

ASSOCIATION BETWEEN ACCULTURATION AND HEALTH INDICATORS
OF HAITIAN-AMERICAN WOMEN

by

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(Under the Direction of Alex K. Anderson)

ABSTRACT

This study aimed to evaluate the association between acculturation, health and nutritional status of Haitian-American mothers. Participants included 81 women ranging from 27.0-78.0 years. The majority of participants living in the US < 5 years (66.0%) had hypertensive blood pressure compared to only 28.6% of those who have lived in the US for >15.0 years. Of the participants identifying themselves as Haitian-American, 54.5% had diabetic blood glucose levels compared to 35.0% of those identifying themselves as Haitian. Similarly, 64.0% of those who identified themselves as Haitian-American were in the obese category as opposed to 51.7% who identified themselves as Haitian. Almost all participants reporting to never eat fast food had a body fat percent of either excess fat (51.4%) or risky fat (42.9%). Findings show that depending on the health outcome being considered among Haitian-American women living in the US, acculturation may have either a negative or positive influence.

INDEX WORDS: Acculturation, Haitian-American, Blood Pressure, Blood Glucose, Blood Hemoglobin, Body Mass Index, Body Fat Percent

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DEDICATION

This thesis is dedicated to my loving parents Jean and Bertha Morose and my wonderful husband Michel Filemon. Without you this would never have been possible. I love you!

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I would like to first give glory to God, my refuge and my strength. “For they that wait upon the Lord shall renew their strength; they shall mount up with wings as eagles; they shall run, and not be weary; and they shall walk, and not faint” Isaiah 40:31.

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CHAPTER 1

INTRODUCTION

Haiti, a country once known as the gem of the Caribbean and the world leader in the production of sugarcane, is currently the poorest country in the western hemisphere, and offers its citizens very few food options ⁽¹⁾. Half of the total population earns only \$60 per year ⁽²⁾, and the lack of funds and resources have brought about a significant increase in malnutrition as families struggle to survive. With the majority of Haitians being dependent on the crops of the land rather than imported food items, the destruction of local crops and farmlands resulting from recent natural disasters has led to the death of many, and even forced some to resort to eating dirt cakes for survival ⁽³⁾.

Although a traditional Haitian meal in Haiti varies between households, the staple dish consumed by the majority of Haitians is rice and beans. According to an article published in Montreal, Canada, a traditional Haitian meal would consist of white rice made with beans or served with pureed beans on the side, a mixture of vegetables made with tomato paste, a tuber of some sort, and fried red meat or poultry ⁽⁴⁾. Through personal experience I have found that these meals are usually prepared from raw materials.

Like many other countries, economic status in Haiti is measured by purchasing power – those who are able to purchase items including food, and those who do not have the means. Through personal communication and experience, I've learned that this view

of economic status compounds the problems for the poor, because many now find it hard to treasure the fruits and vegetables growing on the land, as it reveals one's low economic status. However, the lack of purchasing power provides certain advantages – one of which being the inability to purchase processed food items provides those who survive off of the land with more nutrient-dense foods than their “well-to-do” counterparts. On the other hand, in a country lacking so much, nutrient-dense foods would hardly be considered as being sought after. Rather, individuals seek the basic human needs – shelter, water, and food of any type.

Search for Greener Pasture

Haitians, as with all humans, go to great lengths to pursue those basic needs, one of which has been migrating to other countries. The most recent migration of Haitians to the United States in particular began during the 1950's. During this time the migrants from Haiti to the United States were the educated members of the upper and middle class who wanted to find a life that better suited their status ⁽⁵⁾. During the mid 1980's to the early 1990's, political unrest, added to the lack of resources, caused many Haitians to flee and find asylum in nearby countries. Not only were the skilled professionals leaving Haiti, but also the semi-skilled workers from Haiti's middle and lower class ⁽⁶⁾. They immigrated hoping to be able to work and provide for their family members that came with them, as well as being able to send money to those left behind in Haiti ⁽⁶⁾.

The United States has become a refuge for many Haitians (as well as other nationalities) seeking a better life. According to the United States Census, there were approximately 420,000 Haitians living in the United States in the year 2000 ^(5, 7). However, because a number of Haitians entered the U.S. illegally coupled with the fear

of deportation or other legal worries, many lie about the actual number residing within their households, causing the number reported to be more than likely underreported. While many found the relief they sought after, living abroad has brought about drastic changes and new stressors to the immigrants.

Social Capital and Health Outcome

Social capital indicators have been said to have an effect on the health of a community and increases the risks of death in said community ⁽⁸⁾. The Center for Disease Control and Prevention define social capital as time spent participating in activities that build a social relationships with the community ⁽⁹⁾. Obesity, hypertension, and diabetes remain significant public health concerns in the United States. While impacting all people, these health issues affect the black population more so than whites ⁽¹⁰⁻¹²⁾. Studies show that the main contributors to this disparity are genetics, lifestyle and behavior. While genetics is a non-modifiable risk factor, behavior is not. A number of factors impact behavior – dietary patterns as a child, habits acquired throughout life, and education are a few.

Acculturation and Health Outcome

Those who have migrated to other countries help us better understand the influence that our environment has on our diet, and more specifically our health ^(4, 13-17), as the two groups intertwine and acculturation takes place. According to a 1936 study by Redfield et al., acculturation “result[s] when groups of individuals having different cultures come in continuous first hand contact, with subsequent changes in the original cultural patterns of either or both groups” ⁽¹⁸⁾. In other terms they are the transformations that occur when one culture comes into repeated contact with another culture. Many

studies have been conducted over the years on the effects of acculturation on dietary patterns. Most studies have shown that those who have migrated to another country and acculturated to their new environment had poorer diets than those who had not acculturated^(4, 13-17). Immigrants who acculturate have a tendency to consume a high caloric and low nutrient dense diet⁽¹⁵⁾.

