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Prevalence of and Risk Factors for Subclinical Cardiovascular Disease in Selected US Hispanic Ethnic Groups:

The Multi-Ethnic Study of Atherosclerosis

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Abstract

In this study, the authors determined the prevalence and extent of cardiovascular disease (CVD) risk factors and subclinical CVD in four US Hispanic subgroups, as well as associations between the CVD risk factors and subclinical CVD in these groups. Participants were 1,437 Hispanic men and women enrolled in the Multi-Ethnic Study of Atherosclerosis in 2000–2002. Fifty-six percent were Mexican-American, 12% were Dominican-American, 14% were Puerto Rican-American, and 18% were Other Hispanic-American. All participants underwent clinical examinations for coronary artery calcium, thoracic aortic calcium, carotid intimal-medial thickness, ankle-brachial index, left ventricular mass, and left ventricular size. Mexican Americans had the highest levels of coronary artery calcium, thoracic aortic calcium, and carotid intimal-medial thickness, while Puerto Rican Americans had the highest prevalence of an ankle-brachial index less than 1.0 and levels of left ventricular mass. The magnitudes of the associations between coronary artery calcium and age, sex, and body mass index were similar across all Hispanic subgroups. However, there were differences in the magnitude and significance of the associations between coronary artery calcium and hypertension, hypercholesterolemia, and cigarette smoking among the different Hispanic subgroups. This finding was also present for the other subclinical CVD measures. These results suggest a differential relationship between risk factors and either prevalence or extent of subclinical disease by Hispanic subgroup.

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A full list of participating MESA investigators and institutions can be found at http://www.mesa-nhlbi.org.

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Keywords

atherosclerosis; cardiovascular diseases; ethnic groups; Hispanic Americans; risk factors

Compared with non-Hispanic Whites, the risk factors for and rates of cardiovascular disease (CVD) appear to be different in Hispanic Americans. For example, Hispanic Americans have been variously reported to have higher rates of obesity, elevated blood pressure, elevated triglyceride levels, dyslipidemia, and diabetes (1–4). Nonetheless, many reports have demonstrated lower rates of both coronary heart disease and total CVD in Hispanic men and women (3, 5). Recent data similarly suggest that coronary artery calcium is present in lesser amounts in Hispanics (6, 7). There are also data suggesting that the rates of morbidity and mortality are different among distinct Hispanic ethnic subgroups (8–10).

Examination of the determinants of chronic diseases among distinct Hispanic subgroups is important and highly relevant to future public health planning. Using data from the Multi-Ethnic Study of Atherosclerosis (MESA), we conducted an analysis to determine Hispanic subgroup-specific levels of CVD risk factors and measures of subclinical CVD, as well as the magnitude and significance of associations between these risk factors and subclinical CVD within each Hispanic subgroup.

MATERIALS AND METHODS

Subjects

Details about the study design for the MESA have been published (11). In brief, between July 2000 and August 2002, 6,814 men and women aged 45–84 years who identified themselves as White, African-American, Hispanic, or Chinese and were free of clinically apparent CVD were recruited from six US communities. Persons with a history of physician-diagnosed heart attack, angina, heart failure, stroke, or transient ischemic attack or who had undergone an invasive procedure for CVD (coronary artery bypass graft, angioplasty, valve replacement, or pacemaker placement) were excluded from participation.

The current analysis focused on Hispanic participants in the MESA and included Cuban, Dominican, Mexican, Puerto Rican, and Other Hispanic Americans. Cuban Americans, Puerto Rican Americans, and Other Hispanics were represented at four of six field centers, while Mexican Americans were located at three of the field centers. All Dominican Americans were located at a single MESA field center (Columbia, New York). Because of small numbers ($n = 56$) and the categorization of Cuban Americans as a distinct Hispanic subgroup in the US Census, we did not conduct analyses for Cuban Americans. This resulted in a final sample of 1,437 Hispanic participants available for analysis. The institutional review boards at all participating study centers approved the protocol, and all participants gave informed written consent.

Data collection

At baseline, standardized questionnaires were used to obtain sociodemographic, ethnicity, and health history information. Cigarette smoking was defined as current, former, or never

smoking. Height and weight were measured with participants wearing light clothing and no shoes. Body mass index was calculated as weight in kilograms divided by height in meters squared. Resting blood pressure was measured three times in seated participants with a Dinamap Pro 100 automated oscillometric sphygmomanometer (Critikon, Inc., Tampa, Florida). Hypertension was defined as systolic blood pressure ≥140 mmHg, diastolic blood pressure ≥90 mmHg, or current use of antihypertensive medication.

