

# CORONARY HEART DISEASE RISK FACTORS AMONG CUBAN AMERICANS

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Cuban Americans, one of three major Hispanic subgroups, represent  $\approx 4\%$  of total US Hispanics. Coronary heart disease (CHD) is the leading cause of death among Cuban Americans. Yet, we know very little about the risk factors of CHD. Findings from one Hispanic subgroup cannot be applicable or extrapolative to other Hispanic subgroups because each subgroup's social histories, cultural identities, health behaviors, and genetic compositions are unique. This paper reviews the existing information on Cuban-American health behavior in relation to CHD. Analyses of the Hispanic Health and Nutrition Examination Survey (HHANES) data revealed a high prevalence of overweight, cigarette smoking, and type 2 diabetes among Cuban Americans. However, the cross-sectional nature of HHANES precludes identifying a cause-and-effect relationship. Well-designed studies are warranted to identify the lifestyle, biochemical, and emerging risk factors of CHD among Cuban Americans. (*Ethn Dis.* 2005;15:607-614)

**Key Words:** Cuban Americans, Heart Disease, Risk Factors

## INTRODUCTION

Coronary heart disease (CHD) is the leading cause of death among US Hispanics.<sup>1</sup> Most existing studies and data analyses address primarily Mexican-American health. However, each Hispanic subgroup, including Cuban Americans, is different from each other in regard to social histories, cultural identities, health behaviors, and genetic compositions.<sup>2</sup> Therefore, findings from one Hispanic group cannot be applicable or extrapolative to other Hispanic groups.<sup>3</sup>

Cuban Americans represent  $\approx 4\%$  of total US Hispanics,<sup>4</sup> but adequate research has not been directed to elucidate the health behavior and health problems of this minority population. In-depth and clear understanding of Cuban-American health would enrich our current knowledge. This review discusses the magnitude of CHD and its risk factors (atherogenic diet, overweight or obesity, cigarette smoking, excess alcohol consumption, physical inactivity, hypertension, atherogenic blood lipid profile, diabetes, and depression) among Cuban Americans based on the available information. In the context of CHD risk factors, the article briefly addresses socioeconomic status, access to health care, acculturation, and migration effects. Future research directions to investigate the CHD risk and its prevention are also discussed.

## METHODS

The Medline database was searched for articles using the key words: Cubans, Cuban Americans, coronary heart disease, coronary artery disease, cardiovascular disease, atherosclerosis, etc. We

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also searched for textbooks, book chapters, and research monographs. Additional search was performed by examining bibliographies of original and review articles. Search of articles was limited to only Cubans living in the United States. Nevertheless, studies on other ethnic groups were used when it was pertinent. Results of most papers originated from the Hispanic Health and Nutrition Examination Survey (HHANES) data conducted during 1982-84.<sup>5</sup> Periodic National Health Interview Surveys (NHIS), national vital statistics data, and one community-based study (the Miami Community Health Study) contributed to the knowledge about Cuban-American health to some extent.

## RESULTS

### CHD is the Leading Cause of Death

Earlier reports from vital statistics data indicated that CHD was the leading cause of death among Cuban Americans during 1979-1981.<sup>6</sup> Subsequent reports also ranked CHD at the top of the mortality chart for Cuban Americans.<sup>7,8</sup> Recently, it has been documented that the cardiovascular mortality ratio among adult Cuban Americans is similar to that of non-Hispanic Whites.<sup>9</sup>

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## Prevalence of overweight and obesity among Cuban Americans

Reference	Data Source	Sex (n)	Age (year)	Overweight (%)	Obesity (%)
Najjar et al <sup>20</sup> (1989)	HHANES*	Men (n=43,00)	20–74	29.4	10.6
		Women (n=62,00)	20–74	34.1	7.7
Khan et al <sup>21</sup> (1997)	HHANES*	Men (n=377)	18–74	34.7	10.1
		Women (n=451)	18–74	40.3	9.1
Pawson et al <sup>22</sup> (1991)	HHANES*	Men (n=423)	≥18	34.0	9.0
		Women (n=528)	≥18	38.2	15.0
CDC <sup>23</sup> (2003)	HHANES†‡	Men (NA)	20–74	55.7	13.1
		Women (NA)	20–74	49.4	16.5
Denney et al <sup>24</sup> (2004)	NHIS†	Men (NA)	≥18	50.6	20.2
		Women (NA)	≥18	39.6	20.1

HHANES=Hispanic Health and Nutrition Examination Survey; CDC=Centers for Disease Control and Prevention; NA=data not available; NHIS=National Health Interview Survey.

