in the natural history and treatment of coronary heart disease in Black populations: surgical treatment. *Am Heart J.* 1984;108:688–694.
15. Maynard C, Fisher LD, Passamani ER, et al. Blacks in the Coronary Artery Surgery Study (CASS): race and clinical decision making. *Am J Public Health.* 1986;76:1446–1448.
16. Wenneker MB, Epstein AM. Racial inequalities in the use of procedures for patients with ischemic heart disease in Massachusetts. *JAMA.* 1989;261:253–257.
17. Ford E, Cooper R, Castaner A, et al. Coronary arteriography and coronary bypass surgery among Whites and other racial groups relative to hospital-based incidence rates for coronary artery disease: findings from NHDS. *Am J Public Health.* 1989;79:437–440.
18. Cooper RS, Simmons B, Castaner A, et al. Survival rates and prehospital delay during myocardial infarction among Black persons. *Am J Cardiol.* 1986;57:208–211.
19. Jackson JS. Growing old in Black America: research on aging black populations. In: Jackson JS, ed. *The Black American Elderly: Research on Physical and Psychosocial Health.* New York, NY: Springer Publishing Co; 1988:3–16.
20. Haan M, Kaplan G. Poverty and health: prospective evidence from the Alameda County Study. *Am J Epidemiol.* 1987;125: 989–998.
21. James SA. Coronary heart disease in black Americans: suggestions for research on psychosocial factors. *Am Heart J.* 1984;108: 833–838.
22. Keil JE, Sutherland MS, Knapp RG, Tyroler HA. Does equal socioeconomic status in black and white men mean equal risk of mortality? *Am J Public Health.* 1992;82:1133–1136.
23. Berkanovic E, Telesky C. Mexican-American, Black-American and White-American differences in reporting illnesses, disability and physician visits for illnesses. *Soc Sci Med.* 1985;20:567–577.
24. James SA, Wagner EH, Strogatz DS, et al. The Edgecombe County high blood pressure control program, II: barriers to the use of medical care among hypertensives. *Am J Public Health.* 1984;74:468–472.
25. Alonzo AA. The mobile coronary care unit and the decision to seek medical care during acute episodes of coronary artery disease. *Med Care.* 1980;18:297–318.
26. Hollingshead AB. The two-factor index of social position. New Haven, Conn: Mimeograph; 1956.
27. Work JW, Ferguson JC, Diamond GA. Limitations of a conventional logistic regression model based on left ventricular ejection fraction in predicting coronary events after myocardial infarction. *Am J Cardiol.* 1989;64:702–707.
28. Concato J, Feinstein AR, Holford TR. The risk of determining risk with multivariable models. *Ann Intern Med.* 1993;118:201–221.
29. Weissman JS, Stern R, Fielding SL, Epstein AM. Delayed access to health care: risk factors, reasons and consequences. *Ann Intern Med.* 1991;114:325–331.
30. Turi ZG, Dyonr PH, Muller JE, et al. Implications for acute intervention related to time of hospital arrival in acute myocardial infarction. *Am J Cardiol.* 1986;58:203–209.
31. Alonzo AA. The impact of the family and lay others on care-seeking during life-threatening episodes of suspected coronary artery disease. *Soc Sci Med.* 1986;22:1297–1311.
32. Hackett TP, Cassem NH. Factors contributing to delay in responding to the signs and symptoms of acute myocardial infarction. *Am J Cardiol.* 1969;24:651–658.
33. Mitic WR, Perking J. The effect of a media campaign on heart attack delay and decision times. *Can J Public Health.* 1984;75: 414–418.
34. Frank E, Winkleby M, Fortmann SP, Farquhar JW. Cardiovascular disease risk factors: improvements in knowledge and behavior in the 1980s. *Am J Public Health.* 1993;83:590–593.
35. Herlitz J, Hartford M, Blohm M, et al. Effect of a media campaign on delay times and ambulance use in suspected acute myocardial infarction. *Am J Cardiol.* 1989; 64:90–93.
36. Alonzo AA. The impact of physician consultation on care-seeking during acute episodes of coronary heart disease. *Med Care.* 1977;15:34–50.
37. Winkleby MA, Jatulis DE, Frank E, Fortmann SP. Socioeconomic status and health: how education, income, and occupation contribute to risk factors for cardiovascular disease. *Am J Public Health.* 1992;82:816–820.