Laboratory measures

Levels of total and high density lipoprotein cholesterol, triglycerides, and glucose were measured from blood samples obtained after a 12-hour fast (12). Dyslipidemia was defined as a total cholesterol:high density lipoprotein cholesterol ratio greater than 5.0 or use of medication to reduce cholesterol level. Diabetes was defined as fasting glucose level ≥126 mg/dl or use of hypoglycemic medication. In addition to the indices listed above, fasting blood was assayed for measures of systemic inflammation (high-sensitivity plasma C-reactive protein, fibrinogen, and interleukin-6), insulin concentration (fasting serum insulin), infectious agents (*Chlamydia pneumoniae* antibody titer), hemostasis/fibrinolysis (plasma factor VIII, plasmin-antiplasmin complex, and D-dimer), homocysteine, and von Willebrand factor. Factor VIII is a glycoprotein and an essential clotting factor, while plasmin-antiplasmin is a complex of the enzyme plasmin with its glycoprotein inhibitor antiplasmin. Both factor VIII and plasmin-antiplasmin are measures of the ability of blood to clot.

Measures of subclinical atherosclerosis

Using the Agatston method (13), coronary artery calcium and thoracic aortic calcium scores were obtained from computed tomography scans of the chest (14–16). Images from these scans were also used to determine left ventricular size using an equation previously validated by Mao et al. (17). Measurements for calculation of ankle-brachial index were obtained using a hand-held Doppler instrument with a 5-mHz probe (Nicolet Vascular, Inc., Golden, Colorado) (18). The lower of the right and left ankle-brachial index values was used as the index ankle-brachial index for that subject. Using a Logiq 700 ultrasound machine (GE Medical Systems, Waukesha, Wisconsin), images of bilateral common carotid and internal carotid arteries were obtained using high-resolution B-mode ultrasonography and subsequently read for intimal-medial thickness using a standard protocol (19, 20). To determine left ventricular mass, magnetic resonance images were acquired by 1.5-T magnetic resonance scanners (SIGNA (LX and CVi), General Electric Medical Systems, Waukesha, Wisconsin, and Siemens Medical Solutions (Vision and Sonata), Erlangen, Germany). Analysis of the magnetic resonance imaging data was performed centrally by the MESA cardiac magnetic resonance reading center (21).

Statistical analysis

Age- and sex-adjusted mean values for continuous CVD risk factors and measures of subclinical CVD by Hispanic subgroups were computed using generalized linear models. Tests for differences in the adjusted means were carried out using Dunnett's correction for multiple comparisons and the Mexican-American subgroup as the reference category. Subgroup-specific multivariable logistic regression was performed to determine the

significance and magnitude of the associations between the CVD risk factors and selected dichotomous measures of subclinical CVD. These models included age, sex, body mass index, hypertension, smoking, diabetes, and dyslipidemia ("CVD risk factors"). Additional adjustment was performed using clinic site and the inflammatory CVD risk factors (C-reactive protein, D-dimer, etc.). A two-tailed *p* value less than 0.05 was considered statistically significant.

RESULTS

Cohort characteristics

There were 1,437 Hispanic men and women enrolled in the MESA. Their mean age was 60.9 years (standard deviation, 10.2), and 52 percent were female. Fifty-six percent were Mexican-American, 12 percent were Dominican-American, 14 percent were Puerto Rican-American, and 18 percent were Other Hispanic. Mean ages were similar for these subgroups (Mexican Americans and Other Hispanics, 61.5 years; Puerto Rican Americans, 60 years; and Dominican Americans, 59 years), as were the distributions of women (Mexican Americans, 50 percent; Puerto Rican Americans, 46 percent; and Dominican Americans and Other Hispanics, 45 percent). After adjusting for age and sex and accounting for multiple comparisons, there were no significant differences in the prevalence of graduation from high school or annual family income.

