CHEST PAIN ADMISSIONS: CHARACTERISTICS OF BLACK, LATINO, AND WHITE PATIENTS IN LOW- AND MID-SOCIOECONOMIC STRATA

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To assess the potential impact of socioeconomic status (SES) factors on health-care seeking behavior for suspected acute coronary artery disease symptoms, equal numbers of black, Latino, and white patients seeking care for chest pain at two large hospital emergency rooms were studied. Differences between low and middle SES groups with respect to pre-attack health, health history, ethnicity, gender, and modes of transportation to the hospital were explored. Highly significant self-reported differences between low SES and middle SES patients were found as follows: low SES subjects were more likely to describe themselves as being in fair to poor general health (68% versus 18%), had more frequent chest pain, reported other types of heart disease, were more often current smokers, more likely to be black or Latino, and to be younger. Members of the low SES group also were more likely to have known cholesterol levels, to have used estrogen, to have had a prior ECG or cardiac surgery, to be nonsmokers, to have had a stress test, and to have typical angina. Middle SES subjects more often described typical angina, prior use of estrogen (females), congenital, rheumatic, or family history of heart disease, prior knowledge of high cholesterol, were more likely to be of the male gender, and to be older than the low SES cohort. The data reveal that low SES subjects, with markedly less health-care resources compared with middle SES subjects, have a worse general health and cardiac risk profile despite the fact that they were significantly younger (mean age 53.4 versus 60.7, $P<.001$). These findings have major implications for planning health-care education, prevention measures, and direct care needs. (J Natl Med Assoc. 1993;85:749-757.)

Key words • socioeconomic strata • chest pain
• minorities

Data from multiple sources document the excessive death rates for myocardial infarction and coronary heart disease among some minority subgroups in the United States compared with the overall death rates, which are dominated by the white majority.[1-3] For blacks, this disparity has been recognized to be of major proportions.[4-6] In order to obtain additional information about the nature of this problem, we studied health-care seeking behavior for acute care among three major racial, ethnic, and cultural subgroups of two socioeconomic levels.[7-9] In an earlier study, we demonstrated that socioeconomic status (SES) helped to define patient subgroups with differing psychosocial and

TABLE 1. RACE/ETHNICITY AND GENDER OF PATIENTS SCREENED

	LAC-USC			Kaiser		
	Male	**Female**	**Total**	**Male**	**Female**	**Total**
Black	223 (52%)	212 (48%)	435	149 (52%)	136 (48%)	285
Latino	282 (45%)	351 (55%)	633	200 (65%)	109 (35%)	309
White	197 (66%)	102 (34%)	299	557 (66%)	284 (34%)	841
Total	**702 (51%)**	**665 (49%)**	**1367***	**966 (65%)**	**529 (35%)**	**1435†**

Abbreviations: LAC-USC = Los Angeles County-University of Southern California Medical Center.
*110 "other" not included.
†250 "other" not included.

emotional characteristics, and that individuals in the lower SES groups had greater risks of disabling emotional reactions as well as greater morbidity.[10]

This article summarizes the characteristics of patients seeking emergency care for chest pain based on prospective self-reported health status data collected between October 1988 and March 1990. Subjects underwent structured interviews at two large medical facilities: one serves a predicted low socioeconomic population and the other serves a middle socioeconomic clientele.

METHODS
Site Selection and Population Description

In the Los Angeles County urban area, major health-care facilities exist that serve populations that can be described along socioeconomic lines. The major teaching facility for the University of Southern California School of Medicine is a large public medical center that serves a largely indigent and lower SES population in which only 10% or less have medical coverage. This is in contrast to the Kaiser Permanente Medical Plan hospitals that serve a largely mid-SES population of blue and white collar workers, of which 98% have HMO or Medicare insurance. With appropriate approval from each institution, we planned a study to recruit and compare 200 subjects in each of three racial groups in these two medical centers: the Los Angeles County-USC Medical Center and the Kaiser Permanente Los Angeles Medical Center, with 1300 and 800 active beds, respectively. The racial groups were black, Latino, and white.

