Behavioral Risk Profiles for Coronary Heart Disease Among Apparently Healthy Individuals of African Ancestry

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Objective: Mortality from coronary heart disease (CHD) is lower in foreign-born Blacks compared to their US-born counterparts. The purpose of this study was to determine if behavioral risk factors for CHD are different between foreign-born Afro Caribbeans (FBAC) and their US-born counterparts (US-born Afro Caribbean Americans, USBAC and African Americans, AA).

Design and Participants: For a cross-sectional study, 66 FBAC (31 males; 35 females) living in the United States <10 years, 62 USBAC (30 males; 32 females), and 61 AA (30 males; 31 females) adults (18–40 years) were recruited. Dietary, anthropometric, physical activity, cigarette smoking, and alcohol consumption data were collected and analyzed.

Main Outcome Measure: Risk factors for CHD.

Results: Significantly ($P<.05$) more USBAC (50.0%) and AA (31.0%) males consumed an unhealthy diet compared to the FBAC (16.7%) males. Also, significantly ($P<.05$) more USBAC and AA males compared to FBAC males were obese (20.0% and 33.3% vs 6.5%). No significant differences were observed between the female ethnic groups. Although less USBAC and AA males and females compared to FBAC males and females played sports, the differences were not significant. More USBAC and AA males compared to FBAC (10.0% and 3.3% vs 0.0%) smoked cigarettes and consumed alcoholic beverages (43.3% and 63.3% vs 16.1%). Among the female ethnic groups, only the AA smoked cigarettes. Significantly ($P<.05$) more USBAC (36.7%) and AA (33.3%) males compared to FBAC (3.2%) males had poorer behavioral habits, with no significant differences observed between the female ethnic groups.

Conclusions: Our study showed significant differences in CHD risk behaviors among individuals of African decent. The FBAC participants had more favorable behaviors in preventing CHD compared to their US-born counterparts. (*Ethn Dis*. 2006;16:114–119)

Key Words: African American, Caribbean, Coronary Disease, Ethnicity, Risk Factors

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Introduction

Cardiovascular diseases (CVD) are serious public health concerns that affected >64 million Americans in 2001.[1] The current approach to the prevention of coronary heart disease (CHD) is predicated on identification of risk factors and the quantitative assessment of short-term cardiovascular risk.[2] Evidence shows lower all-cause mortality due to CHD in foreign-born Blacks compared to US-born Blacks and US-born Whites.[3,4] In these studies, US-born Blacks included both non-Hispanic Blacks and Hispanic Blacks. In an earlier study,[5] Caribbean Americans (combined foreign-born Afro Caribbean [FBAC] and US-born Afro Caribbean Americans [USBAC]) in New York City had substantially lower all-cause and cardiovascular mortality rates compared to Blacks born in the southern and northeastern United States, but risk factors for CHD were not investigated. The sociodemographic and behavioral risk factors of CHD among FBAC and USBAC have not been studied, especially in South Florida, where the population is growing. Foreign-born Afro Caribbeans (FBAC) may have different health perceptions, beliefs, behaviors, dietary habits, and propensities compared to USBAC and African Americans (AA). These differences may be distinguishing features of these groups and may influence incidence and outcomes of CHD in this population of African ancestry.[6] Low prevalence of CHD is related to healthy behaviors such as a healthy diet, maintaining a healthy body weight, not smoking, and drinking a moderate amount of alcohol.[7] The behavioral risk factors impose a significant burden on our healthcare system and are the most important and modifiable causes of illness and death from CHD and stroke.[8] This fact is demonstrated in the Nurses' Health Study,[7] which reported that females who ate a healthy diet, exercised regularly, drank alcoholic beverages moderately, and did not smoke had an 84% reduction in cardiovascular events. Behavioral risk factors tend to cluster in individuals and populations,[9–11] and disease risk and healthcare costs are greatest for individuals with multiple behavioral risks.[12] Various cumulative behavioral risk scores have been proposed.[9–12] Thus, the purpose of our study was to evaluate differences in behavioral risk factors for CHD such as unhealthy diet, physical inactivity, obesity, cigarette smoking and alcohol consumption and behavioral risk factor score among FBAC, USBAC, and AA individuals in South Florida.

