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African Americans and Caucasians Have a Similar Prevalence of Coronary Calcium in the Dallas Heart Study

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OBJECTIVES We sought to compare the prevalence of coronary atherosclerosis in a cohort of middle-age African American (black) and non-Hispanic Caucasian (white) men and women from a population-based probability sample.

BACKGROUND Blacks have a higher mortality from coronary heart disease (CHD) than whites, particularly among younger individuals, and yet several studies have reported that coronary atherosclerosis is less prevalent in blacks than in whites. Data from population-based samples comparing coronary atherosclerotic burden between blacks and whites are limited.

METHODS The prevalence of coronary atherosclerosis in middle-aged blacks and whites was determined using coronary calcium measured by electron beam computed tomography in 1,289 men and women from a population-based probability sample from Dallas, Texas.

RESULTS The population estimates of the frequency of a positive scan for coronary artery calcium were not statistically different between black and white men (37% vs. 41%, $p = 0.36$) or between black and white women (29% vs. 23%, $p = 0.21$). Although the prevalence of most of the coronary risk factors varied significantly between blacks and whites, mean Framingham coronary risk factor scores were identical in black and white men (10 ± 4) but significantly higher in black women (13 ± 4) than in white women (12 ± 4).

CONCLUSIONS Blacks in the general population have a prevalence of coronary atherosclerosis similar to whites. Factors other than coronary atherosclerotic burden, which are not reflected in the Framingham risk score, contribute significantly to the higher CHD mortality rate in blacks. (J Am Coll Cardiol 2004;44:1011–7) © 2004 by the American College of Cardiology Foundation

Mortality from coronary heart disease (CHD) is higher in African Americans (blacks) than in non-Hispanic Caucasians (whites), especially among women (1–3). The higher prevalence of hypertension, left ventricular hypertrophy, diabetes, and chronic renal failure (4,5), as well as a reduced access to medical care (3,6,7), are likely contributors to the higher rate of CHD mortality in blacks. It remains controversial whether blacks have a greater coronary atherosclerotic burden than whites. In post-mortem and angiographic studies, blacks have been reported to have less or equivalent amounts of coronary atherosclerosis when compared with whites (8,9–13).

Coronary atherosclerosis can be assessed noninvasively by measuring the amount of coronary artery calcium (CAC), either by fluoroscopy or by electron beam computed tomography (EBCT). Coronary calcium measurements are proportional to coronary atherosclerotic burden (14–17). In several previous studies, the prevalence of CAC in blacks was found to be significantly lower than in whites (18–21). The exceptions are two studies that reported a similar prevalence of EBCT-detected coronary calcium in blacks and whites—one in young adults (22) and the other in postmenopausal women (23).

In this study, we used EBCT to compare the prevalence of coronary atherosclerosis in middle-aged blacks and whites in a population-based sample using EBCT. We also examined the relationship of coronary atherosclerotic burden to individual cardiovascular risk factors and to the Framingham risk factor scores in the two ethnic groups.

METHODS

Study population. The Dallas Heart Study (DHS) is a multiethnic, probability-based sample of the Dallas county population in which blacks were systematically oversampled so the final sample was 50% black (24). Data from the study participants in the DHS were collected in three stages. First, structured interviews and anthropometric and blood pressure (BP) measurements were performed in the homes of 6,101 individuals age 18 to 65 (54% black). A second home visit was performed on a subset of 3,398 participants, age 30 to 65 (52% black), to obtain blood and urine. Of these, 2,971 underwent EBCT and other imaging measures (24). The prevalence of CAC positive (CAC+)