\* Defined overweight as ≥85th percentile and obesity as ≥95th percentile.

† Defined overweight as body mass index (BMI; kg/m<sup>2</sup>) as ≥25.0 – <30.0 and obesity as BMI ≥30.0.

‡ Adjusted for age.

## Dietary Patterns

Data on dietary habits and nutrition status of Cuban Americans are meager, and very little is known about the dietary pattern of Cuban Americans in relation to CHD. Available dietary data exclusively derive from the HHANES. Sanjurjo<sup>10</sup> reported the macronutrient intakes of Cuban Americans did not differ significantly from the 1989 Recommended Dietary Allowances (RDAs).<sup>11</sup> The intakes of carbohydrates, fat, and protein were 43%–51%, 30%–36%, and 18%–19%, respectively for Cuban-American men and women across age groups.<sup>10</sup> Percentage of calorie intakes of these macronutrients in Cuban Americans are comparable to other US ethnic groups.<sup>12</sup> Loria et al<sup>12</sup> showed that the age-adjusted mean percentage calorie intakes of total fat, saturated fat, mono-unsaturated fat, and polyunsaturated fat were 33%, 12%, 13%, and 6%, respectively, which were somewhat in compliance with the National Cholesterol Education Program (NCEP) Step 1 dietary guidelines.<sup>13</sup> The age-adjusted daily mean cholesterol intake was 389 mg in Cuban-American men and 269 mg in Cuban-American women, higher than the NCEP Step 1 recommendation.<sup>12,13</sup>

Daily consumption of one or more junk foods (candy, sodas, cake, cookies,

chips, sugar, etc) among Cuban Americans was >75%.<sup>14</sup> In contrast, only 28% of Cuban men and 35% of Cuban women had daily consumption of four to five healthy food groups (fruits, vegetables, cereals and or grains, meats, and dairy products).<sup>14</sup> On average Cuban Americans ate fruits and vegetables no more than once per day.<sup>15</sup> A significantly higher percentage of Cuban-American men (75%) and women (93%) did not eat the recommended daily portions of grain.<sup>16</sup> Optimal intakes of folate, vitamin B<sub>6</sub> and vitamin B<sub>12</sub> prevent CHD by lowering blood homocysteine concentrations. Cuban-American men exceeded the 1989 RDAs for vitamin B<sub>6</sub> and vitamin B<sub>12</sub>, whereas Cuban-American women achieved the RDAs for vitamin B<sub>12</sub> only.<sup>15</sup> Despite dietary deficiency, most Cuban-American women had normal serum and red blood cell values of folate.<sup>17</sup>

The existing dietary data for Cuban Americans are primarily based on HHANES and are subject to limitations. HHANES used a single 24-hour diet recall, which is not a standard tool to estimate the nutrients that correlate with CHD risk.<sup>18</sup> Second, the accuracy of the nutrient database that analyzed HHANES diet data is questionable.<sup>19</sup> Therefore, the nutrient intakes of Cu-

ban Americans should be assessed by using a validated food frequency questionnaire, analyzing with an accurate nutrient database, and testing the association between diet and CHD with a longitudinal study design.

## Overweight and Obesity

Reported prevalence of overweight or obesity among Cuban Americans is inconsistent (Table 1).<sup>20–24</sup> The most likely reasons are different definitions, unequal sample sizes and statistical methods. For example, HHANES used the definition of 'overweight' as body mass index ≥85th percentile and 'severe overweight' or 'obesity' as BMI ≥95th percentile in men and women aged 20–29 years.<sup>20</sup> In addition, the cut off values used in the HHANES to define overweight and obesity are arguable.<sup>25</sup> However, these data provide evidence of high prevalence of overweight BMI among Cuban Americans. Effective overweight/obesity prevention programs must be implemented by involving changes in both the microenvironment and the macroenvironment.