Inclusion/Exclusion Criteria

Study participants were comprised of male and female patients who were 18 years of age or older at the time of their admission at either facility for chest pain or equivalent complaints if the possibility of a heart attack was considered by the ER physician. Only one entry per patient was admitted. All suspected heart attack patients

were retained in the study unrelated to confirmation of myocardial infarction. The exclusion criteria included the following: 1) error in initial assessment with other obvious cause for symptoms as determined by the responsible medical team prior to interview (such as pneumonia with pleuritis), 2) severe competing medical illness (ie, terminal cancer), 3) disordered mental status (ie, interview impossible as determined by interviewer and medical staff), 4) inability or unwillingness to cooperate (ie, informed consent could not be obtained), 5) race other than black, Latino, or white, and 6) language other than English or Spanish.

Patient Screening and Recruitment

All patients admitted to the medical services of either hospital who fit the eligibility criteria were screened for study entry and entered into a "screening log." The information recorded for each patient included the following: hospital identification number, log entry number, date of admission, age, race, sex, admitting diagnosis or complaint, exclusion criteria met (yes/no), patient consent (yes/no/not asked), discharge status, and comments.

Patients who spoke only Spanish were screened by a bilingual project staff member. After an explanation of the project was given, patient consent to enter the study was sought via a written consent form in either English or Spanish.

Individuals who agreed to participate in the study and who signed the informed consent form were entered into a separate study log in chronological order and assigned a study number. The data recorded in the study log included the following: name, identification number, admission date, interview date, age, sex, race, protocol completion, laboratory dates, ECG completed, chest radiograph completed, and special protocols completed (yes/no). Data were collected during a formal interview conducted by a bilingual interviewer in either English or Spanish according to patient

TABLE 2. RACE/ETHNICITY, GENDER, AND MEAN AGE OF PATIENTS

	LAC-USC			Kaiser		
	Male	Female	Total	Male	Female	Total
Mean age (years)	51.87	55.26	53.43	60.63	60.73	60.68
Black	134 (52%)	123 (48%)	257 (36%)	99 (51%)	96 (49%)	195 (27%)
Latino	128 (46%)	148 (54%)	276 (38%)	141 (67%)	68 (33%)	209 (29%)
White	129 (71%)	53 (29%)	182 (25%)	209 (67%)	105 (33%)	314 (43%)
Total	**391 (55%)**	**324 (45%)**	**715***	**449 (63%)**	**269 (37%)**	**718***

Abbreviations: LAC-USC = Los Angeles County-University of Southern California Medical Center.
*Number without missing data. For the LAC-USC group, 3 subjects had missing data but were included in the SES group database for a total of 718 subjects. For the Kaiser group, 6 subjects had missing data but were included for a total of 724 subjects.

preference or language facility. Follow-up information on hospital admission outcome was obtained by a retrospective review of the formal hospital admission and discharge record for each subject interviewed.

The recruitment efforts were successful as initially planned for all study groups at the Kaiser facility, but were modified at the end of the data collection period at the LAC-USC Medical Center where the recruitment of whites lagged behind all other study groups. Because of this, study entry for this subgroup was continued for 2 months beyond the formal recruitment period and after the screening log was closed. During the data collection period, the interview selection process was monitored closely to ensure that numerical balance among racial groups was achieved. In attempting to interview approximately equal numbers in each racial group each day, interviews were done in order of arrival for each group as consent was obtained. Most patients were interviewed within 48 hours after hospital admission and at a variable time from onset of illness and to diagnosis confirmation. Patients discharged after brief clinical evaluation were least likely to be interviewed.

Data Collection

A multiple component protocol was designed for this study. Resources included study instruments used in prior epidemiological projects and in our own prior studies in this area.[4,9,11-13] The major components of the instrument were: patient variables, medical background, sources of medical care, individual resources (financial, psychosocial, and demographic), social resources, situational factors, details of health-care seeking, and medical outcomes. The average time for interview completion was 1 hour 20 minutes.

Data Analysis

The initial data analysis was done to verify that

TABLE 3. SAMPLING FRACTION OF SCREENED PATIENTS ENROLLED IN STUDY

Race	LAC Sampling Fraction		HMO Sampling Fraction	
	Male	Female	Male	Female
Black	60.1%	58.0%	66.4%	70.6%
Latino	45.4%	42.2%	70.5%	62.4%
White	65.5%	52.0%	37.5%	37.0%

Abbreviations: LAC = Los Angeles County-University of Southern California Medical Center and HMO = Kaiser Permanente Hospital of Los Angeles.

patients recruited from each hospital did indeed belong to different SES groups. The chi-square test was used to investigate differences between the two primary cohorts. Stepwise multivariate logistic regression was used to identify those variables that best characterized the SES classes. Age, ethnicity, and gender were forced in this model. A P value of .05 was used throughout. These procedures were then used to compare the racial/ethnic subgroups at each facility.