Overall, 68.8 percent of the Hispanic participants had been born outside of the United States. After adjustment for age and sex, there were significantly fewer Mexican Americans who had been born outside the United States (49.5 percent) than Dominican Americans (99.6 percent), Puerto Rican Americans (82.8 percent), and Other Hispanic Americans (90.9 percent) ($p < 0.01$ for all). Participants included in the "Other Hispanic Americans" subgroup had been born in many different countries, with the most common being El Salvador (15 percent), Ecuador (14 percent), Columbia (11 percent), and Guatemala (10 percent). Puerto Rican Americans had lived in the United States significantly longer than all other subgroups (41.4 years as compared with 28.3 years for Mexican Americans, 26.9 years for Dominican Americans, and 26.4 years for Other Hispanics; $p < 0.01$). In all Hispanic subgroups, the majority of participants spoke Spanish in the home (Mexican Americans, 59.9 percent; Puerto Rican Americans, 77.6 percent; Other Hispanic Americans, 81.3 percent; and Dominican Americans, 99.5 percent).

The age- and sex-adjusted CVD risk factor characteristics of the four Hispanic subgroups are provided in table 1. Compared with Mexican Americans, all non-Mexican-American Hispanic subgroups had significantly lower triglyceride levels and lower prevalences of the metabolic syndrome but significantly higher plasmin-antiplasmin levels. Dominican, Puerto Rican, and Other Hispanic Americans were not significantly different from Mexican Americans with regard to fasting serum glucose, systolic blood pressure, low density lipoprotein cholesterol, serum creatinine, urinary albumin, fibrinogen, C-reactive protein, D-dimer, and factor VIII.

Mean values and risk factors for subclinical CVD

Table 2 shows the age- and sex-adjusted mean values for and prevalences of selected measures of subclinical CVD by Hispanic subgroup. Additional adjustment of these multivariable results for CVD risk factors, physical activity, serum creatinine, interleukin-6, plasmin-antiplasmin, income, and education did not materially change the magnitude and significance of the associations. Table 3 shows the associations between risk factors and measures of subclinical CVD by Hispanic subgroup. Results are summarized by subclinical CVD measure below.

Coronary artery calcium—In comparison with Mexican Americans, after adjustment for age and sex, Other Hispanic Americans had a significantly lower prevalence of coronary artery calcium. In a multivariable logistic model containing the CVD risk factors, the odds ratio for a coronary artery calcium score greater than 0 was 0.63 (95 percent confidence interval (CI): 0.45, 0.90) for Other Hispanic Americans compared with Mexican Americans. In separate Hispanic subgroup-specific multivariable logistic regression models containing the CVD risk factors, increasing age and male sex were consistently associated with higher odds of having a coronary artery calcium score greater than 0 across all Hispanic subgroups. Hypertension was significantly associated with coronary artery calcium in Mexican Americans, Dominican Americans, and Puerto Rican Americans, with the magnitude of the association being over twice as large in Dominican Americans as in the other two subgroups. Dyslipidemia was significantly associated with coronary artery calcium among Dominican Americans and Puerto Rican Americans, and the magnitudes of the associations were similar between these two Hispanic subgroups.

Thoracic aortic calcium—As for coronary artery calcium, Mexican Americans had the highest prevalence of thoracic aortic calcium. In a multivariable logistic model containing the CVD risk factors, the odds ratio for a thoracic aortic calcium score greater than 0 was 0.47 (95 percent CI: 0.27, 0.80) among Dominican Americans compared with Mexican Americans. In separate Hispanic subgroup-specific multivariable logistic models including the CVD risk factors, increasing age was significantly associated with a thoracic aortic calcium score greater than 0 across all Hispanic subgroups. Among Puerto Rican Americans and Mexican Americans, hypertension was significantly associated with the presence of any thoracic aortic calcium, and the odds were twice as large among the former. Diabetes was significantly associated with any thoracic aortic calcium only among Mexican Americans. Sex, body mass index, dyslipidemia, former smoking, and current smoking were not significantly associated with a thoracic aortic calcium score greater than 0.

Ankle-brachial index—Puerto Rican Americans had the highest prevalence of an ankle-brachial index less than 1.0. When compared with Mexican Americans, Other Hispanic Americans had a significantly higher prevalence of an ankle-brachial index less than 1.0. In a multivariable logistic model containing the CVD risk factors, only Other Hispanic Americans had significantly lower odds of an ankle-brachial index less than 1.0 (odds ratio = 0.51, 95 percent CI: 0.28, 0.93). In separate Hispanic subgroup-specific multivariable logistic models including the CVD risk factors, increasing age was a significant risk factor for an ankle-brachial index less than 1.0 among all Hispanic subgroups except Dominican

Americans. Among Mexican Americans, hypertension and diabetes were significantly associated with having an ankle-brachial index less than 1.0.