Study Rationale

Studies have shown that a mother's dietary habit can have an impact on the food choices and dietary patterns of her children even into adulthood⁽¹⁹⁾. Because of this, a mother's cooking and dietary practices can impact the dietary patterns of several generations. In the Haitian culture, as with many of the world's cultures, women are considered to be the primary cooks for their families, and their children usually adopt their practices. Whether Haitian-American mothers are meeting the recommended amount of nutrients as stated by the 2005 Dietary Guidelines for Americans is unknown because studies are lacking in the area of the Haitian-American population's nutritional status. However, illnesses such as hypertension and diabetes that plague African Americans affect Haitian-Americans as well⁽¹⁰⁻¹²⁾. Whether this is caused by assimilation and acculturation is unknown.

Hypothesis

The main hypothesis being tested was that the degree of acculturation of Haitian-American mothers in the mainland United States influences the nutritional status and health outcomes with respect to chronic diseases such as hypertension.

Specific Aim

The main purpose of this study was to evaluate the association between acculturation and health and nutritional status of Haitian-American mothers.

Objectives

1. To examine the association between acculturation and nutritional status of Haitian-American mothers.
2. To examine the association between acculturation and health status of Haitian-American mothers.

CHAPTER 2

LITERATURE REVIEW

Review of Acculturation

Acculturation has been shown to have an impact on all aspects of life. For example, Marin et al. performed a study to examine the association between acculturation and smoking in Hispanics living in San Francisco ⁽²⁰⁾. Participants included 1,669 Hispanics from Mexico, Central America, South America, or the Caribbean, with participants being selected through random digit dialing. Interview language was chosen by the participant in either English or Spanish. Among the questions answered by the participants were usage of cigarettes, past and present and their knowledge of cessation programs ⁽²⁰⁾. The interview also incorporated a five-item acculturation scale developed by the authors, Short Acculturation Scale for Hispanics. In their findings, the authors reported that when adjusted for age, a higher smoking rate was seen in the less acculturated men (mainly speaking Spanish) compared to the more acculturated, while in the women, a higher smoking rate was seen in the more acculturated than in the less acculturated ⁽²⁰⁾. Overall, daily use of cigarettes was greater in the more acculturated group (13.3 participants), than in the less acculturated group (8.6 participants) ⁽²⁰⁾.

In another study, Harley et al. examined the association between time in the US and breastfeeding practices of women of Mexican origin ⁽²¹⁾. Participants of this study were part of a longitudinal birth cohort study, the Center for the Health Assessment of

Mothers and Children of Salina (CHAMACOS), and were recruited from one hospital and five clinics in the time span of one year (October 1999- October 2000). To participate, the women had to be at least 18 years of age, delivering at the county hospital, speak English or Spanish and be eligible for prenatal services through Medicaid⁽²¹⁾. The study found that women residing in the US for less than 5 years (54.3%) were more likely to initiate breastfeeding and continue to breastfeed at 6-12 months than those who had live all of their lives in the US (9.8%)⁽²¹⁾.

The literature addressing the association of acculturation and diet has predominantly focused on the largest ethnic minority population in the United States, Latinos. A study by Montez et al. looked at the role of acculturation in the dietary patterns of Latino women in the United States⁽¹³⁾. After exclusions, a total of 1245 non-pregnant women of Mexican origin between the ages of 25 and 64 from the 2000 National Health Interview Survey (NHIS) and its Cancer Control Module were used in this study. Researchers examined country of birth to differentiate foreign vs. US birth. Language was also examined using a condensed adaptation of the Short Acculturation Scale as a substitute for acculturation and the dietary intake sections of the NHIS to assess acculturation. They found that women who were of Mexican descent and spoke less English had greater amounts of fiber in their diet with higher intakes of fruits and vegetables and were consuming less fat in their diet than the U.S.-born English speaking women⁽¹³⁾.

Another study by Kaiser et al. looked at how acculturation influenced mother-child feeding practices. Participants of this study included 238 parents with pre-schooled age children who were members of programs such as Head Start, Healthy Start and the

Special Supplemental Nutrition Program for Women, Infants and Children. The parents were contacted by the University of California Cooperative Extension staff via group meetings from the above programs and fliers. The children were to be no less than 36 months and no more than 72 months in age, with no mental impediments. One of the biological parents had to be of Latino heritage and the child had to have been living with their biological parents at the time of recruitment. Acculturation of the parents was measured through time spent in the United States, country of birth and an acculturation scale prepared for Hispanics. Influences of feeding strategies on the children were calculated using anthropometric measurements of the children and a 12-item tool survey which included household size, income and feeding practices. The findings indicate that although the children of mothers with lower levels of acculturation had smaller triceps skinfold thickness than the more acculturated mothers, they were more likely to offer food options to their children, threatened and bribe the child if they did not eat, use food as a reward mechanism, and were less likely to offer vitamin supplementation to the child.⁽¹⁴⁾

The Asian population also makes up a large part of acculturation studies. Similarly to the Latino population, previous studies show that those who make poor dietary choices and are more acculturated, increase their risks of chronic diseases^(15, 16, 22). A cross-sectional study by Yang et al. examined the effects that time spent in the U.S. had on the incidence of disease and dietary habits of Korean Americans⁽¹⁶⁾. Participants included men and women residing in the Michigan state area between the ages of 30 and 87. Out of the initial 1860 surveys mailed out to the residence, 497 surveys met all the requirements and were returned to the researchers with consent forms

included. In the survey the participants were to answer questions that included their demographics, lifestyle habits and health status. Dietary habits were assessed using the 93-item food frequency questionnaire for Korean Americans (KFFQ). In both the male and female group the most predominant self-reported diseases were hypertension, digestive diseases, arthritis, and diabetes. In the male participants, those who had the longest stay in the US (≥ 26 years) had a greater incidence of respiratory disease but, similarly to the female group, a considerably less frequency of digestive disease compared to those who had resided in the US for the shortest time period (≤ 15 years)⁽¹⁶⁾.