## Cigarette Smoking and Alcohol Consumption

Data from the HHANES showed that the age-adjusted prevalence of current cigarette smoking was 45%

and 25% in Cuban-American men and women, respectively.<sup>14,26</sup> However, data from the NHIS (1992–1995)<sup>27</sup> and the National Hispanic Leadership Initiative on Cancer: *En Acción*<sup>28</sup> reported a much lower prevalence of current smoking among Cuban Americans. The prevalence of current cigarette smoking was highest (58%) among younger men (25–34 years of age) and lowest (10%) among older Cuban women (65–74 years of age).<sup>26</sup> In general, the prevalence of current cigarette smoking was higher among younger persons than older persons,<sup>26</sup> and men had higher prevalence than women.<sup>14,29</sup>

The age-adjusted prevalence of heavy smoking (20 cigarettes/day) was 64% and 49% in Cuban-American men and women, respectively, highest among all three Hispanic subgroups.<sup>26</sup> On average, Cuban-American men smoke  $\geq 20$  cigarettes/day.<sup>26,30</sup> Prevalence of current smoking is high among Cuban Americans, particularly young adults (25–34 years of age)<sup>26</sup> and adolescents (15–19 years of age).<sup>31</sup> Smoking prevention and cessation interventions need to be developed for Cuban-American men of younger age to reduce the burden of CHD attributable to smoking.

The relationship between alcohol consumption and CHD mortality is J-shaped, meaning that moderate consumption (1–2 drinks/day) protects against CHD. Based on the HHANES data, Rogers<sup>30</sup> reported that most Cuban Americans were moderate drinkers (1–2 beers, 1 glass of wine, 1–2 drinks of liquor per day). This healthy drinking pattern may offer some cardioprotective benefits to this population.

### Physical Activity

The Miami Community Health Study<sup>32</sup> assessed and compared the physical activity pattern (expressed as Kcal/week) of Cuban Americans, non-Hispanic Whites, and African Americans. Physical activity at  $>3000$  Kcal/week level was lowest among Cuban-

American men (24%) and highest in Cuban-American women (19%) than the other two ethnic groups of corresponding sexes. In a preliminary study, we reported that most Cuban Americans with type 2 diabetes (72%) did not spend  $\geq 30$  minutes/day in physical activities.<sup>33</sup> It may be reasonable to hypothesize that physical inactivity is associated with excess overweight among Cuban Americans. Larger studies are warranted to address the physical activity pattern of Cuban Americans.

### Hypertension

According to the HHANES data, the mean systolic blood pressure (SBP) was 115–138 mm Hg among Cuban Americans aged  $\geq 35$  years.<sup>34</sup> Using the Joint National Commission on Detection, Evaluation, and Treatment of High Blood Pressure, 1988 (JNC, 1988)<sup>35</sup> criteria of hypertension, the age-adjusted prevalence was 21% and 14% in adult Cuban-American men and women, respectively.<sup>36,37</sup> Havas et al<sup>34</sup> reported that in the 45- to 64-year-age group, mean SBP ( $>130$  mm Hg) and DBP ( $>80$  mm Hg) were higher in Cuban-American men than men of any other ethnic groups. Among Cuban-American women, the mean SBP was lower and the mean DBP was higher than those of non-Hispanic White counterparts.<sup>34</sup> Contrary to these findings, in a relatively younger cohort, Donahue et al<sup>38</sup> reported identical mean SBP and DBP in Cuban Americans and non-Hispanic Whites.

Although most Cuban Americans had normal blood pressure (BP) ( $\leq 140/90$  mm Hg and or not taking antihypertensive medication), the percent distributions of different BP categories (high normal, mild high, moderate high, and severe high) were higher in Cuban Americans than Mexican Americans or Puerto Ricans.<sup>37</sup> However, the age-adjusted prevalence of stage 2–4 hypertension (SBP  $\geq 160$  mm Hg or DBP  $\geq 100$  mm Hg) was not significantly different among three Hispanic

subgroups.<sup>36</sup> The prevalence of different stages of hypertension among Cuban Americans is presented in Figure 1. Prevalence of isolated systolic hypertension, an important predictor of cardiovascular complications especially in the elderly, was also higher in Cuban Americans than Mexican Americans and Puerto Ricans.<sup>37</sup>