Carotid intimal-medial thickness—Dominican Americans had the lowest carotid intimal-medial thickness values; these values were significantly lower than those for Mexican Americans. In comparison with Mexican Americans, in a multivariable logistic model containing the CVD risk factors, the odds ratio for a carotid intimal-medial thickness value in the highest quartile was 0.50 (95 percent CI: 0.32, 0.77) among Dominican Americans. In separate Hispanic subgroup-specific multivariable logistic models including the CVD risk factors, age was significantly associated with having a carotid intimal-medial thickness in the highest quartile. Male sex was significantly associated with the highest quartile of carotid intimal-medial thickness among Mexican Americans and Other Hispanic Americans only. Diabetes and current smoking were significantly associated with carotid intimal-medial thickness among Mexican Americans and Puerto Rican Americans.

Left ventricular mass—Puerto Rican Americans had the highest mean value for left ventricular mass. In comparison with Mexican Americans, in a multivariable logistic model, there were no significant associations between Hispanic ethnic subgroup and left ventricular mass. Among all Hispanic subgroups, male sex was highly significant for having a left ventricular mass value in the highest quartile. Beyond this, age was associated with a lower odds ratio for the highest quartile of left ventricular mass among three Hispanic subgroups, while hypertension was significant only among Mexican Americans.

Left ventricular size—For left ventricular size, Mexican Americans had the *smallest* mean values. Compared with Mexican Americans, Dominican and Puerto Rican Americans had significantly higher left ventricular size values. In a multivariable logistic model containing the CVD risk factors, the odds ratio for a left ventricular size value in the highest quartile was 3.13 (95 percent CI: 1.93, 5.1) among Dominican Americans and 1.91 (95 percent CI: 1.22, 3.00) for Puerto Rican Americans, with Mexican Americans as the reference group. Male sex was highly associated with left ventricular size among all of the Hispanic subgroups. Body mass index was significantly associated with the highest quartile of left ventricular size among all Hispanic subgroups except Other Hispanic Americans. Hypertension was significantly associated with the highest quartile of left ventricular size among Mexican and Puerto Rican Americans. Diabetes and dyslipidemia were not significantly associated with having a left ventricular size value in the highest quartile.

DISCUSSION

In this exploratory study of distinct US Hispanic ethnic groups, there were significant differences in the distributions of CVD risk factors, as well as prevalences and mean values of several measures of subclinical CVD. Moreover, there were differences in the magnitude and significance of the associations between these risk factors and subclinical disease by Hispanic subgroup. This suggests that the magnitude of the effect of a given risk factor on the development of a given subclinical CVD measure may vary by Hispanic subgroup and that the observed differences in levels of risk factors and their associations with measures of subclinical CVD by Hispanic subgroup have important clinical implications. For example,

among Dominican Americans, hypertension is highly prevalent, and the magnitude of the association between this CVD risk factor and both coronary artery calcium score greater than 0 and an ankle-brachial index less than 1.0 is stronger than that for the other Hispanic subgroups studied. Therefore, blood pressure surveillance and control should be especially aggressive in Dominican Americans in an effort to reduce their risk for incident CVD events.

Although they are usually classified as a single ethnic group, Hispanics are culturally, socioeconomically, and genetically heterogeneous and represent a wide variety of national origins and social classes. These differences are manifested in measures of CVD. For example, in the Dominican Republic there has been substantial mixing of persons of European, Hispanic, and (especially) African ancestry. The influence of African admixture appears to be manifested as a significantly higher prevalence of hypertension among Dominican Americans in comparison with Mexican, Puerto Rican, and Other Hispanic Americans. Similarly, a significant proportion of Puerto Rican Americans have a mixed ("mestizo") heritage that consists of European and Amerindian ancestry. Since non-Hispanic Whites have been shown to have lower rates of the metabolic syndrome (2) and higher rates or levels of smoking (4, 22, 23), the partly European heritage of Puerto Rican Americans may have contributed to the observed differences in the distributions of these risk factors in comparison with Mexican Americans.