RESULTS

The recruitment activities described resulted in 3162 total subjects being screened, with 1442 subjects entering the study (Tables 1 and 2). The numbers of subjects entered into each study subgroup are given in Table 2, with the age and sex distributions. The sampling fraction for patients entering the study from the screening sample is given in Table 3. Details are not given for individuals screened who did not belong to one of the three designated subgroups. The major reasons for not interviewing subjects, in addition to the exclusion criteria given, were early discharge of unconfirmed myocrdial infarction patients and excess patients in the Latino (low SES) and white (middle

TABLE 4. SOCIOECONOMIC STRATA FACTORS

	LAC-USC		Kaiser	P Value*		
	No Ins	Ins	Ins	1 − 2	1 − 3	2 − 3
Married/together	33.5%	38.8%	68.6%	.208	.0001	.0001
≥12 years of education	42.6%	44.3%	69.7%	.729	.0001	.0001
Skilled manual machine operation unskilled†	78.6%	70.9%	42.5%	.042	.0001	.0001
Hollingshead 1-3‡	20.2%	28.3%	54.4%	.029	.0001	.0001
Working full-time	27.7%	20.3%	42.9%	.058	.0001	.0001
Retirement due to coronary heart disease or due to disability	89.9%	70.2%	39.6%	.0001	.0001	.0001
Income ≥$1000/month	7.2%	11.6%	82.7%	.0797	.0001	.0001
Owned house	11.2%	27.5%	67.8%	.0001	.0001	.0001
Spouse's skilled manual machine operation unskilled	79.4%	74%	43.7%	.413	.0001	.0001
Spouse's Hollingshead 1-3	19.3%	26.3%	53.1%	.241	.0001	.0001

Abbreviations: LAC-USC = Los Angeles County-University of Southern California Medical Center and Ins = insurance.
*To obtain P values, columns were subtracted, ie, column 1 − column 2 (1 − 2), column 1 − column 3 (1 − 3), and column 2 − column 3 (2 − 3).
†Grouping of employment classifications consistent with lower socioeconomic standards compared to white-collar occupations.
‡Hollingshead classifications consistent with middle or upper socioeconomic standards.

TABLE 5. REGULAR HEALTH CARE AND HEALTH STATUS

	Low SES	Mid SES	Difference (Low/Mid)	P Value
Regular source of care/MD clinic	449 (62.7%)	683 (94.3%)	−31.6%	<.001
Waiting time ≥1 hour	264 (58.8%)	4 (0.6%)	58.2%	<.001
MD spends enough time	401 (55%)	599 (84%)	−29%	<.001
Medical staff interested	401 (90.7%)	599 (88.1%)	2.6%	NS
Direct cost	90 (20.6%)	25 (3.7%)	16.9%	<.001
Insurance	412 (57.5%)	721 (99.7%)	−42.2%	<.001
Health status				
Good/excellent	228 (31.6%)	593 (81.9%)		
				<.001
Poor/fair	493 (68.4%)	131 (18.1%)		

Abbreviations: SES = socioeconomic strata.

SES) subgroups. Thus, except for exclusions for other diseases and mental problems, the patients not interviewed were more likely to be white or Latino and to be less severely ill. As can be seen in Table 2, there are proportionately more females in the low SES than in the middle SES group. This is most striking in the Latino subgroups, which show a female predominance in the low SES (53.6% versus 46.38%), while in the middle SES, males predominate (67.46% versus 32.5%). Similarly, the overall mean age of 53.4 years for low SES subjects was significantly lower than that of 60.7 for middle SES subjects (P<.001).

Documentation of the SES of the two hospital groups is shown in Table 4. The marked differences in all measurements of SES between the LAC-USC Medical Center group and the Kaiser group, and the relatively small differences between the uninsured and the insured group at LAC-USC Medical Center support the contention that the hospital of origin can be a surrogate for SES. The significant differences in SES descriptors for the two overall groups were replicated for each race/ethnic group within hospitals (data not shown).

A series of questions was asked regarding insurance coverage, prior regular use of a physician or clinic for ongoing care, the cost to the individual for such care, and the average waiting time for prior regular care (last several visits, if any). The results are shown in Table 5. Slightly more than 50% of the low SES patients had a regular source of care, markedly different from the figure of 98% for the middle SES patients (P<.001).