A higher percentage of Cuban-American women were aware of hypertension and its treatment and control than Cuban-American men.<sup>34,36,37</sup> Despite a higher rate of hypertension awareness, hypertension treatment was lower in Cuban-American women compared to women of other Hispanic subgroups.<sup>36</sup> Hypertension control was also worst among Cuban-American women: 50% less than all three major Hispanic subgroups.<sup>36</sup> The rates of hypertension awareness, treatment, and control among Cuban-American men were comparable to men of other Hispanic subgroups;<sup>36</sup> however, they were less than the rates for non-Hispanic White men.<sup>34</sup>

Little is known about the contributions of lifestyle factors to hypertension. It has been reported that more than twice as many hypertensive Cuban Americans were overweight ( $\geq 60\%$ ) as compared to hypertensive Cuban Americans with normal BMI.<sup>36</sup> Goslar et al<sup>39</sup> reported strong associations between BMI and SBP and DBP among Cuban-American women. Future research should investigate the risk factors of hypertension. At the same time considerable efforts must be emphasized on the control and maintenance of normal BMI.

### Lipid Profile

More than half of the Cuban Americans examined in the HHANES had serum cholesterol levels  $<200$  mg/dL, the highest percentage among all Hispanic subgroups.<sup>40</sup> The age-adjusted mean serum cholesterol levels among Cuban-American men and women were 205 and 199 mg/dL, respectively.<sup>40</sup> The age-adjusted mean serum triglyceride