Whittemore et al. examined diet, physical activity and colorectal cancer in Chinese living in North America and in China⁽²²⁾. The British Columbia registry, the Los Angeles Cancer Surveillance Program, and the San Francisco-Oakland Surveillance, Epidemiology and End Results Program were all used as recruitment methods for the participants in the North America region (≥ 20 years of age). The participants in the China region (20-79 years of age) were recruited by using a total of 17 hospitals. Criteria for inclusion into this study included a diagnosis of adenocarcinoma of the colon and parents of Chinese origin. The researchers interviewed the participants in their language of choice. Participants reported information on their dietary habits, physical activity and medical history among others⁽²²⁾. The Chinese American participants had a higher intake of fat and protein in their diet than did the participants in China. The participants in China consumed only 20% of their protein from meat and fish compared to 60% of the participants in North America. Percentage of calorie consumption supplied by fat in participants in China was 20% compared to 35% for the participants in North America

⁽²²⁾. The results showed a higher prevalence of colorectal cancer in the participants living in North America than in participants living in China

Another study by Kim et al. ⁽¹⁵⁾, examined the effects of acculturation on the dietary patterns of Korean Americans. The participants included 486 (64% female, 35% male) random residents of Korean heritage in metro New York age 18 and older. Instruments used in this study incorporated a questionnaire, which included the food-frequency questionnaire for Korean Americans (KFFQ), and a modified version of the SL-ASIA (Suinn-Lew Asian Self-Identity Acculturation) scale, an acculturation scale. Variables used to assess acculturation were: language use, media use, friendship and dietary habits. Their findings show higher levels of acculturation among participants that were younger, educated, born in the United States and/or lived in the United States for a long period of time. Participants in this study had an average acculturation score of 2.1 using a scale of 1-5, with 1 being very Korean and 5 being very American. Those who spoke more English than Korean and who participated in American pastimes were more likely to eat American food items, have American friends, and identified themselves as Americans ⁽¹⁵⁾.

Health Care Beliefs

Health care beliefs and practices of Haitian-Americans are based on their religion, education and level of acculturation. Educated Haitian-Americans are more likely to view an illness as a scientific occurrence and refer to their physician and other health care professionals for assistance ⁽²³⁾. There are some Haitian-Americans who believe that an illness is sent from God or from another person, usually an enemy, through spirits and depend on home remedies, family recommendations, folk healers and voodoo medicine

^(23, 24). Other Haitian-Americans borrow prescription medications from friends and medicate themselves ⁽²⁵⁾, which maybe a result of their fear of medical professional. The lack of observance to medical recommendations maybe due to language barriers, understanding the etiology of illnesses and the dependence on traditional home remedies ⁽²⁴⁾. These individuals usually seek health care from a medical professional only after being unsuccessful dealing with the problem themselves ⁽²⁵⁾.

Review of Haitians and Acculturation

Health and Nutritional studies on the Haitian-American population are rare. This may be due to lack of interest on the part of researchers or it may be due to the language barrier. The only study found that addressed Haitians and acculturation was a cross-sectional study performed in Montreal, Canada ⁽⁴⁾. The main objective of this study was to examine the dietary patterns of Haitians living in Montreal and develop dietary transition stages from the data ⁽⁴⁾. Participants included 181 Haitians in Montreal age ranging 25-60 years ⁽⁴⁾. Participants were recruited using the telephone system of Montreal with a response rate of about 34%. Variables examined were dietary intake using 24-hr recalls, eating patterns (21 categories of food items, Haitian food habits (Appendix A)), diet quality (compared recommended intakes of micronutrients and recommendations from the World Health Organization) and socio-economic data (socio-economic status (SES) score) ⁽⁴⁾. Categorization of participants was done using cluster analysis where participants with similar responses were grouped together. There were 4 dietary patterns or clusters considered in this study, Traditional, Pre-Western, Western and Modern ⁽⁴⁾. Participants in the Traditional group were less educated, while those in the Modern group were more educated. Those placed in the Traditional and Pre-Western

groups were those who had lower levels of acculturation and those in the Western and Modern groups were those with higher levels of acculturation and higher SES scores. Those in the Traditional group (44%), represented participants who consumed a diet which matched their description of a Haitian meal, had the highest intake of fruits and grains, while those in the Western group (9%) had higher intakes of total fat, saturated fat and cholesterol in their diets ⁽⁴⁾. The results suggest that those with lower levels of acculturation have healthier dietary habits than those who have higher levels of acculturation. The authors concluded that the dietary transition stages are associated with the amount of time spent in Canada ⁽⁴⁾. Although the conclusions in this study depicted the acculturation patterns of Haitians who have migrated to another country, there are no studies available on the effects of acculturation on the dietary pattern, nutritional and health status of Haitian mothers who have migrated to the United States.