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Abbreviations and Acronyms

BMI	= body mass index
BP	= blood pressure
CAC	= coronary artery calcium
CARDIA	= Coronary Artery Risk Development In young Adults study
CHD	= coronary heart disease
DHS	= Dallas Heart Study
EBCT	= electron beam computed tomography
HDL	= high-density lipoprotein
LDL	= low-density lipoprotein
NCEP	= National Cholesterol Education Program

scans by criteria described in this report was very low in men age <40 (black men 8%; white men 2%) and women age <45 (black women 3%; white women 5%); the 940 subjects in this age range were excluded from the analysis. Hispanics and individuals of other ethnicity were also excluded from the analysis (n = 577). The final sample included 528 whites (242 women, 286 men) and 761 blacks (380 women and 381 men). Black and white DHS participants not included in the dataset included those individuals who exceeded the weight limit of the table (36 black and 5 white women; 30 black and 14 white men), had poor quality scans due to breathing or movement artifacts (38 black and 2 white women; 13 black and 1 white men), had a previous surgical procedures (3 black and 2 white women; 10 black and 5 white men), suffered from claustrophobia (n = 2) or fear of radiation (n = 1), refused the study, or (n = 1) in which the equipment failure and the study could not be rescheduled (n = 5).

EBCT protocol and CAC classification. Electron beam computed tomography image acquisition was gated to the electrocardiogram at 80% of the RR interval using an Imatron C-150XP EBCT scanner (Imatron Inc., San Bruno, California), 30 cm FOV, 512 matrix, sharp reconstruction kernel and a 3-mm slice with a table increment of 3 mms. Beginning at the level of the carina, sufficient slices were acquired (n = ~40) to span the heart during a single inspiratory breath-hold. Duplicate scans were performed within 1 to 2 min while the subject remained supine. The data was then analyzed in a separate workstation (NeoImagery Industries, City of Industry, California). A focus was defined as a region of three or more contiguous voxels with a computed tomography (CT) number >130 HU. The voxel size was 0.586 × 0.586 × 3 mm (field of view 30 cm, matrix 512, 3-mm slice) so that 3 voxels would be a volume of 3.08 mm. Scans were read blinded by a single individual, and only foci within the coronary arteries were scored. Results were expressed in Agatston U (25,26), and the mean of the two scores was used as the final CAC score. Individuals with a mean EBCT score >10 Agatston U were classified as CAC+.

Risk factor measurements. Height, weight, BP, plasma lipids, and glucose were measured, and the body mass index (BMI) was calculated using standard methods (24). Smoking was defined as cigarette use within the previous 30 days and a lifetime history of having smoked ≥100 cigarettes. Thresholds for categorical variables were defined according to National Cholesterol Education Program (NCEP) (27,28): high total cholesterol ≥240 mg/dl; high low-density lipoprotein (LDL) cholesterol ≥160 mg/dl, and high triglycerides ≥150 mg/dl. Low high-density lipoprotein cholesterols were defined according to the NCEP cut-points for metabolic syndrome (27,28) (<40 mg/dl for men and <50 mg/dl for women). Obesity (29) was defined as a BMI ≥30 kg/m^2, and diabetes was defined as a fasting serum glucose ≥126 mg/dl, self-reported diabetes, or taking hypoglycemic medication. Elevated systolic and diastolic BPs were defined as ≥140 mm Hg and ≥90 mm Hg, respectively, and hypertension was defined as BP ≥140/90 mm Hg or taking antihypertensive medication(s). Framingham risk scores for men and women were determined from major risk factors according to the algorithm presented in NCEP guidelines (27,28).

Statistical analysis. The DHS is a probability-based sample of Dallas county that was designed to include 50% blacks in the final clinic visit (visit 3), which was the source of the data for this study. To obtain unbiased estimates of population parameters, and to accommodate sampling biases, such as varying participation rates across sampling strata, sampling weights were applied to the data (24) using the survey (svy) package (Stata Corp., College Station, Texas). Statistical analyses were performed with and without sample weights using statistical packages S-Plus (Insightful, Seattle, Washington) and Stata. The unweighted results are presented because they are based on actual observed data and do not depend on additional assumptions associated with statistical analysis of complex probability surveys (30). The weighted data are presented only if the results differ significantly from the unweighted results.

