Cuban Americans have the highest rates of peripheral arterial disease in diverse Hispanic/Latino communities

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Objective: **Because Hispanic ethnicity in the United States is heterogeneous, the purpose of this study was to determine the epidemiology of peripheral arterial disease (PAD) within U.S. Hispanic/Latino groups defined by national background.**
Methods: **This analysis included 9648 men and women older than 45 years enrolled in the Hispanic Community Health Study/Study of Latinos (HCHS/SOL). The ankle-brachial index (ABI) was computed as the higher of the posterior tibial and dorsalis pedis systolic blood pressures for each leg divided by the higher brachial artery systolic blood pressure. The index ABI was the higher of the two. An ABI ≤0.90 was the criterion for the presence of PAD.**
Results: **The mean age was 56 years, and 55% were female. Overall, the prevalence of an ABI ≤0.90 (PAD), 0.90 to 0.99 (borderline), 1.0 to 1.39 (normal), and ≥1.40 (high) was 5.7%, 19.3%, 72.5%, and 2.6%, respectively. After multivariable adjustment for PAD risk factors and compared with Mexicans, Cubans had a nearly threefold higher odds for PAD (odds ratio, 2.9; 95% confidence interval, 1.9-4.4). The odds of PAD for the other Hispanic/Latino groups ranged from 1.2 to 1.8. Although men had a more than threefold higher odds of an ABI ≥1.40 (3.6; 2.0-6.5), the odds did not differ significantly by Hispanic/Latino background.**
Conclusions: **Compared with Mexican Americans, all other Hispanic/Latino background groups have a significantly higher odds of having PAD, with the odds being nearly threefold higher among Cubans. (J Vasc Surg 2015;62:665-72.)**

In the United States, peripheral arterial disease (PAD) affects >8 million adults[1] and is associated with significant morbidity and mortality.[2,3] In addition to clinical symptoms, the presence of PAD is typically determined by the ankle-brachial index (ABI).[4] Using ABI data from the Multi-Ethnic Study of Atherosclerosis (MESA), and compared with non-Hispanic whites, we have previously reported that Hispanic Americans have approximately half the risk of PAD,[5] defined as an ABI <0.90.

Although they are usually classified as a single ethnic group (as was the case for the aforementioned studies), Hispanic/Latinos are heterogeneous from cultural, socioeconomic, and genetic perspectives, and these differences are manifested in measures of cardiovascular disease (CVD). Indeed, recent results from the Hispanic Community Health Study/Study of Latinos (HCHS/SOL) showed that compared with Mexican Americans, Dominican and Cuban Americans have significantly higher rates of hypertension, whereas the rates of diabetes mellitus are significantly lower among Cuban Americans and South Americans, and rates of smoking are significantly higher among Cuban and Puerto Rican Americans.[6] Similarly, findings from MESA showed that Central and South Americans have significantly lower levels of prevalent coronary artery calcium, Dominican Americans have significantly lower carotid intimal-medial thickness, and both Puerto Rican and Dominican Americans have significantly higher left ventricular volumes.[7]

Given this, we conducted a study to test the hypothesis of differential risks of PAD among the different Hispanic/Latino ethnic groups enrolled in the HCHS/SOL.

METHODS

Study population. The design, implementation, and recruitment strategies for the HCHS/SOL have been

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published in detail previously.[8,9] In brief, between March 2008 and June 2011, the HCHS/SOL recruited and then examined 16,415 self-identified Hispanic/Latino persons between the ages of 18 and 74 years. Households were selected with use of a stratified two-stage area probability sample design. Census block groups were randomly selected in the defined community areas of each field center (Bronx, New York; Chicago, Illinois; Miami, Florida; San Diego, California), and households were randomly selected in each sampled block group. Oversampling occurred at each stage, with block groups in areas of Hispanic/Latino concentration, households associated with a Hispanic/Latino surname, and persons aged 45 to 74 years selected at higher rates than their counterparts. Sampling weights were generated to reflect the probabilities of selection at each stage.[9] As a result, the HCHS/SOL included participants from Cuban, Dominican, Mexican, Puerto Rican, Central American, and South American backgrounds. Institutional Review Boards at each participating institution approved the study, and written informed consent was obtained from all participants.