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Methods

Study Population and Data Source

A cross sectional survey study design[13] using a convenience sample of 189 apparently healthy individuals (18–40 years old) from three ethnic groups of the same race, FBAC (31 males, 35 females), USBAC (30 males, 32 females), and AA (30 males, 31 females) were recruited. Participants were sur-

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veyed only once. Participants were classified as FBAC if they were born in one of the Caribbean Islands and had lived in the United States <10 years, USBAC if they were born in the United States to both Caribbean-born parents, and AA if they were born in the United States to both parents who were also born in the United States. The place of birth of participants and their parents was determined at the initial screening interview. Participants signed an informed consent form approved by the institutional review board at FIU. Eligible participants completed a sociodemographic, validated self-administered food frequency,[14–16] and physical activity[17,18] questionnaires.

A diet score was devised according to whether the participants met the recommended dietary requirements for seven selected nutrients (percent energy from fat, saturated fat, dietary cholesterol, fiber, sodium, fruit servings, vegetable servings) or not. Individuals who exceeded the dietary recommendations for percent energy from fat, saturated fat, cholesterol, and sodium were assigned a score of 0; participants who met or consumed less than the recommendations were assigned a score of 1. Participants who consumed below the dietary recommendations for dietary fiber, fruit, and vegetable servings were assigned a score of 0; participants were assigned a score of 1 if they met or exceeded the dietary requirements. These scores were summed across the selected nutrients and food items to obtain a total diet score. The diet score ranged from 0 to 7. A higher score indicated a relatively more healthful diet.

The Baecke[17] physical activity questionnaire assessed leisure and occupational activities. It consisted of three sections: work activity, sports activity, and non-sports leisure activity. Each section was scored on a five-point Likert scale, ranging from never to always or very often. For two of the most frequently reported sports activities, additional questions queried the number of months per year and hours per week of participation. The mean scores for each of the work, sports, and non-sports leisure-time activities were added to give the total score; the physical activity index (PAI). The scores were then classified into quartiles for general classification of activity levels. Evidence shows that self-assessment of physical activity parallels the scores of actual physical activity reasonably well.[19]

Body mass index (BMI), was calculated as weight divided by height squared (kg/m^2). Individuals with BMI <18.5 were considered underweight, between 18.5 and 24.9 normal, between 25.0 and 29.9 overweight, and >30.0 as obese.[20]

Smoking status (yes, no) was determined by two questions: ''Do you smoke cigarettes now?'' and, if yes, ''On the average about how many cigarettes a day do you smoke now?'' Alcohol consumption included beer, wine coolers, liquor, or mixed drinks on a nine-point Likert scale (never, a few times per year, once per month, two or three times per month, once per week, twice per week, three or four times per week, five or six times per week, every day) along with their respective portion sizes. Participants responded to these questions on the food frequency questionnaire.

A composite behavioral risk factor score was devised. The risk factor score was based on whether participants met the recommended requirements for five behavioral factors. A score of 0 was assigned to each factor for diet score ≤2, played sports, BMI <25.0, no cigarette smoking, or consuming alcoholic beverages less than once per month; a score of 1 was assigned to each factor for diet score ≤2, did not play sports (an indication of sedentary lifestyle), BMI ≥25.0, cigarette smoking, consuming alcoholic beverages more than once per month. The scores were summed across the selected behavioral risks to obtain a total score. Higher scores were indicative of poor behavioral habits.

Statistical Analysis

Validation of the Block FFQ for this population was evaluated by comparing dietary analyses of the Block FFQ and the 24-hour dietary recall. Test-retest validation of the Baecke Physical Activity questionnaire was evaluated by comparing the test and retest scores of this questionnaire from the prestudy evaluation. Descriptive and summary statistics calculated with SPSS for Windows (v 12.0) were based on the total number of behavioral risk factors; percentages of the FBAC, USBAC, and AA participants that did not meet recommendations for each of the five behavioral risk factors; and the composite behavioral risk factor (BRF) score. The results were expressed as mean plus or minus standard deviation and percentages and compared by sex-ethnic groups. Two-way analysis of variance (ANOVA) and chi-square analyses were performed as appropriate. Pairwise comparison with Bonferroni post hoc test was performed to adjust for multiple comparisons. Pearson and Spearman correlations, including partial correlations to adjust for age, were also performed to evaluate associations between the sociodemographic and behavioral risk factors for CHD. Differ-