TABLE 6. COMPARISON OF HEALTH STATUS ACROSS SOCIOECONOMIC STRATA (SES) AND RACE

Health Status & Race	LAC-USC	Kaiser
White		
Poor	115 (62.8%)	55 (17.5%)
Good	68 (37.1%)	260 (82.5%)
Total	183	315
Black		
Poor	191 (75.2%)	34 (17.5%)
Good	63 (24.8%)	160 (82.5%)
Total	254	194
Latino		
Poor	186 (67.2%)	40 (19.1%)
Good	91 (32.9%)	170 (81%)
Total	**277**	**210**

Abbreviations: LAC-USC = Los Angeles County-University of Southern California Medical Center.

TABLE 7. MODE OF TRANSPORTATION TO HOSPITAL

	Low SES	Mid SES	P Value
Via paramedics	162 (87.6%)	131 (68.6%)	<.001
Via private ambulance	23 (12.4%)	60 (31.4%)	
Via private auto	407 (84.8%)	484 (97.6%)	<.001
Via public transportation	73 (15.2%)	12 (2.4%)	
Via taxi	5 (9.3%)	13 (40.6%)	<.001
Miscellaneous other	49 (90.7%)	19 (59.4%)	

Abbreviations: SES = socioeconomic strata.

Questions related to satisfaction with the level of health care received in the past and general health status also were asked. These results are also shown in Table 5. Of interest is that low SES subjects had significantly longer waiting times and felt that the time spent with the doctor was less than optimal, while the overall level of satisfaction with physician care was comparable with middle SES subjects. To the direct question of whether individuals were satisfied with the level of care provided by the physician at their regular source of care, more than three fourths in both groups indicated their level of satisfaction with care received to be good or very good (data not shown). Comparisons were made between the percentages reporting generally good health and the percentages reporting generally poor health, and there are striking differences between the SES (hospital) groups. A significantly higher percentage of the middle SES group considered themselves to be in generally good health (81.9% versus 31.6%, P<.001). Comparisons also were made between black low and middle SES subjects, Latino low and middle SES subjects, and white low and middle SES subjects. Differences in the same direction were found for all groups with P<.0001 for each (Table 6).

Table 7 compares the mode of transportation to the hospital for the acute event between low and middle SES subjects (Table 7). Nearly equal percentages of low and middle SES patients came to the hospital by ambulance; more middle SES subjects came by private ambulance while a larger percentage of low SES subjects were transported by public paramedic ambulances. Similarly, a significantly higher percentage of low SES patients came by public transportation than by private automobile. The use of taxis was more frequent by the middle SES group compared with miscellaneous other modes of transport. When the racial groups were compared between hospitals, significant differences between modes of transportation for blacks (P<.0001), whites (P<.0001), and Latinos (P<0.002) were seen and reflected SES differences, although the pattern of difference varied between groups (Table 8).

To determine whether the overall health status as self-reported by the study subjects was consistent with other self-reported aspects of health status, the frequency of known risk descriptors (by history) was recorded (Table 9). The data clearly show that the low and middle SES cohorts were not different for some of the major risk descriptors. However, low SES subjects were more likely to be current smokers, less likely to have a history of known elevated cholesterol or to know their cholesterol status, and less likely to know whether or not lipid levels had even been determined; low SES subjects also were less likely to have had a prior ECG or stress test. The greater likelihood of low SES subjects having had a cardiac catheterization was not significant. Middle SES subjects were more likely to have had estrogen prescribed in the past, to have a history of angina pectoris as defined by Rose criteria, and to have undergone coronary artery bypass surgery or coronary angioplasty. Not shown in Table 9 is the result that the complaint of prior chest pain, not specifically determined as angina, was more common in low SES than in middle SES subjects (86.7% versus 70.0%, P<.001).