CHAPTER 3

METHODOLOGY

This was a cross-sectional study using a convenience sample of Haitian-American women. Eighty-one non-pregnant mothers who are of Haitian origin residing in the States of Georgia and Florida were recruited for the study. To participate, the mothers had to be at least 18 years of age and no more than 80 years of age, born in Haiti or the United States, and raised in a traditional Haitian family. For the purposes of this study we defined a traditional Haitian family as one where French-Creole (Creole) was spoken in the home. Recruitment of participants was done via flyers and by word of mouth (speaking with family, friends and church members) in the Greater Atlanta Metropolis and Central Florida areas. Data collection sites were at local churches in the selected cities as Haitian-Americans congregate there at least once per week for worship. Although the majority of the people of Haiti are Catholic ^(26, 27), we mainly used Seventh-Day Adventist churches because of the connection we had through one of our researchers who comes from this community. The study was approved by the Institutional Review Board of the University of Georgia.

Questionnaire Development

Questionnaire, Haitian-American Nutrition Acculturation (HANA) scale used for data collection in the study was developed by the Maternal and Child Nutrition Research Lab of the Department of Foods and Nutrition, University of Georgia. The HANA scale

contained various acculturation variables extracted from different acculturation scales out there. Variables in the HANA scale included self-identification, language spoken at home and child, country of birth, politics, culture, years lived in the United States, and food among others (see Appendix C)

Pilot Testing

Prior to data collection for the current study, we conducted a pilot study to assess the content validity of the HANA scale in a local Haitian-American church. Seven (7) Haitian-American mothers attending the Eben-Ezer Seventh-Day Adventist Church in Atlanta, Georgia participated in the pilot study. All interviews for the pilot study were done by a trained bilingual/bicultural interviewer. Each woman was interviewed individually and in privacy. Based on responses to questions and comments received from participants during the pilot study, we made additions and subtractions to questions within the HANA scale to make the questionnaire more culturally appropriate.

Procedures

Study protocol was explained to participants and those who showed interest in participating were asked to read and complete the informed consent form (Appendix B). Participants were therefore enrolled only after they had provided their written informed consent approved by the Institutional Review Board of the University of Georgia. The consent form was also read and explained in Creole by a trained bilingual/bicultural interviewer to those who were not able to read or understand English.

Participants responded to questions from the Haitian-American Nutritional Acculturation (HANA) scale (Appendix C), which has previously been pilot tested among the Haitian-American population. Participants who provide their signed consent

form were interviewed in their language of choice (Creole, French or English) by a trained bilingual/bicultural interviewer. The following information was collected during the interview: a) dietary intake, b) food assistance program participation (WIC, food stamp etc), c) socio-economic, d) demographic, e) social capital, and f) acculturation indicators.

The interview was followed by anthropometric measurements ⁽²⁸⁾. Height was measured using a standard SECA Stadiometer to the nearest 0.1 inches ⁽²⁸⁾. Weight (to the nearest 0.1 pounds), body mass index (BMI, to the nearest 0.1 kg/m²) and body fat percent (to the nearest 0.1 percent) was measured using a SECA SENSE 804 digital scale which had earlier been validated against the BOD POD (Table 12) ⁽²⁹⁾. Waist and hip circumference were measured using a standard non-stretched measuring tape ⁽²⁹⁾ (to the nearest 0.5 cm). Blood pressure was measured using an automatic blood pressure monitor following manufacturer's guidelines ⁽³⁰⁾. Blood glucose and blood hemoglobin were measured using HemoCue Glucose 201 and HemoCue Hb 201+, respectively, also following the manufacturer's guidelines ^(31, 32). Height, weight, waist circumference, BMI and body fat percent were all measured twice. An average of each reading was used as a final measure for these indicators. Participant health indicators were categorized as the following: blood pressure as Normal (<120/80 mmHg), Pre-hypertensive (120-139/80-89 mmHg), and Hypertensive (>140/90 mmHg) ⁽³³⁾; blood glucose as Normal (<120 mg/dL), Pre-Diabetic (120-140 mg/dL), Diabetic (>140 mg/dL) ⁽³⁴⁾; blood hemoglobin as Anemic (<12 gm/dL), Normal (12.0-15.5 gm/dL) ⁽³⁵⁾; BMI as Normal (<25.0 kg/m²), Overweight (25-29.9 kg/m²), Obese (>30.0 kg/m²) ⁽³⁶⁾; body fat percent as Moderately Lean (23-30%), Excess Fat (30.1-40%), Risky Fat (>40%) ⁽³⁷⁾. All

measurements were done by trained research assistants and a trained bilingual/bicultural research assistant who served as an interpreter for participants who did not speak English.

Dietary Intake

Food Frequency Questionnaire (FFQ)

A FFQ⁽²⁹⁾ was developed using food items commonly consumed by Haitians and common American food items during which was also pilot tested for content validity and appropriateness prior to actual data collection (Appendix C & D). Names of common Haitian foods were obtained from Haitians born and raised in Haiti. The FFQ containing both traditional Haitian and American foods were used to attain the dietary history of the participants when they were living in Haiti and 12 months prior to the interview. Participants reported whether or not they eat a particular food item and how often they eat it. They were also asked to comment whether the amount eaten has increased or decreased since migration to the United States from Haiti.

Meal and Snack Skipping Patterns

Participants were asked to report on the number of times per week, the time of day and the place, where they consume breakfast, lunch, dinner and snacks. When applicable, they were asked the reasons for skipping any of these meals/snacks. Participants also reported the number of times they eat out per week, the time of day and the location.

Food Assistance Program

Food Stamps/SNAP (Supplemental Nutrition Assistance Program)

Participants reported if they have ever received food stamps. This included their current and past participation in the food stamps program.

WIC Program

The women also reported whether they are currently receiving WIC or if they have ever used the WIC program.

Emergency Food Assistance

Participants also reported if they are currently using or if they have ever had to use emergency food assistance programs such as food pantries, soup kitchens or homeless shelter food services since they migrated to the United States.