Continuous demographic and clinical characteristics are presented as means and SD, and categorical variables are reported as relative frequencies. Student *t* test or analysis of variance was used to compare means of continuous variables, and associations between categorical variables were evaluated using a chi-square test. Coronary calcium scores were analyzed both as a continuous and a binary (above/below 10 Agatston U) variable. Logistic regression models were used to evaluate the association between CAC prevalence (as a binary dependent variable) and clinical characteristics, including cardiovascular risk factors. Because CAC prevalence increases with age, all logistic regression analyses included age as a covariate. These methods were used to analyze the entire dataset, as well as stratified analyses defined by ethnicity and gender. In logistic models based on the entire dataset, we included ethnicity and gender as covariates. Logistic model diagnostics were summarized by the area under receiver operator characteristic curves; areas above 70% indicate good model discrimination

Table 1. Clinical Characteristics of Black and White DHS Participants (Women >45 years and Men >40 years)

	Women			Men		
	Black (n = 380)	White (n = 242)	p*	Black (n = 381)	White (n = 286)	p*
Continuous						
Age, yrs	54 ± 5	54 ± 5	0.78	51 ± 7	50 ± 6	0.05
BMI, kg/m²	33 ± 7	30 ± 7	<0.01	28 ± 5	28 ± 4	0.93
Systolic BP, mm Hg	136 ± 19	125 ± 16	<0.0001	136 ± 19	129 ± 14	<0.0001
Diastolic BP, mm Hg	82 ± 9	77 ± 8	<0.0001	81 ± 10	80 ± 9	0.04
Total cholesterol, mg/dl	193 ± 45	192 ± 35	0.92	177 ± 41	188 ± 40	<0.001
LDL-C, mg/dl	114 ± 40	109 ± 33	0.12	105 ± 39	115 ± 36	<0.01
HDL-C, mg/dl	56 ± 16	58 ± 18	0.11	49 ± 14	43 ± 10	<0.01
Triglycerides, mg/dl	116 ± 98	128 ± 75	0.09	128 ± 133	158 ± 128	<0.01
Glucose, mg/dl	112 ± 56	98 ± 31	<0.001	111 ± 53	100 ± 27	0.001
Framingham scores†	13 ± 4	12 ± 4	<0.0001	10 ± 4	10 ± 4	0.22
(10-yr risk for CHD)	(3%)	(2%)		(6%)	(6%)	
Discrete (%)						
Smoking	28	22	0.11	44	23	<0.0001
Hypertension‡	66	33	<0.0001	52	28	<0.0001
BP >140/90 mm Hg§	37	19	<0.0001	37	18	<0.0001
Diabetes (%)	20	8	<0.001	16	7	<0.001
Cholesterol >240 mg/dl	10	10	0.98	5	9	0.02
LDL-C >160 (mg/dl)	11	8	0.23	8	9	0.56
HDL-C <50 (F); <40 (M)	40	33	0.09	25	42	<0.0001
Triglycerides >150 mg/dl	19	30	<0.001	24	38	<0.0001
Obesity (BMI ≥30 kg/m³)	59	42	<0.0001	36	34	0.52

**t* test for continuous variables and chi-square test for discrete variables; †Framingham scores are higher for women than men for any set of risk factors; however, at similar absolute scores, the 10-year risk for cardiovascular heart disease (CHD) (myocardial infarction + coronary death) is lower for women; the slight difference in Framingham scores between black and white women is statistically significant because of the large number of subjects; ‡Individuals with BP >140/90 mm Hg or on treatment for hypertension; §BP >140/90 mm Hg at entry into study.

BP = blood pressure; BMI = body mass index; C = cholesterol; DHS = Dallas Heart study; HDL = high-density lipoprotein; LDL = low-density lipoprotein.

between CAC+ and CAC− subjects (31). All statistical testing was assessed at a 5% significance level, and mean comparisons were two-tailed.

RESULTS

Characteristics of the study population. Baseline characteristics according to ethnicity and gender are presented in Table 1. The age distributions between black and white women were similar, as were the distributions between black and white men. Mean BMI was higher in black women than in white women, but was similar in black and white men. Mean systolic BP, diastolic BPs, and plasma glucose levels were significantly higher in both black men and black women than their white counterparts. Compared with white men, black men had lower plasma levels of cholesterol, triglyceride, and LDL cholesterol, and higher plasma levels of high-density lipoprotein cholesterol; however, none of these lipid variables was significantly different between black and white women. Despite these differences in prevalence of cardiovascular risk factors, the mean Framingham coronary risk factor scores (27,28), which predict the absolute 10-year probability of having a coronary event, were identical in black and white men. In contrast with men, the mean Framingham scores were significantly higher in black women than in white women.