Compared with non-Hispanic Whites, Hispanics have been variously reported to have higher levels of several CVD risk factors (1–4). In spite of this risk factor profile, many reports have demonstrated lower rates of both coronary heart disease and total CVD in Hispanic men and women (3, 5, 24, 25). This discordance between CVD risk factor levels and CVD morbidity and mortality in Hispanics comprises an aspect of the "Hispanic Paradox." Our results suggest that there is a differential relationship between Hispanic subgroups and 1) the prevalence and extent of CVD risk factors and 2) the associations between these risk factors and measures of subclinical CVD. Since several of these subclinical measures have been previously shown to be significant independent predictors of incident CVD (26–31), a closer examination of the Hispanic Paradox and how different Hispanic ethnic groups contribute to this phenomenon seems warranted.

In support of the differential relationship between CVD risk factors and Hispanic subgroups, population studies consistently find a high prevalence of type 2 diabetes among Puerto Rican Americans and Mexican Americans (8). Other national studies confirm the high prevalence of diabetes among Mexican Americans and Puerto Rican Americans living on the mainland and suggest that the prevalence of diabetes in Cuban Americans is similar to that of non-Hispanic Whites (9, 10). The results of the current study confirm these earlier reports.

The risk factor profile of Mexican Americans in our study was associated with the highest levels of nearly all of the measures of subclinical CVD that we examined. Puerto Rican Americans had the second-highest levels of most of the measures of subclinical CVD, yet the risk factor profile for this Hispanic subgroup was distinctly different from that of Mexican Americans. Since Mexican Americans and Puerto Rican Americans form a

significant proportion of the Hispanic population in the United States (approximately two thirds), the results of our study suggest that the current formulation of the Hispanic Paradox may be driven largely by the morbidity and mortality rates of Mexican Americans and, to some degree, Puerto Rican Americans. Future studies examining the risk factors driving morbidity and mortality in different Hispanic ethnic groups would help to refine our interpretation of the Hispanic Paradox and its implications.

To our knowledge, there have been no previous direct comparisons of measures of subclinical CVD between Mexican Americans, Dominican Americans, Puerto Rican Americans, and Other Hispanic Americans. In addition, very few studies have made direct comparisons of CVD risk factors and extant CVD among different Hispanic subgroups. Accordingly, the results provided here are a first step toward a better understanding of the differences between different Hispanic ethnic groups that may refine the Hispanic Paradox construct. Since previous studies have suggested that acculturation to US society is associated with unfavorable changes in levels of CVD risk factors, an important consideration in these future studies should be the potential effect of acculturation on the associations between CVD risk factors and both subclinical and incident CVD (32–34). For example, after adjustment for CVD risk factors, Hispanic Americans born outside of the United States have significantly lower carotid intimal-medial thickness values than those born in the United States (35). There is currently research under way in the MESA to better clarify the associations between acculturation and CVD among Hispanics.

Limitations

Although the MESA participants were drawn from six field centers in different regions of the United States and subjects from minority ethnic groups were over-recruited, the recruitment scheme was not designed to obtain truly representative racial samples. Therefore, the Hispanic subgroups included in this analysis should not be considered representative of a national cross-section. The sample size for some of the Hispanic subgroups was relatively small. For categorical subclinical CVD measures and categorical CVD risk factors, this resulted in limited statistical power to detect significant differences. The limited sample size is also likely to have influenced the significance of the Hispanic subgroup-specific associations between risk factors and measures of subclinical CVD. Therefore, the results presented should be viewed globally, and further research is needed to confirm the nature of the associations tested. The recently launched Hispanic Community Health Study/Study of Latinos (http://www.cscc.unc.edu/hchs/) provides a unique opportunity to further clarify these associations.

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Abbreviations

CI	confidence interval
CVD	cardiovascular disease
MESA	Multi-Ethnic Study of Atherosclerosis.