Socio-economic, Demographic and Cultural Indicators

During the interview, the following information was obtained for the socio-economic and demographic indicators: educational level, marital status, social benefits (e.g. TANF-Temporary Assistance for Needy Families), employment status, household monthly income, household composition including number and ages of household members.

Measure of Acculturation

Acculturation was measured during the interview through a multidimensional battery of questions that was previously developed and successfully validated in the target Haitian community. This scale measures indicators such as: self-identification, number of years in the U.S., language fluency and preferences, nativity, country of birth and migration patterns among others (see Appendix C). For the purposes of this study we considered those living in the US for <5.0 years and speaking only Creole or French and no English as the less acculturated group, those living in the US for 5.0-14.0 years and speaking one of the primary languages along with English as the moderate group, and

those living in the US for ≥ 15.0 years and speaking English only or in combination with one of the primary languages as the more acculturated group.

Acculturation Score

An acculturation score was created based on 5 acculturation variables; self-identification (Black, Haitian, and Haitian-American) years in the United States, language spoken (Creole, French and/or English), consumption of Haitian foods and attending Haitian events. These 5 variables were coded and a composite acculturation score was generated for each participant (ranging from 5-15). We further categorized the composite score into three levels of acculturation. A score of 5-8 was considered to be less acculturated, 9-11 was considered to be moderately acculturated, and 12-15 was considered to be acculturated.

Data Analyses

A total of 180 women was needed to document at least a 4 percentage points difference in the prevalence of diabetes among acculturated versus non-acculturated Haitian women in the United States ⁽³⁸⁾. A similar magnitude in difference was expected to be detected with this sample size in the prevalence of hypertension attributable to the degree of acculturation. These differences are well in line with results from studies on Hispanics and other minority groups in the United States ^(16, 39-41). SPSS for Windows (version 17.0) was used for data entry and all analyses. The main outcome variables for this study were blood pressure, blood glucose, blood hemoglobin, body mass index and body fat percent. Chi-square analyses were used to examine bivariate associations between each outcome variable and independent variables. Results are presented as

means \pm SD and percentages. All results are interpreted using $p < 0.05$ (2-sided) as the criterion for statistical significance.

CHAPTER 4

RESULTS

Description of Study Participants

In total, 81 mothers participated in the study. The characteristics of the participants are outlined in Table 1. The average age of the participants was 46.8 ± 10.6 years (range: 27.0-78.0 years). The majority of our participants (82.7%) resided in the state of Florida (Table 1). The average time spent in the United States was approximately 15.0 years, and all participants except for one were first generation Haitian-Americans (born in Haiti and moved to the United States). The majority (50.7%) of the women had a household income $> \$1500$ per month. While 25.9% reported to have completed high school, the remaining had formal education either eight h grade or at college/trade school level (Table 1). Although almost all participants were born in Haiti, 12.3% identified themselves as Black, 74.1% Haitian and 13.6% as Haitian-American. Most of the participants (29.6%) spoke all three languages, Creole, French, and English well and equally with 28.4% speaking only English and Creole, while the rest spoke only one of the 3 languages very well or in other combinations (Table 1). Majority (67.9%) of the participants reported to be married or cohabiting. In terms of religion, 88.9% reported to be Seventh-Day Adventist.

Association between Acculturation and Health Indicators

Acculturation was measured with indicators such as self-identification, number of years in the U.S., primary language spoken, and foods eaten. In almost all of the acculturation categories, participants with normal or good health status results were highly outnumbered by those with negative results.

Blood Pressure

Forty percent (40.0%) of the women who identified themselves as Black had blood pressure measurements in the hypertensive range (>140/90 mmHg) compared to 30.0% in the normal (<120/80 mmHg) and pre-hypertensive (120-139/80-89 mmHg) categories respectively. Interestingly, among participants who identified themselves as Haitian there were equal numbers (33.3%) of blood pressure measurements in the normal, pre-hypertensive, and hypertensive categories (Table 2). Approximately 66.0% of the participants who have lived in the United States (US) for <5.0 years had hypertensive blood pressure results compared to only 28.6% of those who have lived in the US for >15.0 years (Table 2). Majority of participants (62.5%) who reported to speak Creole and French equally had blood pressure results in the hypertensive range compared to those who spoke the 3 primary languages in different combinations. Although 54.0% of the women who stated that they only ate Haitian foods had hypertensive blood pressure results, almost the same amount 52.8% who reported never eating fast food fell in the same category. While not being statistically significant we observed an inverse association between fast food consumption and blood pressure results of the participants ($p=0.06$). Participants reporting to never eat fast food tended to have higher blood pressure results.

Blood Glucose

Of the respondents who identified themselves as Haitian, 30.0% had blood glucose level in the pre-diabetic (120-140 mg/dL) category and 35.0% in the normal (<120 mg/dL) and diabetic (>140 mg/dL) categories, respectively. Similarly, 60.0% of the women who identified themselves as Black and 54.5% who identified themselves as Haitian-American had diabetic blood glucose results (Table 3). Most of participants living in the US for 5-14 years were either pre-diabetic (37.0) or diabetic (40.7). Similar percentages (40.5%) were seen in those who reported to have lived in the US for >15.0 years who had either normal or diabetic blood glucose results. The majority of the women who spoke all 3 languages were diabetic (54.2%), 26.1% of those who only spoke English and Creole were pre-diabetic and 62.5% of those who spoke only Creole and French had normal blood glucose levels (Table 3). Of the women who ate traditional Haitian foods very often, 37.0% were pre-diabetic, 32.6% were diabetic and 30.4% were in the normal category according to their blood glucose measurements. Most of the participants who never ate fast food, 47.2% were diabetic, 33.3% were pre-diabetic and only 19.4% had normal blood glucose values (Table 3).