Significant differences in the prevalence of discrete cardiovascular risk factors in blacks and whites were also found. Smoking rates were significantly higher in black men than in white men. Hypertension, elevated BP at entry, and diabetes were significantly more common in blacks. Compared with white men, a greater proportion of black men had a high plasma level of total cholesterol (≥240 mg/dl), but significantly fewer black men had a low plasma level of high-density lipoprotein cholesterol (<40 mg/dl); no ethnic differences were observed in the frequency of elevated plasma levels of LDL cholesterol (≥160 mg/dl). For both genders, high plasma levels of triglycerides (≥150 mg/dl) were less common in blacks. Black women were more frequently obese (BMI ≥30 kg/m²) than whites, but obesity rates were not significantly different between black and white men.

Determining a threshold for positive coronary calcium. Electron beam computed tomography measurements of CAC are complicated by X-ray scattering due to obesity and interference from adjacent tissues (32). To reduce the false-positive rate of CAC classification, duplicate scans were performed (Fig. 1A) and evaluated for reproducibility. Concordance of CAC scores (i.e., both scores being above or below a given threshold) was assessed (Fig. 1B). Due to high interscan variability in CAC scores within the range of 0 to 10, CAC+ status was defined as mean score >10 Agatston U; at 10 Agatston U, more than 95% of subjects were concordant for positive (>10) or negative (≤10) scores in the replicate EBCT scans (Fig. 1). Raising the threshold to 15 or 20 Agatston U only modestly increased the concordance between the two scans. Therefore, >10 Agatston U was chosen as a threshold to define a CAC+ status.

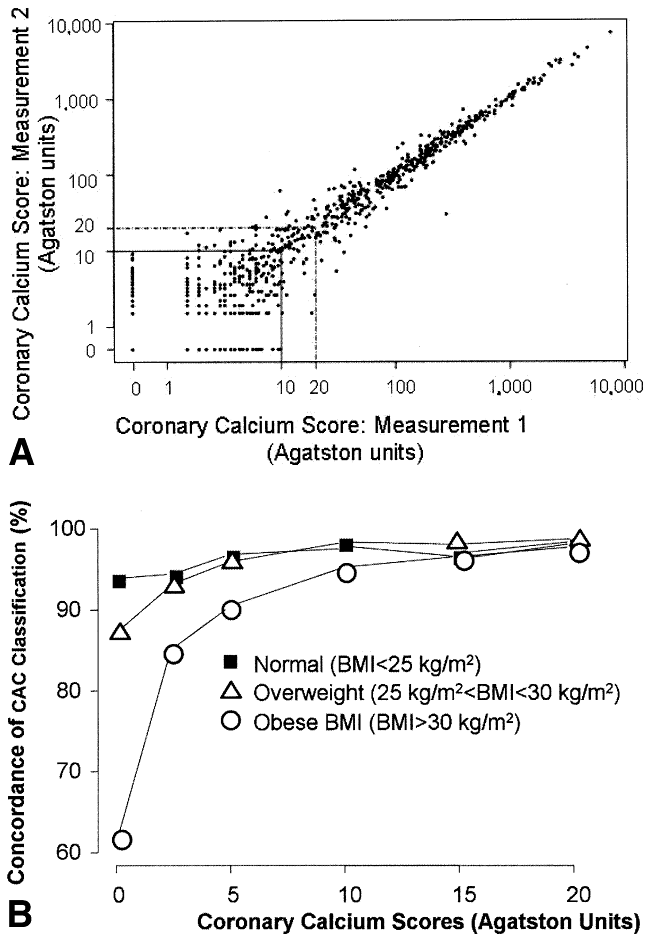

Figure 1. **(A)** The relationship between coronary artery calcium (CAC) scores from duplicate electron beam computed tomography scans. No subjects with a CAC score >10 Agatston U had a second CAC score = 0 Agatston U. **(B)** Concordance of calcium classification (i.e., both scores being above or below a given threshold CAC score) for subjects in different body mass index (BMI) categories.