In regard to estrogen use, the low SES cohort reported a very low use of estrogen and low use of oral contraceptives compared with the middle SES cohort; in both Tables 9 and 10, all known use of estrogen is included. The lower percent of positive responses to questions about congenital and rheumatic heart disease

TABLE 8. COMPARISON OF MODE OF TRANSPORTATION TO HOSPITAL ACROSS SOCIOECONOMIC STRATA AND RACE

Mode of Transportation	White LAC-USC	White Kaiser	Black LAC-USC	Black Kaiser	Latino LAC-USC	Latino Kaiser
Paramedic	58 (31.6%)	59 (18.7%)	73 (28.7%)	44 (22.7%)	28 (10.1%)	27 (12.9%)
Private auto	78 (42.6%)	205 (64.9%)	117 (46.1%)	124 (63.9%)	210 (75.8%)	155 (73.8%)
Taxi	2 (1.1%)	8 (2.5%)	1 (0.4%)	4 (2.1%)	2 (0.7%)	1 (0.5%)
Ambulance	8 (4.4%)	32 (10.1%)	8 (3.2%)	10 (5.2%)	7 (2.5%)	19 (9.1%)
Public transportation	24 (13.1%)	4 (1.3%)	30 (11.8%)	5 (2.6%)	19 (6.9%)	3 (1.4%)
Other	13 (7.1%)	8 (2.5%)	25 (9.8%)	7 (3.6%)	11 (4%)	5 (2.4%)
Total	**183**	**316**	**254**	**194**	**277**	**210**

Abbreviations: LAC-USC = Los Angeles County-Univesity of Southern California Medical Center.

TABLE 9. RISK FACTORS

Risks	Low SES No Rx	Low SES Rx	Mid SES No Rx	Mid SES Rx	P Value
Hypertension	4.58	53.75	11.45	44.51	.354
Diabetes	1.11	26.29	4.14	21.52	.443
Elevated cholesterol	6.41	20.33	39.45	5.24	<.001
Stroke	2.23	5.98	4.83	3.18	.886
Peripheral vasculature	11.31	7.54	15.77	1.66	.474
Estrogen use*		13.25		39.32	<.001
Smoking	34.64		19.64		<.001
Prior ECG	90.25		95.45		<.001
Stress test	49.65		62.93		<.001
Prior heart attack	32.18		32.04		.807
Prior angina	49.93		59.89		<.001
Heart catheterization	28.09		24.03		.098
Surgery/angiolasty	11.66		17.34		.00

Abbreviations: SES = socioeconomic strata.
*Female subjects only.

and a history of family heart disease could reflect a difference in overall knowledge levels between the groups. Prior ECG and stress test experiences refer to encounters prior to the current hospital admission.

From the overall data describing these two SES groups, we used stepwise multivariate logistic regression to identify factors jointly predictive of group membership. The ranked results, adjusted for age, gender, and ethnicity, are displayed in Table 10. The variable exp(B) is the "relative risk" estimate for belonging to the low SES group. For example, a person with fair to poor self-rated health is 9.364 times more likely to belong to the low SES group after adjustment for all other significant predictors. These SES differences are clearly reflected in the breakdown for black, Latino, and white SES comparisons (Table 11).

Most notable are those factors that affected large numbers of subjects of both groups, such as poor self-reported health status, chest pain attributed by the

patient to the heart, current smoking status, and younger age, which were characteristic of the low SES group. Having typical angina, being of the male sex, having specific identified risk factors (family history, elevated cholesterol, and obesity), and being older were characteristics more likely to be found in the middle SES group. Considering the significantly younger age of the low SES cohort, the overall risk profile was worse because there were comparable percentages with hypertension, diabetes, prior stroke, and peripheral vascular disease, as already noted.

DISCUSSION

The two medical centers providing the cohorts for this study were chosen for comparison because they serve definably different segments of the population; this allowed the assumption that the HMO, Kaiser Medical Center, could be a surrogate for middle SES and that the public hospital, LAC-USC Medical Center,

TABLE 10. FACTORS ASSOCIATED WITH PATIENTS ATTENDING LAC-USC VERSUS KAISER: LOGISTIC REGRESSION

Factor	ZB	Exp (B)*	SE	P Value
Poor self-rated general health	2.2369	9.364	0.166	.0000
Heart pain	1.9549	7.063	0.242	.0000
History of congenital heart disease	− 1.8101	0.164	0.588	.0021
Angina	− 1.3998	0.274	0.215	.0000
Other heart disease	1.2723	3.569	0.292	.0000
Estrogen use	− 1.2657	0.282	0.322	.0001
History of rheumatic heart disease	− 1.0202	0.361	0.246	.0000
Current smoking	0.6913	1.996	0.176	.0001
Male gender	− 0.6576	0.518	0.178	.0002
Family history†	− 0.6350	0.530	0.179	.0004
High cholesterol	− 0.5709	0.565	0.166	.0006
Obesity	− 0.4697	0.625	0.187	.0120
Prior stress test	− 0.4586	0.632	0.174	.0084
Age	− 0.0432	0.948	0.007	.0000