Table 1. Sociodemographic characteristics of the participants

Variables	FBAC* *n*=31m/35f	USBAC† *n*=30m/32f	AA‡ *n*=30m/31f	*P*
Age (mean ± SD)				
Males	24.5 ± 5.8	21.6 ± 3.6	25.5 ± 5.4	.009
Females	24.2 ± 6.0	21.7 ± 4.0	23.4 ± 4.5	NS
College/graduate studies (%)				
Males	36.8	16.7	30.0	NS
Females	28.6	18.7	29.1	NS
Household income <$20,000 (%)				
Males	51.6	33.3	40.0	NS
Females	40.0	43.8	51.7	NS
Medical insurance (yes) (%)				
Males	67.7	80.0	73.3	NS
Females	74.3	59.4	61.3	NS
Visits to healthcare professional (%)				
Males	77.4	83.3	60.0	NS
Females	82.9	87.5	87.1	NS
Family history of coronary heart disease (%)				
Males	35.5	40.0	23.0	NS
Females	42.9	12.5	38.7	NS

* Foreign-born Afro Caribbeans.
† US-born Afro Caribbeans.
‡ African Americans.
NS=not significant; m=males; f=females.

ences were considered significant at $P<.05$.

RESULTS

Differences in mean ages between the USBAC and AA males but not the FBAC males were observed (Table 1). Thus, all analyses were conducted with and without age adjustments. However, age-adjusted values were not significantly different from the unadjusted values, so only the unadjusted results are shown. Participants' dietary intakes are shown in Table 2.

Table 3 shows the behavioral profiles of the participants. Although the percentage of FBAC (16.1%) males who consumed more than one alcoholic beverage per month was lower compared to USBAC (43.3%) and AA (63.3%) participants, further analysis with the Bonferroni post hoc test showed no significant differences in alcohol consumption between the groups. All of the female smokers were AA. Associations between selected sociodemographic variables and the composite behavioral risk factor score was only found with household income ($r=-.571$; $P<.01$) in the USBAC males.

DISCUSSION

This is the first study of its kind presenting behavioral risk profiles of foreign and US-born Afro Caribbeans in South Florida. Comparisons of our results with other reports on behavioral risk factors are difficult because of differences in methods, variables, and study population. In our study, the percentage of individuals (14.5%) with none of the five behavioral risk factors (unhealthy diet, watched television often/very often, obese, smoked cigarettes, drank more than one alcoholic beverage per month) was higher than that reported by Pronk et al (10.8%),[21] whereas the percentage of individuals (15.9%) with more than three behavioral risk factors was lower than the percentage of adults (26.9%) who met fewer than three behavioral guidelines in the study by Pronk et al.[21] Pronk et al[21] scored no and moderate alcohol consumptions as healthy. Although moderate alcohol consumption is considered protective,[22] consumption of alcoholic beverages more than once per month was added to our behavioral score calculation since it reflected risky behavior. However, we observed no significant differences between the ethnic groups with respect to alcohol consumption, and thus this variable did not add significance to the overall behavioral score. Other studies[23–26] reporting on four behavioral risk factors have demonstrated the high prevalence of multiple behavioral risk factors for CHD in the United States, and the challenge this may present for heathcare professionals and policy planners. Although no significant difference between the three ethnic groups with respect to socioeconomic status (SES) was observed in our study, the negative association between household income and the behavioral risk factor score in USBAC males is in agreement with suggestions by Wood et al[27] that individuals from lower SES groups have poorer health habits and health knowledge. Other researchers have suggested that SES may be associated with higher cumulative levels of stress and that biological reaction to this stress may contribute to hypertension,[28,29] overeating, and/or increase in cigarette smoking.[1]

Our study is also corroborated by studies that used larger sample sizes.[4,5,30] Data from the National Center for Health Statistics[30] have shown that foreign-born persons were generally healthier than the US-born population, although the health advantage varied by length of residence in the United States. The report also stated that in every measure of health status, and with regard to almost every sociodemographic vari-