Body Mass Index (BMI)

As seen in Table 4, the majority of the women had a BMI in either the overweight or obese ranges. Almost 64.0% of those who identified themselves as Haitian-American were in the obese category, compared to 51.7% who identified themselves as Haitian, and 30.0% who identified themselves as Black. Of the participants who have spent >15.0 years in the US 47.6% were obese and only 16.7% had normal BMI (Table 4). Of the respondents who spoke only English and Creole 8.7% had normal BMI, 30.4% were

overweight, and 60.9% were obese. Most of the women who reported never attending Haitian events had BMI in either overweight (41.4%) or obese (44.8%) categories (Table 4). Although 10.9% of the participants who reported eating traditional Haitian foods very often had normal BMI, 50.0% were obese. Of the women who only ate Haitian food, 63.6% were in the obese category. Of those who ate equal amounts of Haitian and American foods, 18.2% had normal BMI and equal numbers 40.9% were overweight or obese (Table 4).

Body Fat Percent (BF %)

Majority of the participants had higher values for BF% (Table 5). Approximately 72.0% of the participants who identified themselves as Haitian-American had a BF% in the risky body fat category. Of the women who have lived in the US for 5-14 years, similar proportions were seen in those considered to have excess body fat (48.1) or risky body fat (44.4) while only 7.4% had BF% in the moderately lean category (Table 5). All of the women who spoke Creole, French and English had either a BF% in the excess body fat (50.0%) category or the risky body fat category (50.0%). About 60.0% of the women who spoke only Creole had excess body fat, 30.4% had risky body fat and only 8.7% had a moderately lean BF% (Table 5). Of the participants who reported no consumption of fast food, 52.8% had excess BF% and 41.7% had risky BF%.

Association between Demographics and Health Indicators

Blood Pressure

The relationship between participant demographics and blood pressure are presented in Table 6. Age, household income and employment status were significantly associated with blood pressure. Among participants age 30-49 years, a greater proportion

(42.2%) had blood pressure results within normal range, compared to 35.6% in the pre-hypertensive and 22.2% in the hypertensive categories (Table 6). Majority (48.4%), of participants age 50-64 years had blood pressure in the hypertensive range while 12.9% and 38.7% had blood pressure values in the normal and pre-hypertensive ranges, respectively. All participants age 65.0 years and older had hypertensive blood pressure results (Table 6). Half of the participants from the state of Georgia (50.0%) had blood pressure results in the hypertensive range while only 31.3% of their counterparts from the state of Florida had similar results. The higher the participant's household income and more hours worked per week the lower the blood pressure results (Table 6). Among participants making >\$2000, equal numbers (40.9%) had blood pressure results in the pre-hypertensive or normal range, while 18.2% had hypertensive blood pressure results. The majority of the participants who worked full-time had blood pressure results in the normal (42.5%) and pre-hypertensive (42.5%) (Table 6). We also observed an inverse association between level of education and blood pressure measurements with participants with lower level of education recording higher blood pressure measurements. Fifty-three point three percent (53.3%) of the women with an education of eighth grade or less had hypertensive blood pressure results compared to only 20.0% of the women with a college/higher education (Table 6).

Blood Glucose

Among participants age 50-64 years, majority (54.8%) had blood glucose levels in the diabetic range (Table 7). Participants whose household income was less than \$500 per month (60.0%) tended to have blood glucose levels in the diabetic category. Among participants with a household income >\$2000 per month, 50.0% had normal blood

glucose levels. Unemployed participants were more likely to have pre-diabetic or diabetic blood glucose (66.7%) and less likely to have normal blood glucose values (33.3%). Number of children and religion was strongly associated with the respondents' blood glucose levels (Table 7). Forty percent (40.0%) of participants with only one child (primiparous) had normal blood glucose levels compared to only 10.0% in the diabetic category. Those with more than one child (multiparous) were more likely to have blood glucose levels in the diabetic range (45.1%) compared to 10.0% of those who were in the primiparous category, and less likely to have normal blood glucose (32.4%). Approximately 41% of participants who identified their religion as Seventh-Day Adventist had blood glucose values in the diabetic category, 22.2% were pre-diabetic and 36.1% had normal blood glucose values (Table 7).

Body Mass Index (BMI)

All participants between the age range of 18-29 years were found to be obese (Table 8). The majority of participants age 30-49 years were either overweight (35.6%) or obese (48.9%). The participants whose state of residence was Florida tended to be more obese (53.7%) than the participants who resided in the state of Georgia (35.7%). Fifty-five percent (55.0%) of participants with full-time employment were obese, whereas only 10.0% had normal BMI. The less educated and the more children the participants had the higher their BMI (Table 8). Over 66.0% of participants with high school education were obese according to their estimated BMI values while 88.7% of all multiparous participants were either overweight or obese (Table 8).

Body Fat Percent (BF %)

The majority of the women were either in the excess body fat or risky body fat categories (Table 9). Over 95% of the women age 30-49 years were in the excess body fat or risky body fat categories, while the rest were in the moderately lean category. Irrespective of employment status, majority of the participants had percent body fat in the range of excess or risky. Almost all the unemployed (96.6%) participants had a BF% that fell in the excess body fat category or the risky body fat category (Table 9).