Abbreviations: LAC-USC = Los Angeles County-University of Southern California Medical Center.
*Exp (B) indicates an individual with that attribute is more likely to belong to the low SES than the middle SES group.
†Two or more risk descriptors in family.

would be a surrogate for low SES. The descriptive data collected confirm this assumption in regard to insurance coverage with 99.7% of the Kaiser population indicating that they were covered by health insurance and only 57.5% of the LAC-USC Medical Center population reporting health coverage (Table 4). The large majority (62%) at LAC-USC Medical Center reporting insurance coverage were covered by a state (MediCal), county (General Relief), or federal program (MediCare) (22.5%, 9.2%, and 4%, respectively). The difference in the proportions with insurance who were below age 65 also was highly significant. The data documenting SES clearly show that the low SES group is significantly different for most descriptors. Socioeconomic status and hospital of record were considered interchangeable because of these findings. The number of uninsured subjects admitted to the middle SES hospital was too small to affect these comparisons.

Important differences also were found in the sex distributions among the two SES groups and strikingly among the racial subgroups within each SES subgroup (Table 1). Most notably, in the Latino middle SES group, males predominated, mirroring the sex distributions usually found for symptomatic coronary heart disease. In contrast, the Latino low SES group contained a majority of females. The reasons for this marked discrepancy are not readily apparent, and this issue deserves further attention. Stern and colleagues[14] noted that the sex differential for cardiovascular risk factors among Latino subjects in San Antonio was importantly related to sociocultural status, and women

represented a larger component of the lower SES group, as we are reporting here. Among blacks, there was greater parity between sexes for both low SES and middle SES (Table 1).

Highly pertinent to the issue of whether access to care is affected by the contrasting circumstances of SES groups is whether they perceive that health-care services are readily available in regard to a potential major illness.[15,16] The two cohorts gave strikingly different answers to questions dealing with this subject. First, nearly 50% of the low SES group indicated that they had no regular source of medical care compared with 2% of the middle SES cohort. Second, the 57% of the low SES group who felt that such services were regularly available to them reported markedly different waiting times in order to receive services, and they were more likely to have out-of-pocket costs for receiving such services (Table 4). Among individuals with a regular source of health care in both low SES and middle SES groups, comparable numbers were satisfied with the level of physician care despite dissatisfaction with the process of receiving care in the low SES group. Reported experiences from other studies of comparable populations support these findings.[17-19]

Age does not account for the self-reported differences in health status. Although the two cohorts differed significantly in age, as shown in Table 1, the low SES subjects were significantly younger and on this basis would be expected to have a generally better health profile. The differences and similarities in self-reported health status between the two groups'

TABLE 11. FACTORS ASSOCIATED WITH PATIENTS ATTENDING LAC-USC VERSUS KAISER: LOGISTIC REGRESSION

	Black				White				Latino			
Factors	Exp (B)*	95% CI	SE	P Value	Exp (B)	95% CI	SE	P Value	Exp (B)	95% CI	SE	P Value
Poor self-rated general health	14.267	8.94-22.76	0.238	.0001	7.995	5.27-12.14	0.213	.0001	8.687	5.67-13.30	0.217	.0001
Heart pain	2.524	1.65-3.87	0.217	.0001	1.379	0.91-2.08	0.210	.127	1.822	1.24-2.68	0.198	.002
Congenital heart disease	0.295	0.09-0.96	0.600	.042	0.237	0.03-1.94	1.073	.180	0.746	0.18-3.02	0.713	.682
Angina	0.706	0.48-1.04	0.195	.074	0.591	0.41-0.86	0.190	.006	0.703	0.49-1.01	0.185	.057
Acute myocardial infarction	1.234	0.81-1.86	0.209	.315	1.211	0.83-1.77	0.193	.320	0.924	0.62-1.38	0.206	.700
Other heart disease	3.950	1.99-7.83	0.349	.0001	2.102	1.18-3.73	0.293	.011	3.067	1.13-8.36	0.511	.028
Estrogen use	0.323	0.15-0.69	0.386	.003	0.225	0.09-0.56	0.462	.001	0.295	0.13-0.67	0.414	.003
Rheumatic heart disease	0.405	0.24-0.68	0.260	.0005	0.533	0.30-0.94	0.290	.030	0.440	0.23-0.83	0.324	.011
Current smoking	2.229	1.48-3.36	0.210	.0001	5.164	3.35-7.95	0.220	.0001	0.794	0.51-1.23	0.223	.301
Male gender	1.055	0.73-1.53	0.101	.780	1.221	0.82-1.81	0.202	.324	0.405	0.28-0.59	0.191	.0001
Family history	0.185	0.10-0.35	0.319	.0001	0.101	0.05-0.20	0.337	.0001	0.085	0.05-0.15	0.294	.0001
High cholesterol	0.432	0.29-0.65	0.206	.0001	0.435	0.30-0.64	0.196	.0001	0.592	0.40-0.87	0.197	.008
Hypertension	0.962	0.64-1.45	0.208	.853	0.754	0.52-1.087	0.186	.130	1.473	1.03-2.11	0.184	.035
Prior stress test	0.771	0.53-1.13	0.193	.177	0.615	0.42-0.90	0.193	.012	0.502	0.35-0.72	0.186	.0002
Age	0.963	0.95-0.98	0.008	.0001	0.931	0.92-0.95	0.009	.0001	0.974	0.96-0.99	0.008	.001