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TABLE 1

Age- and sex-adjusted characteristics of four subgroups of Hispanic Americans, the Multi-Ethnic Study of Atherosclerosis, 2000–2002

Variable	Mexican Americans (*n* = 801)	Dominican Americans (*n* = 175)	Puerto Rican Americans (*n* = 201)	Other Hispanic Americans (*n* = 260)
Height (cm)	161.7	163.3*	162.7	161.9
Body mass index†	30.0	27.9*	29.7	28.6*
Hip circumference (cm)	105.7	103.5*	106.6	103.7*
Glucose level (mg/dl)	112.9	105.1	110.6	110.3
Insulin level (mU/liter)	8.7	6.5*	7.7	7.7*
Metabolic syndrome (%)	49.1	33.2*	37.9*	37.6*
Diabetes mellitus (%)	22.3	16.1	19.7	15.2*
Pack-years of smoking	7.8	5.8	11.3*	5.3
Ever smoking (%)	47.5	34.8*	54.6	41.1
Systolic blood pressure (mmHg)	126.7	128.8	124.9	125.5
Diastolic blood pressure (mmHg)	70.7	74.9*	72.3	71.6
Hypertension (%)	37.6	52.9*	43.3	42.1
Low density lipoprotein cholesterol level (mg/dl)	119.1	124.6	118.2	118.2
High density lipoprotein cholesterol level (mg/dl)	46.3	48.4	49.0*	49.6*
Triglyceride level (mg/dl)	173.1	125.3*	134.4*	147.4*
Dyslipidemia (%)	41.1	36.9	33.4	33.0*
Creatinine level (mg/dl)	0.90	0.93	0.91	0.88
Urinary albumin level (mg/dl)	5.07	3.41	6.83	3.26
Urinary creatinine level (mg/dl)	123.4	134.0	141.2*	122.2
Interleukin-6 level (pg/ml)	1.83	1.44*	1.66	1.64
Plasmin-antiplasmin concentration (nM)	4.40	5.10*	4.80*	4.76*
Homocysteine level (μmol/liter)	9.00	9.56*	9.37	8.79
Fibrinogen level (mg/dl)	356.7	364.7	367.2	349.7
C-reactive protein level (mg/liter)	4.33	3.41	4.14	3.92
D-dimer level (μg/ml)	0.34	0.35	0.44	0.42
Factor VIII (%)	159.3	162.5	170.4	158.9

* $p < 0.05$ (reference group, Mexican Americans).

† Weight (kg)/height $(m)^2$.

TABLE 2

Adjusted[†] mean values for selected measures of subclinical cardiovascular disease in four subgroups of Hispanic Americans, the Multi-Ethnic Study of Atherosclerosis, 2000–2002

Subclinical measure	Mexican Americans (*n* = 801)	Dominican Americans (*n* = 175)	Puerto Rican Americans (*n* = 201)	Other Hispanic Americans (*n* = 260)
Coronary artery calcium score > 0 (%)	47.9	43.6	45.0	39.7[*]
Thoracic aortic calcium score > 0 (%)	26.9	22.3	25.6	22.3
Ankle-brachial index < 1.0 (%)	10.7	9.4	13.0	6.0[*]
Carotid intimal-medial thickness (mm)	0.96	0.89[*]	0.94	0.94
Left ventricular mass (g)	146.1	147.8	149.6	144.7
Left ventricular size (ml)	175.4	208.7[*]	197.9[*]	182.5

[*] $p < 0.05$ (reference group, Mexican Americans).

[†] Adjusted for age and sex.

TABLE 3

Associations between cardiovascular disease risk factors and selected measures of subclinical cardiovascular disease in four subgroups of Hispanic Americans, the Multi-Ethnic Study of Atherosclerosis, 2000–2002