Comparison of coronary calcium prevalence rates among study groups. Coronary artery calcium scores were highly positively skewed (black skewness = 8; white skewness = 11), with median values (50th percentile) being dramatically lower than mean values in all groups (Table 2). In all ethnicity-gender groups, CAC scores increase progressively with age as indicated by the Spearman correlation coefficient: black men, r = 0.42; black women, r = 0.26; white men, r = 0.49; white women, r = 0.24. As expected, median and mean CAC scores were higher in men than in women in both ethnic groups. No significant differences in the CAC scores or the prevalence of CAC+ status were found between blacks and whites. The CAC+ prevalence was not significantly different in men using either the weighted or unweighted data. The prevalence of CAC+ was significantly higher in black women than in white women using the unweighted data ($p < 0.01$), but when the weighted data was used, no significant differences in CAC+ prevalence were found between the two ethnic groups (BW = 29% and WW = 23%, p = 0.21). Weighting resulted in relatively larger standard errors and subsequently larger p values, as expected. Regardless of methods applied to analyze the data, CAC+ prevalence was at least as great or greater in black women as in white women. If the threshold for a positive score was raised to 20 Agatston U, the fraction of CAC+ individuals in each ethnic subgroup was reduced slightly, but the proportion of blacks and whites that was CAC+ was similar.

Relation of risk factors to CAC status. Next we examined the relationship between the individual cardiovascular risk factors and the CAC+ status. The odds ratios for having a positive CAC status associated with each risk factor, adjusted for age, gender, and ethnicity are presented in Table 3. Age and male gender were both highly predictive of CAC+. Other significant predictors of CAC+ status were cigarette smoking, systolic BP, diastolic BP, BMI, and the plasma levels of total cholesterol, high-density lipoprotein cholesterol, triglycerides, and glucose. Plasma levels of LDL cholesterol were marginal as a predictor ($p < 0.073$). Importantly, no difference in odds ratios for CAC+ was observed for blacks and whites after adjusting for age and gender (odds ratio = 1.2, 95% confidence interval, 0.94 to 1.54). A similar result was obtained using a multivariate regression model with all the factors listed in Table 3 (data not shown).

Table 4 summarizes the relationship between continuous (age, BMI, lipids) and discrete (smoking, hypertension, and diabetes) cardiovascular risk factors by CAC status in all subjects, in blacks and in whites. The strongest, most consistent associations were observed for age, smoking, hypertension, and diabetes; other risk factors were less consistently associated with CAC+ status. Additional significant associations with CAC+ status in whites, but not blacks, were BMI, and plasma levels of LDL cholesterol and high-density lipoprotein cholesterol.

Weighting the data allows for extrapolation of the findings to the general population of Dallas County. For all parameters examined in this study, weighting had only minimal effects on the mean values of the quantitative variables and on the prevalence of the dichotomous traits except when indicated. Weighting introduced only small changes in the nominal p values for differences between blacks and whites, but in all cases the same trends were observed in the weighted and unweighted samples.

DISCUSSION

This study reports on a large, representative population of middle-aged black and white men and women in which EBCT was used to compare the prevalence of coronary atherosclerosis in whites and blacks. No significant differences were found in the prevalence of coronary calcium between the two ethnic groups.

Our results differ from most previous studies comparing

Table 2. CAC Scores and CAC Prevalence by Ethnicity and Gender

	All		Women		Men	
	Blacks (n = 761)	Whites (n = 528)	Black (n = 380)	White (n = 242)	Black (n = 381)	White (n = 286)
CAC scores						
Mean ± SD*	128 ± 456	101 ± 443	94 ± 321	52 ± 204	163 ± 560	143 ± 569
Percentiles						
25th	0	0	0	0	0	0
50th	3.8	1.4	3.1	0.5	4.5	4.3
75th	47	35	29	7.2	71	72
90th	294	203	236	97	338	295
Max	6,749	7,444	3,708	1,796	6,749	7,444
CAC+						
Prevalence						
Unweighted	38%	33%†	33%	24%‡	42%	41%‡
Weighted‡	33%	33%	29%	23%§	37%	41%§