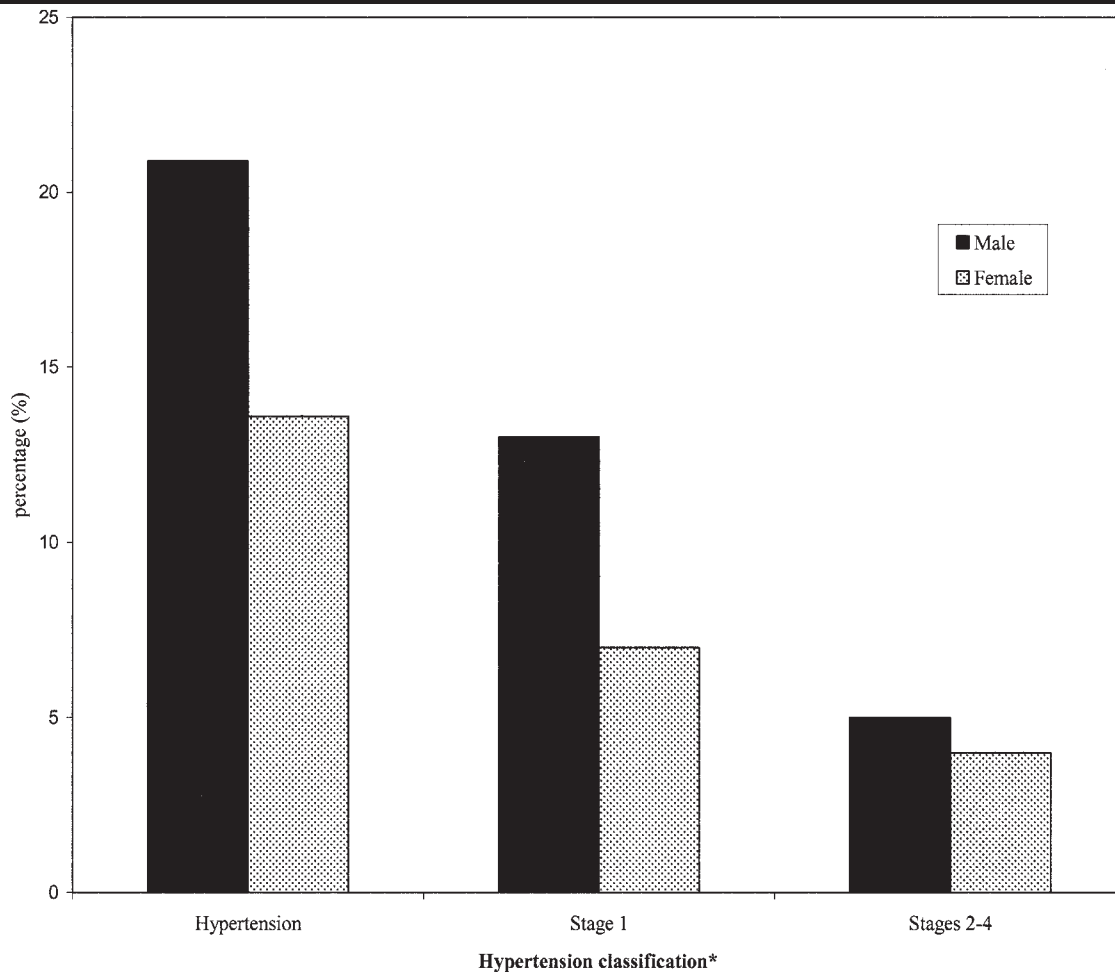


Fig 1. Age-adjusted† prevalence of hypertension among Cuban Americans aged 18–74 years

\* *Hypertension* is defined as systolic or diastolic blood pressure  $\geq 140/90$  mm Hg or currently on antihypertensive medication; *Stage 1* is defined as mean systolic blood pressure 140–159 mm Hg or mean diastolic blood pressure 90–99 mm Hg regardless of medication; *Stages 2–4* are defined as mean systolic blood pressure  $\geq 160$  mm Hg or mean diastolic blood pressure  $\geq 100$  mm Hg regardless of medication.

† Age-adjusted prevalence was calculated by the direct method and the age-distribution for the 1980 census population. (Ref: Crespo et al<sup>36</sup>)

(TG) levels in Cuban-American men and women were 135 and 104 mg/dL, respectively.<sup>40</sup> Age-adjusted mean serum values of low-density lipoprotein cholesterol (LDL-C) among Cuban-American men (137 mg/dL) and women (129 mg/dL) were higher than in their Puerto Rican and lower than in their Mexican-American counterparts.<sup>40</sup> Almost half of the Cuban-American men and >60% of Cuban-American women had LDL-C values <130 mg/dL.<sup>40</sup> More than half of the Cuban Americans had cholesterol levels

<200 mg/dL and LDL-C <130 mg/dL.<sup>40</sup>

Age-adjusted mean concentrations of high-density lipoprotein cholesterol (HDL-C) was higher in women (52.2 mg/dL) compared to men (43.4 mg/dL).<sup>40</sup> In addition, more Cuban-American women (95%) than men (81%) had HDL-C >35 mg/dL.<sup>40</sup> (Figure 2)

There is no study available to associate the dietary intake with blood lipid profile. Frequent consumption of eggs, pork, and beef may contribute to

high dietary cholesterol.<sup>41</sup> Therefore, any reduction in cholesterol-rich food intake would lower the blood cholesterol levels.

## Type 2 Diabetes

Results based on the HHANES data suggest that in the 45- to 74-year-age group, age-standardized prevalence of diabetes (sum of previously diagnosed diabetes and undiagnosed diabetes) was  $\approx 16\%$  in Cuban Americans, 1.3 times higher than in non-Hispanic Whites (12%).<sup>42</sup> In the 20- to 74-year-age group, the age-standardized rates of