Risk factor (comparison)	Mexican Americans (*n* = 801)		Dominican Americans (*n* = 175)		Puerto Rican Americans (*n* = 201)		Other Hispanic Americans (*n* = 260)	
	OR[†]	95% CI[†]	OR	95% CI	OR	95% CI	OR	95% CI
Coronary artery calcium score (>0 vs. 0)								
Age (1 year)	1.11*	1.09, 1.13	1.08*	1.03, 1.13	1.11*	1.07, 1.16	1.09*	1.05, 1.13
Sex (male vs. female)	3.03*	2.10, 4.38	2.93*	1.21, 7.09	3.35*	1.57, 7.14	4.33*	2.27, 8.28
Body mass index[‡] (1 unit)	1.05*	1.02, 1.09	1.02	0.93, 1.12	0.98	0.90, 1.06	0.99	0.92, 1.07
Hypertension (yes vs. no)	1.99*	1.38, 2.86	5.21*	2.01, 13.5	2.22*	1.02, 4.84	1.18	0.61, 2.31
Dyslipidemia (yes vs. no)	1.28	0.75, 2.17	3.26*	1.04, 10.22	3.61*	1.21, 10.78	1.93	0.87, 4.29
Diabetes mellitus (yes vs. no)	1.53*	1.01, 2.32	0.81	0.25, 2.61	0.50	0.19, 1.32	1.27	0.53, 3.05
Former smoking (yes vs. never)	1.38	0.95, 2.02	0.43	0.15, 1.29	2.29*	1.01, 5.20	2.23*	1.12, 4.45
Current smoking (yes vs. never)	1.60	0.95, 2.71	1.24	0.33, 4.68	2.83*	1.05, 7.65	1.39	0.47, 4.14
Thoracic aortic calcium score (>0 vs. 0)								
Age (1 year)	1.17*	1.13, 1.20	1.12*	1.05, 1.19	1.17*	1.11, 1.24	1.15*	1.10, 1.21
Sex (male vs. female)	0.60*	0.39, 0.91	0.98	0.33, 2.90	1.34	0.50, 3.59	1.16	0.54, 2.48
Body mass index (1 unit)	1.01	0.97, 1.06	1.03	0.92, 1.14	0.92	0.83, 1.02	0.96	0.87, 1.05
Hypertension (yes vs. no)	2.11*	1.41, 3.16	2.64	0.71, 9.83	5.49*	1.99, 15.09	1.94	0.91, 4.11
Dyslipidemia (yes vs. no)	1.00	0.58, 1.73	1.36	0.41, 4.48	1.25	0.38, 4.13	1.44	0.61, 3.38
Diabetes mellitus (yes vs. no)	1.57	1.00, 2.46	0.83	0.22, 3.11	1.46	0.49, 4.33	1.21	0.47, 3.15
Former smoking (yes vs. never)	0.94	0.60, 1.45	1.22	0.36, 4.13	1.33	0.45, 3.92	1.43	0.64, 3.20
Current smoking (yes vs. never)	1.29	0.65, 2.55	0.84	0.14, 5.27	3.97	0.98, 16.06	2.60	0.65, 10.51
Ankle-brachial index (≤1.0 vs. >1.0)								
Age (1 year)	1.05*	1.02, 1.08	1.07	0.99, 1.17	1.05	1.00, 1.11	1.08*	1.01, 1.15
Sex (male vs. female)	0.50*	0.29, 0.86	0.49	0.09, 2.57	0.72	0.26, 1.99	0.92	0.27, 3.09
Body mass index (1 unit)	0.95	0.90, 1.00	0.91	0.76, 1.08	0.97	0.87, 1.07	0.91	0.78, 1.07