Abbreviations: LAC-USC = Los Angeles County-University of Southern California Medical Center, CI = confidence interval, and SE = standard error.
*Exp (B) indicates an individual with that attribute is more likely to belong to the low than the middle SES group.

cohorts have been emphasized. Despite the significant difference in the mean age of the groups, the frequency of risk factors that nominally increase with age is remarkably similar as shown in Table 9 (diabetes, hypertension, stroke, peripheral vascular disease, and prior heart attacks). Thus, the younger low SES group had a risk factor profile that was worse than that of the older middle SES group, suggesting that low SES exerts an "aging effect" on those in this group. Members of the low SES group also were more likely to be current smokers (34.6% versus 19.6%) and to have experienced prior chest pain, while typical angina was more common in middle SES. Thus, the SES "effect" may be mediated by smoking, or the two factors may be additive. This is especially noteworthy in view of the higher percentage of women in the low SES group.

An important issue, moreover, is whether in the context of seeking care for a possible heart attack, there are significant differences between the groups in regard to the ability to get to the source of care and the use of appropriate or available ancillary services. Table 7 shows contrasts between the low SES and middle SES groups in the mode of transportation used while seeking urgent health care for the acute medical symptom of chest pain. In contrast to the middle SES subjects, the

low SES subjects used a multiplicity of modes of transportation, some with built-in delay components (such as use of public transportation). A telephone survey carried out in a neighboring county revealed a striking difference between Latino and white subjects in relationship to the likelihood of having insurance, having a regular source of care, and employment status; lack of access to care was strongly associated with lack of insurance.[17] Such factors have been recognized previously as important in regard to the potential availability of and use of health-care facilities.[18,19]

The analyses performed to identify risk descriptors that might differentiate our two groups dramatize the striking differences between them (Table 9). While other investigators have reported contrasts between racial/ethnic groups seeking care as defined by hospital records, this is the first study to assemble groups matched by race/ethnicity so that SES influences could be directly addressed. Indeed, in many prior studies, the demographic factors of sex, SES, and racial make-up have been ignored.[11,12,15] An exception is the San Antonio study.[14]

In the logistic regression shown in Table 10, the highly significant variables that seemed to be related directly to SES, such as presence or absence of insurance and a

regular source of medical care, have been removed and the rest of the significant variables were retained. Differences in self-reported health status are in sharp contrast between the two overall SES groups as previously noted. Thus, after adjusting for the contribution of ethnicity, gender, and age, our data show that our low SES cohort presented a distinct and significantly different risk and health-care seeking profile compared with our middle SES cohort. Poor self-rated health, heart pain, miscellaneous heart disease, and current smoking were characteristic of low SES. Angina, estrogen use, congenital heart disease, rheumatic heart disease, family history of at least two risk factors, and obesity were characteristic of middle SES subjects.

Each race/ethnic subgroup showed the same low SES versus middle SES differences as were found in the overall low SES versus middle SES comparisons, with some notable exceptions in the subgroup logistic regression (Table 11). Thus, race may be less important than SES status in determining major cardiovascular risk, although important racial differences exist. Efforts to further reduce the morbidity and mortality from cardiovascular disease in the United States must consider socioeconomic status as an overriding issue in addition to addressing needs for public education and changing the behavior of major segments of the population.[20]

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