Association between Anemia, Acculturation and Demographic Variables

Among participants who identified themselves as black, Haitian and Haitian-American 70.0%, 56.7% and 36.4%, respectively, were anemic according to their blood hemoglobin level (Figure 1a). Majority (55.0%) of the participants who are 1st generation immigrants were anemic (Figure 1b). About 54.2% of the participants who spoke all 3 languages also had blood hemoglobin values in the anemic range, whereas only 37.5% of those who spoke only Creole and French had similar blood hemoglobin values (Figure 1d). In the traditional Haitian food category, 58.7% of participants who ate Haitian food very often were anemic while 41.3% had normal blood hemoglobin values (Figure 1e). Age of the participants was significantly ($p=0.02$) associated with blood hemoglobin levels (Figure 2a). Participants between the ages of 30-49 years were more likely (66.7%) to have blood hemoglobin levels <12 gm/dL (Figure 2a). All of the participants between the age of 18-29 years had normal hemoglobin values (Figure 2a). Sixty percent (60.0%) of the women whose household income was between 0-\$500 had normal hemoglobin values (Figure 2d).

Acculturation Score and Health Indicators

Table 10 reports acculturation score levels with health indicators blood pressure, blood glucose, blood hemoglobin, body mass index, and body fat percent. Based on this score we found that participants who were categorized as hypertensive were more likely to be considered as moderately acculturated (42.9%). Participants who were considered to be diabetic were either moderately acculturated (43.6%) or acculturated (38.5%) (Table10). When looking at blood hemoglobin we found that in those who were considered to have normal hemoglobin, 19.4% were considered to be less acculturated, 41.7% were considered to be moderately acculturated and 38.9% were considered to be acculturated. Similar numbers were seen in those who were considered to be anemic. When comparing body mass index to the acculturation score we found that a greater number of the participants were considered to be overweight/obese and moderately acculturated (Table10). Likewise the same results were seen when looking at body fat percent with the majority having a risky body fat percent and considered to be moderately acculturated. The 95% confidence intervals for acculturation scores and health indicators were not significant (Table 11).

Association between Body Fat Percent, Body Mass Index and Waist Circumference

Figure 3 presents the associations between waist circumference, body fat percent (BF%) and body mass index (BMI). When comparing BMI to waist circumference ($p \leq 0.01$), we found that all of the participants who were in the obese category for BMI (100.0%) also had larger waist circumference considered high risk (Figure 3a). Also, majority of the participants who had risky percent body fat (94.6%) had a high risk waist circumference ($p \leq 0.01$) (Figure 3b). Interestingly, participants who had BMI in the

normal range did not necessarily have moderately lean percent body fat ($p \leq 0.01$). Twenty point five percent (20.5%) of the women who had excess BF %, also had BMI in the normal range while 100% of the women who had moderately lean BF % had BMI in either the overweight or obese ranges (Figure 3c).

Table 1: Descriptive Characteristics of Study Participants

	Mean ± Standard Deviation	
Age	46.8 ± 10.6	
Years in the US	15.3 ± 9.4	
Number of Children	3.3 ± 1.8	
	n	(%)
Self-Identification		
Black	10	12.3
Haitian	60	74.1
Haitian-American	11	13.6
Generation		
1st	80	98.8
2nd	1	1.2
Marital Status		
Married/Cohabiting	55	67.9
Single	26	32.1
State of Residence		
Georgia	14	17.3
Florida	67	82.7
Employment		
Fulltime > 35 hours	40	33.1
Part-time < 35 hours	11	9.1
Unemployed	30	24.8
Household Income		
0-\$500	10	12.3
\$501-\$1000	16	19.8
\$1001-\$1500	14	17.3
\$1501-\$2000	19	23.5
> \$2000	22	27.2
Education		
Eighth grade or less	30	37.0
High School	21	25.9
College or Higher/Trade School	30	37.0
Spoken Language		
Creole	23	28.4
English	2	2.5
All	24	29.6
Creole and French	8	9.9
French and English	1	1.2
English and Creole	23	28.4
Religion		
Seventh Day Adventist	72	88.9
Other	9	11.1

Table 2: Association between Acculturation and Blood Pressure

	Blood Pressure		
	Normal n (%)	Pre- Hypertensive n (%)	Hypertensive n (%)
Self-Identification			
Black	3 (30.0)	3 (30.0)	4 (40.0)
Haitian	20 (33.3)	20 (33.3)	20 (33.3)
Haitian-American	2 (18.2)	5 (45.5)	4 (36.4)
Generation			
1st	24 (30.0)	28 (35)	28 (35.0)
2nd	1 (100.0)	0 (0.0)	0 (0.0)
Years in the US			
<5years	3 (25.0)	1 (8.3)	8 (66.7)
5-14 years	9 (33.3)	10 (37.0)	8 (29.6)
>15 years	13 (31.0)	17 (40.5)	12 (28.6)
Vote in Last U.S. Election			
Yes	10 (28.6)	15 (42.9)	10 (28.6)
No	15 (32.6)	13 (28.3)	18 (39.1)
Church Language			
Creole	5 (29.4)	7 (41.2)	5 (29.4)
French	0 (0.0)	0 (0.0)	2 (100.0)
All	14 (35.0)	12 (30.0)	14 (35.0)
Creole and French	6 (35.3)	6 (35.3)	5 (29.4)
French and English	0 (0.0)	1 (100.0)	0 (0.0)
Creole and English	0 (0.0)	2 (50.0)	2 (50.0)
Spoken Language			
Creole	6 (26.1)	6 (26.1)	11 (47.8)
English	1 (50.0)	1 (50.0)	0 (0.0)
All	8 (33.3)	10 (41.7)	6 (25.0)
Creole and French	3 (37.5)	0 (0.0)	5 (62.5)
French and English	0 (0.0)	1 (100.0)	0 (0.0)
English and Creole	7 (30.4)	10 (43.5)	6 (26.1)
Haitian Events			
Often	5 (45.5)	2 (18.2)	4 (36.4)
Sometimes	8 (29.6)	5 (18.5)	14 (51.9)
Rarely	4 (28.6)	8 (57.1)	2 (14.3)
Never	8 (27.6)	13 (44.8)	8 (27.6)
Eat Traditional Haitian Food			
Very Often	14 (30.4)	14 (30.4)	18 (39.1)
Often	4 (17.4)	11 (47.8)	8 (34.8)
Somewhat Often	6 (66.7)	2 (22.2)	1 (11.1)
Rarely	1 (33.3)	1 (33.3)	1 (33.3)
Serve Haitian Food			
Yes	24 (31.2)	27 (35.1)	26 (33.8)
No	1 (25.0)	1 (25.0)	2 (50.0)