Risk factor (comparison)	Mexican Americans (*n* = 801)		Dominican Americans (*n* = 175)		Puerto Rican Americans (*n* = 201)		Other Hispanic Americans (*n* = 260)	
	OR[†]	95% CI[†]	OR	95% CI	OR	95% CI	OR	95% CI
Hypertension (yes vs. no)	2.43*	1.39, 4.24	4.13	0.62, 27.4	1.11	0.38, 3.22	3.13	0.84, 11.67
Dyslipidemia (yes vs. no)	1.65	0.88, 3.11	2.26	0.45, 11.38	1.55	0.47, 5.11	0.60	0.12, 2.98
Diabetes mellitus (yes vs. no)	2.89*	1.69, 4.94	2.78	0.55, 14.13	2.01	0.66, 6.17	0.36	0.04, 3.20
Former smoking (yes vs. never)	0.72	0.40, 1.30	—§	—	0.96	0.29, 3.16	1.27	0.35, 4.55
Current smoking (yes vs. never)	1.46	0.66, 3.27	2.72	0.39, 18.88	2.39	0.67, 8.60	1.43	0.14, 14.96
Carotid intimal-medial thickness (highest 25% vs. lowest 75%)								
Age (1 year)	1.08*	1.06, 1.11	1.12*	1.06, 1.18	1.11*	1.07, 1.16	1.08*	1.04, 1.12
Sex (male vs. female)	2.21*	1.49, 3.27	0.74	0.30, 1.84	1.33	0.59, 3.04	2.39*	1.22, 4.67
Body mass index (1 unit)	1.03	0.99, 1.07	1.01	0.92, 1.11	1.06	0.98, 1.15	1.03	0.95, 1.11
Hypertension (yes vs. no)	2.50*	1.70, 3.68	1.09	0.39, 3.03	1.77	0.77, 4.07	1.17	0.59, 2.30
Dyslipidemia (yes vs. no)	1.06	0.63, 1.78	2.15	0.75, 6.14	0.88	0.29, 2.66	1.14	0.52, 2.51
Diabetes mellitus (yes vs. no)	1.79*	1.18, 2.69	1.59	0.51, 5.01	2.57*	1.04, 6.37	1.46	0.64, 3.36
Former smoking (yes vs. never)	1.17	0.77, 1.76	1.75	0.60, 5.17	1.72	0.67, 4.38	1.19	0.59, 2.43
Current smoking (yes vs. never)	2.30*	1.29, 4.09	2.42	0.62, 9.41	5.80*	1.87, 17.93	1.75	0.56, 5.46
Left ventricular mass (highest 25% vs. lowest 75%)								
Age (1 year)	0.97*	0.95, 0.98	0.94*	0.90, 0.97	0.94*	0.91, 0.97	0.99	0.96, 1.01
Sex (male vs. female)	2.42*	1.80, 3.26	4.93*	2.31, 10.52	3.93*	2.07, 7.46	2.80*	1.61, 4.86
Body mass index (1 unit)	0.98	0.96, 1.01	1.01	0.93, 1.09	0.96	0.90, 1.05	0.94	0.89, 1.00
Hypertension (yes vs. no)	1.43*	1.05, 1.95	1.18	0.53, 2.64	1.84	0.96, 3.55	1.41	0.80, 2.47
Dyslipidemia (yes vs. no)	1.25	0.81, 1.93	2.64	0.98, 7.15	2.05	0.82, 5.11	1.05	0.52, 2.09
Diabetes mellitus (yes vs. no)	0.93	0.66, 1.30	1.12	0.39, 3.24	0.36*	0.16, 0.81	1.02	0.49, 2.11
Former smoking (yes vs. never)	0.99	0.72, 1.35	1.09	0.47, 2.55	0.95	0.48, 1.86	1.05	0.59, 1.87
Current smoking (yes vs. never)	1.18	0.76, 1.84	2.30	0.80, 6.59	1.05	0.48, 2.33	0.81	0.34, 1.93
Left ventricular size (highest 25% vs. lowest 75%)								
Age (1 year)	0.96*	0.94, 0.98	0.90*	0.85, 0.96	0.93*	0.89, 0.98	0.99	0.95, 1.02
Sex (male vs. female)	11.26*	6.99, 18.12	7.96*	3.07, 20.60	4.20*	1.84, 9.56	8.63*	4.11, 18.12

Risk factor (comparison)	Mexican Americans (*n* = 801)		Dominican Americans (*n* = 175)		Puerto Rican Americans (*n* = 201)		Other Hispanic Americans (*n* = 260)	
	OR[†]	95% CI[†]	OR	95% CI	OR	95% CI	OR	95% CI
Body mass index (1 unit)	1.04	1.00, 1.08	1.13*	1.01, 1.26	1.10*	1.02, 1.19	1.08	0.99, 1.17
Hypertension (yes vs. no)	3.33*	2.16, 5.14	1.64	0.55, 4.91	2.70*	1.16, 6.29	0.95	0.47, 1.96
Dyslipidemia (yes vs. no)	0.83	0.45, 1.50	2.03	0.46, 8.91	0.64	0.16, 2.62	1.02	0.42, 2.47
Diabetes mellitus (yes vs. no)	0.79	0.50, 1.24	0.40	0.07, 2.25	0.61	0.21, 1.76	0.54	0.21, 1.40
Former smoking (yes vs. never)	1.17	0.78, 1.78	1.63	0.57, 4.67	2.67*	1.11, 6.45	1.25	0.61, 2.55
Current smoking (yes vs. never)	1.40	0.80, 2.45	6.12*	1.68, 22.36	2.00	0.72, 5.58	1.10	0.38, 3.15

*$p < 0.05$.

†OR, odds ratio; CI, confidence interval.

‡Weight (kg)/height (m)^2.

§Undefined.