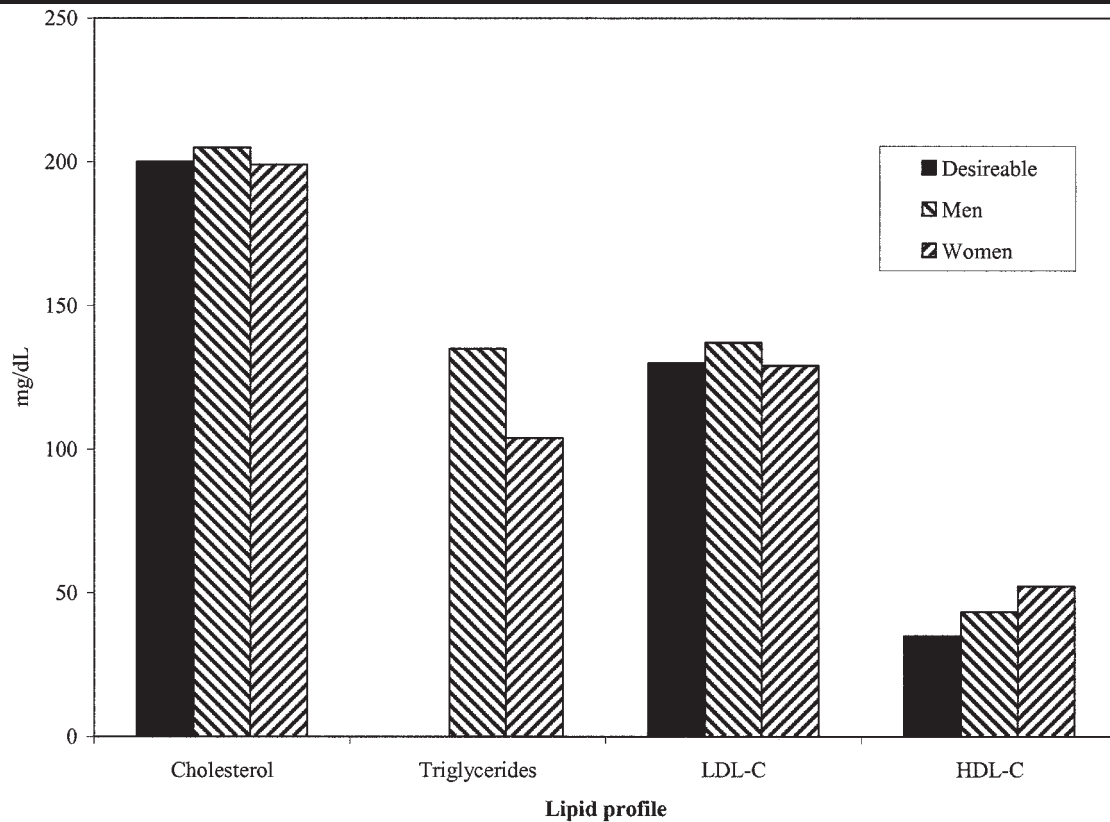


Fig 2. Desirable\* and age-adjusted† mean levels of serum lipids and lipoproteins of Cuban Americans aged 20–74 years  
LDL-C = Low-density lipoprotein cholesterol; HDL-C = High-density lipoprotein cholesterol.

\* Desirable levels are based on the National Cholesterol Education Program, Adult Treatment Panel, 1987.

† Age-adjusted mean was calculated by the direct method and the age-distribution for the 1980 census population.

Note: There was no desirable levels of triglycerides according to the National Cholesterol Education Program, Adult Treatment Panel, 1987. (Ref: Carroll et al<sup>40</sup>)

type 2 diabetes and impaired glucose tolerance were also higher in Cuban Americans (9.3%) compared to non-Hispanic Whites (1.5%).<sup>43</sup> In general, one in six Cuban Americans has diabetes in the 45- to 74-year age group.<sup>44</sup>

The prevalence of diabetes increases with age. Elderly ( $\geq 65$  years) Cuban Americans represent the largest segment (21%) of the elderly population among all US ethnic/racial groups.<sup>45</sup> The age-specific rate of type 2 diabetes (diagnosed and undiagnosed diabetes) increased among Cuban Americans with increasing age:  $\approx 8\%$  in the 45- to 54-year-age group to  $\approx 35\%$  in the 65- to 74-year-age group, highest among any US ethnic groups.<sup>43</sup> This scenario underscores the importance of diabetes

in increasing rate of CHD among elderly Cuban Americans. Studies are needed to document incidence, prevalence, correlates, and complications of diabetes among Cuban Americans.

### Depression

Preliminary reports from the HHANES showed a 10% prevalence of major depressive symptoms among Cuban Americans,<sup>46</sup> and the lifetime prevalence of any major depressive episode in this population was  $\approx 3\%$ – $3.5\%$ .<sup>47,48</sup> Oquendo et al<sup>49</sup> reported that one-year prevalence of major depression was lowest among Cuban Americans compared to other US ethnic groups. Cuban Americans do not appear to suffer from high rates of depression.

### Socioeconomic Status and Access to Health Care

According to several national surveys, Cuban Americans have higher socioeconomic status (SES) than do Mexican Americans or Puerto Ricans.<sup>4,14,27</sup> The adjusted prevalence of several SES indicators such as household income  $\geq \$35,000$ , years of education, and current or white-collar employment are pronounced among Cuban Americans and many of these variables are similar to those for non-Hispanic Whites. Cuban Americans have the highest private health insurance coverage (66%) among all Hispanics.<sup>50,51</sup> It is also reported that Cuban Americans have integrated a healthcare system of their own similar to the one they have

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*Socioeconomic status (SES) along with other factors, such as relatively low BP, acceptable blood lipid profile, low depression rate, and low level of acculturation, may offer Cuban Americans a decreased risk for CHD.*

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had in Cuba.<sup>52</sup> A high rate of health insurance together with easy access to health care may confer a better health.