*Mean difference in levels of coronary calcium between whites and blacks by *t* test: women, p = 0.07; men, p = 0.67; †The chi-square p value for unweighted (weighted) prevalence between blacks and whites is 0.08 (0.98); ‡Difference in unweighted CAC+ prevalence between whites and blacks by binomial proportions test (H_0: $p_W = p_B$): women, p = 0.01; men, p = 0.80; §Difference in weighted CAC+ prevalence between whites and blacks by weighted binomial proportions test: women, p = 0.21; men, p = 0.36.
CAC = coronary artery calcium.

the prevalence of coronary calcium in blacks and whites, which have reported a higher prevalence of CAC in whites than in blacks (19–21,33,34). For example, Tang et al. (33) used digital subtraction fluoroscopy and conventional cinefluoroscopy to detect coronary calcium in 1,461 asymptomatic high-risk adults and found that blacks had a significantly lower prevalence of coronary calcium than did whites or Asians. Doherty et al. (34) found a lower prevalence of coronary calcium in blacks than whites in 283 high-risk subjects. In 2002, Budoff et al. (11) reported that whites have a greater coronary atherosclerotic burden than blacks or Hispanics, whether atherosclerosis severity was assessed by EBCT or by coronary angiography. In a study of 999 low-risk military personnel (age 40 to 45 years), blacks were found to have a significantly lower prevalence of CAC than whites (21). Another study of older subjects (age 67 to 99 years) also found less coronary calcium in blacks than in whites (19,20).

Table 3. OR* of Positive CAC by Risk Factors

Risk Factor† (Δ)‡	OR	95% CI	p Value
Age (5 yrs)	1.86	1.67–2.06	0.000
Gender (male)	2.85	2.19–3.70	0.000
Current smoker	2.78	2.11–3.67	0.000
SBP (18 mm Hg)	1.26	1.11–1.44	0.000
DBP (9 mm Hg)	1.17	1.03–1.32	0.016
HDL (16 mg/dl)	0.81	0.71–0.93	0.003
BMI (5 kg/m^2)	1.14	1.03–1.26	0.014
Triglycerides (113 mg/dl)	1.15	1.02–1.29	0.021
Total cholesterol (41 mg/dl)	1.14	1.02–1.29	0.027
Glucose (50 mg/dl)	1.14	1.00–1.30	0.048
LDL-C (37 mg/dl)	1.12	0.99–1.26	0.073
Ethnicity (white)	1.20	0.94–1.54	0.150

*Odds ratios (OR) were calculated separately for each risk factor by logistic regression with adjustments for the following covariates: age, gender, and ethnicity; †When the risk factor was age, gender, or ethnicity, adjustments were made for the other two covariates; ‡Δ = ~1 SD difference in risk factor; the odds ratios for continuous risk factors are based on a difference of Δ units; for discrete risk factors, the reference group is given in parenthesis.
BMI = body mass index; CAC = coronary artery calcium; CI = confidence interval; DBP = diastolic blood pressure; HDL = high-density lipoprotein; LDL-C = low-density lipoprotein cholesterol; OR = odds ratio; SBP = systolic blood pressure.

Only two previous studies using EBCT to assess coronary atherosclerosis reported a similar prevalence of coronary calcium in blacks and whites. The prevalence of EBCT coronary calcification was not significantly different in 443 black and white young adults (age 28 to 40) (22) in the Coronary Artery Risk Development In young Adults (CARDIA) study, although there was a trend toward black women having a higher prevalence of CAC+ status than white women. In the CARDIA study, coronary calcium positive status was defined as having at least one focus of calcium ≥2.05 mm^2 in area; the prevalence of CAC+ was relatively low in this study (16.1% in black men, 17.1% in white men, 11.8% in black women, and 4.6% in white women) due to the young age of the subjects. In a more recent smaller study of 128 black and 733 white asymptomatic postmenopausal women (mean age, 63 ± 8 years), a similar distribution of CAC scores was found between the two ethnic groups. Our study differs from these two studies by being larger, having a broader age range of the subjects, including both genders, and, most importantly, being population-based.