Participants were defined as first generation if they were foreign born and with parents that were both foreign born. Second generation was defined as U.S. born with at least one foreign-born parent. In addition, foreign-born adults with at least one U.S.-born parent were classified as second generation to reflect their mixed cultural backgrounds.[2]

Of the participants, 6701 were younger than 45 years and were not examined by the ABI. Given this, and excluding other individuals with missing ABI data (n = 66), the sample size for the current analysis was 9648 men and women.

DATA COLLECTION

Information on demographic factors, socioeconomic status, acculturation, cigarette smoking, physical activity, and medical history was obtained by survey questionnaires. To complete a current medication inventory, participants were instructed to bring all prescription and nonprescription medications taken in the past month.

Participants were asked to fast and to refrain from smoking for 12 hours before the examination and to avoid vigorous physical activity the morning of the visit. Height was measured to the nearest centimeter and body weight to the nearest 0.1 kg. Body mass index was calculated as weight in kilograms divided by height in meters squared. After a 5-minute rest period, three seated blood pressure measurements were obtained with an automatic sphygmomanometer; the second and third readings were averaged, and the result was used in the analysis. Hypertension was defined as a systolic blood pressure >139 mm Hg, a diastolic blood pressure >89 mm Hg, or taking a blood pressure-lowering medication.

Blood samples, including plasma glucose (fasting and after a 2-hour oral glucose load), were collected according to standardized protocols. Total serum cholesterol was measured by a cholesterol oxidase enzymatic method, and high-density lipoprotein (HDL) cholesterol was measured with a direct magnesium-dextran sulfate method. Low-density lipoprotein (LDL) cholesterol was calculated by the Friedewald equation.[10] Dyslipidemia was defined as a total cholesterol to HDL cholesterol ratio >5 or use of a cholesterol-lowering medication. Plasma glucose concentration was measured by a hexokinase enzymatic method (Roche Diagnostics, Indianapolis, Ind). Hemoglobin A_{1c} was measured by a Tosoh G7 automated high-performance liquid chromatography analyzer (Tosoh Bioscience, King of Prussia, Pa). Diabetes mellitus was defined as a fasting glucose concentration >125 mg/dL or taking a medication to control blood glucose level.

A standardized method was used to determine the ABI. Specifically, with the patient sitting, the circumference of each upper arm was measured and used to determine the appropriate cuff size to be used: adult (12-cm width) for arm circumference of <32 cm, large adult (16-cm width) for arm circumference of 32 to 42 cm, and thigh (20-cm width) for arm circumference of ≥43 cm. Then, starting in the right arm and moving counterclockwise, systolic blood pressures were obtained once in the bilateral brachial, anterior tibial, and posterior tibial arteries. The limb-specific ABI was computed using the higher of the ipsilateral ankle artery pressures and dividing by the higher of the two brachial artery pressures. The index ABI was the lower of the two limb values; the presence of PAD was defined as an ABI <0.90, whereas an ABI >1.39 is indicative of stiff arteries.[11]

Statistical analysis. All reported values (means, prevalence, and odds ratios) were weighted to adjust for sampling probability and nonresponse. More specifically, all reported values were weighted to account for the disproportionate selection of the sample and to at least partially adjust for any bias effects due to differential nonresponse in the selected sample at the household and person levels. The adjusted weights were also trimmed to limit precision losses due to the variability of the adjusted weights and calibrated to the 2010 Census characteristics by age, sex, and Hispanic background in each field site's target population. All analyses also account for cluster sampling and the use of stratification in sample selection.

Adjusted prevalence estimates for the target population of Hispanic/Latinos in the four HCHS/SOL communities were calculated by survey-specific logistic regression procedures adjusting each Hispanic/Latino group to the age, gender, and Hispanic/Latino background distribution of the target population. Survey-specific logistic regression analyses were used to examine associations of risk factors with PAD. Initial models adjusted for age, sex, and Hispanic background. Multivariable models adjusted for all covariates shown. Of note, inclusion of a variable for the field center from which the participant enrolled did not change the results from those in the full model. Also, the field center variable is highly collinear with ethnic background. Therefore, and to ensure model stability, we did not include a field center variable in the models. Odds ratios with 95% confidence intervals were computed by survey-specific logistic regression procedures to account for the two-stage sampling design, stratification, and clustering.