### Acculturation

The majority (96%) of Cuban Americans are less acculturated to American culture as opposed to other Hispanic groups<sup>14,16,21</sup> but not much is known about the effects of acculturation on their health behavior. Available data demonstrate that heavy cigarette smoking and alcohol consumption increase with acculturation, particularly among Cuban-American women.<sup>14,28</sup> In a study with boys aged 11–12 years, Vega et al<sup>53</sup> found that lifetime prevalence of cigarette use was higher among US-born Cuban Americans than foreign-born Cuban Americans. Acculturation was not associated with hypertension among Cuban-American women.<sup>39</sup> The effects of acculturation on dietary change may be either positive or negative; however, the net effects are toward deleterious changes.<sup>14</sup>

In HHANES, acculturation was measured based on a scale that essentially pertains to ethnic identification and language preference.<sup>5</sup> Therefore, other dimensions of acculturation were missed. Studies are needed to understand the nature of acculturation using a multi-dimensional tool and to collect data on the effects of acculturation on other health behaviors.

### Migration Effect

The Hispanic paradox illustrates that, despite increased rates of diabetes and obesity and lower SES, Hispanics, particularly Mexican Americans, experience lower all-cause and cardiovascular mortality.<sup>54</sup> Several hypotheses for the Hispanic paradox exist: “salmon-bias” (the re-migration of ill and socioeconomically disadvantaged immigrants to their home country), healthy migration, data artifact, etc. Recent analysis, however, concludes that neither “salmon bias” nor healthy migration are applicable to Cuban Americans because they cannot return to Cuba for political embargo.<sup>55,56</sup> In addition to the above hypotheses of Hispanic paradox, duration of migration may also influence cardiovascular disease by affecting several health habits.<sup>57</sup> Similar research involving all components of Hispanic paradox is needed for Cuban Americans.

## DISCUSSION

Little research has been dedicated to learn the health behaviors and influence of these modifiable factors on CHD risk among Cuban Americans. The major data source of Cuban-American health is the HHANES. However, existing findings are based on cross-sectional reports, which preclude us from establishing cause-and-effect relationships.

In general, a high percentage of Cuban Americans report their overall health status as excellent to good.<sup>27</sup> Socioeconomic status (SES) along with other factors, such as relatively low BP, acceptable blood lipid profile, low depression rate, and low level of acculturation, may offer Cuban Americans a decreased risk for CHD. However, overweight and type 2 diabetes are highly prevalent among Cuban Americans, and rates of current and heavy cigarette smoking are also high in this population. Although Cuban Americans' dietary patterns are conducive to

high CHD risk, the intakes of most nutrients are in compliance with guidelines. However, any of these variables of CHD have not been established independently in population-based incidence studies after controlling for confounding variables. Moreover, these aforementioned traditional CHD risk factors may not necessarily explain the full picture of CHD among Cuban Americans. We do not have any information about emerging CHD risk factors (eg, homocysteine, C-reactive protein) for Cuban Americans. Additionally, unexplained biological mechanisms and artifacts may also be involved, as hypothesized by Rewers et al.<sup>58</sup> Identification of these risk factors and establishing their independent roles in the pathogenesis and progression of atherosclerosis in multivariate analyses using well designed studies would establish the cause of CHD among Cuban Americans.

Despite decades of advocates and initiatives, we have not come forward to explore and appreciate the uniqueness of Cuban-American health behavior and health outcomes. Population-based studies are needed for the Cuban-American population, and results from such studies would add a new dimension to our knowledge in regard to ethnicity, lifestyle, and biochemical factors and their contributions to CHD. These studies would be more appealing and robust with the inclusion of other ethnic groups.

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## HEART DISEASE AND CUBAN AMERICANS - Nath

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### AUTHOR CONTRIBUTIONS

*Design and concept of study:* Nath

*Acquisition of data:* Nath

*Data analysis and interpretation:* Nath

*Manuscript draft:* Nath