Table 2. Participants' mean energy and nutrient intakes by gender and ethnicity

Males	FBAC* *n*=30	USBAC† Mean ± SD *n*=30	AA‡ *n*=29	*P*
Calories (kcal)	1721 ± 883§	2301 ± 1016‖	2337±1271‖	.049
Carbohydrate (g)	234 ± 112	273 ± 118	283 ± 165	NS
Protein (g)	66.9 ± 38.0§	95.5 ± 48.1‖	91.3 ± 50.4‖	.037
Total fat (g)	59.2 ± 37.4§	86.7 ± 47.0‖	90.3 ± 54.4‖	.023
Saturated fat (g)	21.4 ± 13.4§	30.3 ± 17.1‖	30.5 ± 17.4‖	.048
MUFA¶ (g)	22.5 ± 15.6§	33.8 ± 19.5‖	35.1 ± 21.5‖	.023
PUFA# (g)	9.7 ± 5.7§	14.8 ± 7.9‖	17.0 ± 11.9‖	.006
Cholesterol (mg)	211 ± 134	302 ± 190	301 ± 162	NS
kcal carbohydrate (%)	56.0 ± 12.2§	49.5 ± 11.7‖	48.4 ± 8.1‖	.017
kcal protein (%)	15.8 ± 5.0	16.4 ± 3.6	16.0 ± 3.6	NS
kcal fat (%)	29.4 ± 7.6§	32.8 ± 7.3§‖	34.6 ± 5.5‖	.015
Fruits (servings/day)	1.2 ± .9	1.0 ± .6	.9 ± .6	NS
Vegetables (servings/day)	2.3 ± 2.6	2.2 ± 2.1	2.8 ± 2.5	NS
Fats (servings/day)	1.2 ± 1.0§	1.9 ± 1.2‖	1.9 ± 1.4‖	.042
Sodium (mg)	2031 ± 1101§	2760 ± 1296‖	2883 ± 1553‖	.032
Females	**FBAC* *n*=30**	**USBAC† *n*=30**	**AA‡ *n*=29**	***P***
Calories (kcal)	1417 ± 649	1400 ± 705	1575 ± 739	NS
Carbohydrate (g)	201.2 ± 91	197.6 ± 112	206.8 ± 100	NS
Protein (g)	49.6 ± 24.1	53.1 ± 27.2	58.8 ± 27.7	NS
Total fat (g)	47.3 ± 26.5	46.5 ± 23.1	56.3 ± 33.6	NS
Saturated fat (g)	16.3 ± 9.2	16.2 ± 8.0	19.5 ± 12.2	NS
MUFA¶ (g)	17.3 ± 10.4	16.6 ± 8.2	21.1 ± 13.0	NS
PUFA# (g)	9.4 ± 6.2	9.3 ± 6.0	10.8 ± 6.6	NS
Cholesterol (mg)	132 ± 78.6§	141 ± 64.7§‖	188 ± 126.7‖	.042
kcal carbohydrate (%)	57.3 ± 8.2	55.8 ± 7.4	52.6 ± 8.4	NS
kcal protein (%)	14.0 ± 3.0	15.3 ± 3.5	15.4 ± 3.7	NS
kcal fat (%)	29.3 ± 6.2	30.2 ± 5.2	31.6 ± 7.1	NS
Fruits (servings/day)	1.5 ± .9	1.3 ± 1.0	1.2 ± .6	NS
Vegetables (servings/day)	2.3 ± 2.0	2.2 ± 2.6	.2 ± 1.5	NS
Fats (servings/day)	1.3 ± .7	1.2 ± .7	1.7 ± 1.0	NS
Sodium (mg)	1671 ± 851	1746 ± 958	1937 ± 954	NS

* Foreign-born Afro Caribbeans.
† US-born Afro Caribbeans.
‡ African Americans.
¶ Monounsaturated fatty acids.
# Polyunsaturated fatty acids.
§‖ Values in a row with differing symbols differed significantly.
NS=not significant.

able, the most recent immigrants were healthier than foreign-born individuals who have lived in the United States ≥10 years as well as healthier than the US-born population, although the differences were not as striking as those seen between recent immigrants and the native-born population. Some suggestions have been made of a so-called ''immigrant effect''; these suggestions include that: 1) recent immigrants may have been healthier than earlier immigrants at the time of migration[30] or physically active and more driven than those who remain in their country of origin[4]; 2) earlier immigrants may have been as healthy as recent immigrant but that the health status of these earlier immigrants may have deteriorated with increased duration of residence in the United States[30]; and 3) that the findings may reflect a combination of the above or other factors such as behavioral, lifestyle, psychological, and environmental conditions known to influence health status, morbidity, and mortality.[4] Recent immigrants may have acquired physical conditions or behaviors that expose them to risk of chronic diseases in their new environment or that access to health care or visitation to health-care professions may have been limited. Also, if recent immigration is by choice and selection,[4] then these more recent immigrants maybe more affluent and, thus, have better access to health care.