Although black and white men had similar mean Framingham scores, significant ethnic and gender-specific differences were found in the prevalence of the individual cardiovascular risk factors. The prevalence rates of both hypertension and diabetes were higher in blacks than whites, irrespective of gender. Smoking prevalence was higher in black men than in white men. Black women, but not black men, were more obese than their white counterparts. Except for a lower prevalence of elevated plasma triglyceride levels and low plasma high-density lipoprotein cholesterol levels in black men, lipid levels were not significantly different between the two ethnic groups. Thus, blacks (and especially black men) tended to have a more advantageous lipid risk factor profile (i.e., lower triglycerides, higher high-density lipoprotein cholesterol) than whites, but

Table 4. Summary Statistics by CAC Classification*

	Black			White			All		
	CAC+ (n = 288)	CAC− (n = 473)	p†	CAC+ (n = 175)	CAC− (n = 352)	p†	CAC+ (n = 463)	CAC− (n = 825)	p†
Continuous									
Age (yr)	55 ± 6	51 ± 6	<0.01	55 ± 6	51 ± 6	<0.01	55 ± 6	51 ± 6	<0.01
BMI (kg/m^2)	31 ± 7	30 ± 6	0.78	30 ± 6	29 ± 6	0.05	30 ± 7	30 ± 6	0.13
LDL (mg/dl)	111 ± 38	108 ± 40	0.37	118 ± 38	109 ± 33	<0.01	114 ± 38	109 ± 37	0.02
HDL (mg/dl)	51 ± 16	53 ± 15	0.17	46 ± 15	52 ± 16	<0.01	49 ± 16	52 ± 16	<0.01
TG (mg/dl)	131 ± 125	117 ± 112	0.09	152 ± 107	141 ± 108	0.30	139 ± 119	127 ± 111	0.07
Discrete									
Smoking	48%	29%	<0.01	30%	19%	<0.01	41%	25%	<0.01
Hypertension	70	52	<0.01	45	23	<0.01	61	40	<0.01
Diabetes	24	15	<0.01	13	5	<0.01	19	11	<0.01

*Entries for continuous (discrete) variables are unweighted sample mean ± SD (sample percentage); †Mean values were compared using linear regression; percentages compared by logistic regression; Each ethnicity-gender subgroup was analyzed separately; and all regressions were unweighted with age as a covariate.

BMI = body mass index; CAC = coronary artery calcium; HDL = high-density lipoprotein; LDL = low-density lipoprotein; TG = triglyceride.

had a significantly higher prevalence of non-lipid risk factors (smoking, diabetes, hypertension), accounting for the similar mean Framingham risk factor scores between the two ethnic groups.

The finding of a similar prevalence of coronary atherosclerosis in blacks and whites in this population-based study of middle-age individuals suggests that the higher rates of coronary heart disease mortality in blacks are not due to an increase in coronary atherosclerotic burden (1–3). The mean Framingham risk scores, which were not significantly different between black and white men, but tended to be higher in black women than white women, correlated with the prevalence of coronary atherosclerosis in this study. But neither the Framingham risk factor scores nor the prevalence of EBCT coronary calcium reflected the significantly higher CHD mortality in blacks than in whites. The Framingham risk factor scores were developed based on coronary events in an almost exclusively white population. When these scores were applied to blacks, they were found to underestimate the impact of hypertension on major coronary events (35) particularly in black women (36). The differences in risk factor profiles in whites and blacks, with blacks having a significantly higher prevalence of non-lipid cardiovascular risk factors (i.e., smoking, diabetes, and hypertension) may be responsible for the overall higher coronary mortality in blacks with coronary atherosclerosis. The greater non-lipid risk factor burden in blacks may predispose to cardiovascular complications. Future studies will be required to determine how ethnic differences in coronary risk factor profiles contribute to the higher coronary mortality associated with coronary atherosclerosis in blacks.

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