The participants, in answering the self-administered questionnaires and receiving information on their health profile, were more aware of their health status, which may provoke them to address health issues of concern to them. In evaluating the composite behavioral risk factors, we provided more information about the health status of this population than would have been possible if the report was based on only one single factor.[21] The comprehensive behavioral risk measure should be used more frequently, especially in the field of health promotion, disease prevention, and health policy determinants. The self-report nature of some aspects of the data collection process such as alcohol and cigarette use, in our young adult population, may be reported with less accuracy[31] and raises the possibility of recall bias. However, our results showed that most participants were knowledgeable about cardiovascular disease, and the test-retest results of our questionnaires have shown high correlation; thus, we are not aware of any evidence of systematic biases associated with recall of information in our study. Our research design was cross-sectional, and we may not be able to generalize our results beyond these ethnic-cultural groups from south Florida. The FBAC and USBAC populations comprise different groups such as Jamaicans, Haitians, Trinidadians, Barbadians, and others from the English-speaking Caribbean. These different groups may have different socioeconomic backgrounds and behavioral habits. Thus, future research should investigate risk factors for CHD in the different Caribbean groups living in the Caribbean and compare these risk

Table 3. Behavioral risk factors of the participants

Variables	FBAC* *n*=31m/35f	USBAC† *n*=30m/32f	AA‡ *n*=30m/31f	*P*
Diet score (mean ± SD)				
Males	3.0 ± 1.6§	2.0 ± 1.9‖	2.1 ± 1.4§‖	.038
Females	3.8 ± 1.5§	3.4 ± .9§‖	3.0 ± 1.5‖	.036
Poor diet score (≤2, %)				
Males	16.7§	50.0‖	31.0§‖	.030
Females	3.2	3.2	16.7	.170
Physical activity index (mean ± SD)				
Males	8.4 ± 1.2	8.3 ± 1.0	8.5 ± 1.2	.784
Females	7.3 ± 1.4	7.1 ± 1.2	7.2 ± 1.4	.907
Played sports (%)				
Males	83.9	70.0	66.7	.269
Females	37.1	18.7	22.6	.196
Watched television (often/very often, %)				
Males	41.9	60.0	56.7	.321
Females	48.6	50.0	41.9	.791
Body mass index (mean ± SD)				
Males	25.4 ± 4.2	27.3 ± 4.9	28.2 ± 7.7	.165
Females	24.3 ± 3.8	25.2 ± 4.5	25.3 ± 5.0	.601
Obese body mass index ≥30.0 (%)				
Males	6.5§	20.0‖	33.3‖	.008
Females	8.6	15.6	12.9	.912
Cigarette smoking (%)				
Males	0	10.0	3.3	.154
Females	0	0	9.7	.035
Alcohol consumption ≥1/month (%)				
Males	16.1	43.3	63.3	.004
Females	31.4	15.6	38.7	.202
Behavior risk factor score (mean ± SD)				
Males	1.2 ± .8§	2.4 ± 1.2‖	2.0 ± 1.0‖	.0001
Females	1.2 ± .9	1.1 ± .9	1.5 ± .8	.258
Behavior risk factor categories ≥3 (%)				
Males	3.2§	36.7‖	33.3‖	.002
Females	8.6	9.4	6.5	.865

* Foreign-born Afro Caribbeans.
† US-born Afro Caribbeans.
‡ African Americans.
§‖ Values in a row with differing superscripts differed significantly.
m=males; f=females.
Diet score range 0–7, where ≤2 is poor. Behavior Risk Factor Category range 0–5, where ≥3 is high risk.

factors with US-born counterparts over time.

These findings will become more noteworthy as the population of foreign-born individuals, especially Afro Caribbeans, increases. The need for culturally sensitive messages and programs to address health disparities by trained healthcare professionals will become even more important. The healthcare establishment must also evaluate and understand the health needs, concerns, and behavioral propensities of this and other ethnic groups.

According to the US Census Brief Report,[32] the term, "Black or African American" describes individuals with origins in any of the Black racial groups of Africa and includes individuals who reported their race as "Black, African American, Negro, Afro American, Nigerian, or Haitian," on the 2000 census survey. Such broad categorization of individuals does not take into consideration the existence of subgroups/cultures within this population. These subgroups/cultures may be composed of varying numbers of foreign-born individuals. Also, individuals of the Black population may share some sociodemographic and genetic characteristics. Although the Afro Caribbeans are considered part of the African-American ethnic mosaic, they have different attitudes and behaviors toward health and health care and indeed are growing faster than the other ethnic groups, such as Cubans.[33] In spite of this increase in the foreign-born population in the United States, relatively few studies investigate differentials in health, nutrition, and mortality patterns between foreign-born and US-born individuals, especially Afro Caribbean. Our study will help in the formulation of culturally sensitive strategies and programs to improve health access and health outcomes in this and other populations.

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