Prepare Haitian Food			
Yes	25 (31.6)	28 (35.4)	26 (32.9)
No	0 (0.0)	0 (0.0)	2 (100.0)
Foods mostly eat			
Only Haitian	4 (18.2)	6 (27.3)	12 (54.5)
More Haitian than American	12 (33.3)	13 (36.1)	11 (30.6)
Equal amounts of Haitian and American	8 (36.4)	9 (40.9)	5 (22.7)
More American than Haitian	1 (100.0)	0 (0.0)	0 (0.0)
Fast Food			
Often	2 (66.7)	1 (33.3)	0 (0.0)
Somewhat Often	6 (50.0)	4 (33.3)	2 (16.7)
Rarely	10 (33.3)	13 (43.3)	7 (23.3)
Never	7 (19.4)	10 (27.8)	19 (52.8)

Blood Pressure: Normal (<120/80 mmHg); Pre-Hypertensive (120-139/80-89 mmHg); Hypertensive (>140/90 mmHg)

Table 3: Association between Acculturation and Blood Glucose

	Blood Glucose		
	Normal n (%)	Pre-Diabetic n (%)	Diabetic n (%)
Self-Identification			
Black	3 (30.0)	1 (10.0)	6 (60.0)
Haitian	21 (35.0)	18 (30.0)	21 (35.0)
Haitian-American	3 (27.3)	2 (18.2)	6 (54.5)
Generation			
1st	26 (32.5)	21 (26.3)	33 (41.3)
2nd	1 (100.0)	0 (0.0)	0 (0.0)
Years in the US			
<5years	4 (33.3)	3 (25.0)	5 (41.7)
5-14 years	6 (22.2)	10 (37.0)	11 (40.7)
>15 years	17 (40.5)	8 (19.0)	17 (40.5)
Vote in Last U.S. Election			
Yes	12 (34.3)	9 (25.7)	14 (40.0)
No	15 (32.6)	12 (26.1)	18 (41.3)
Church Language			
Creole	5 (29.4)	8 (47.1)	4 (23.5)
French	1 (50.0)	0 (0.0)	1 (50.0)
All	16 (40.0)	7 (17.5)	17 (42.5)
Creole and French	4 (23.5)	6 (35.3)	7 (41.2)
French and English	0 (0.0)	0 (0.0)	1 (100.0)
Creole and English	1 (25.0)	0 (0.0)	3 (75.0)
Spoken Language			
Creole	6 (26.1)	9 (39.1)	8 (34.8)
English	2 (100.0)	0 (0.0)	0 (0.0)
All	6 (25.0)	5 (20.8)	13 (54.2)
Creole and French	5 (62.5)	1 (12.5)	2 (25.0)
French and English	0 (0.0)	0 (0.0)	1 (100.0)
English and Creole	8 (34.8)	6 (26.1)	9 (39.1)
Haitian Events			
Often	2 (18.2)	4 (36.4)	5 (45.5)
Sometimes	12 (44.4)	6 (22.2)	9 (33.3)
Rarely	5 (35.7)	2 (14.3)	7 (50.0)
Never	8 (27.6)	9 (31.0)	12 (41.4)
Eat Traditional Haitian Food			
Very Often	14 (30.4)	17 (37)	15 (32.6)
Often	6 (26.1)	4 (17.4)	13 (56.5)
Somewhat Often	5 (55.6)	0 (0.0)	4 (44.4)
Rarely	2 (66.7)	0 (0.0)	1 (33.3)
Serve Haitian Food			
Yes	26 (33.8)	20 (26.0)	31 (40.3)
No	1 (25.0)	1 (25.0)	2 (50.0)
Prepare Haitian Food			

Yes	26 (32.9)	21 (26.6)	32 (40.5)
No	1 (50.0)	0 (0.0)	1 (50.0)
Foods mostly eat			
Only Haitian	5 (22.7)	9 (40.9)	8 (36.4)
More Haitian than American	13 (36.1)	9 (25.0)	14 (38.9)
Equal amounts of Haitian and American	8 (36.4)	3 (13.6)	11 (50.0)
More American than Haitian	1 (100.0)	0 (0.0)	0 (0.0)
Fast Food			
Often	1 (33.3)	1 (33.3)	1 (33.3)
Somewhat Often	5 (41.7)	2 (16.7)	5 (41.7)
Rarely	14 (46.7)	6 (20.0)	10 (33.3)
Never	7 (19.4)	12 (33.3)	17 (47.2)

Blood Glucose: Normal (<120 mg/dL); Pre-Diabetic (120-140 mg/dL); Diabetic (>140 mg/dL)

Table 4: Association between Acculturation and Body Mass Index

	Body Mass Index		
	Normal n (%)	Overweight n (%)	Obese n (%)
Self-Identification			
Black	1 (10.0)	6 (60.0)	3 (30.0)
Haitian	7 (11.7)	22 (36.7)	31 (51.7)
Haitian-American	1 (9.1)	3 (27.3)	7 (63.6)
Generation			
1st	9 (11.3)	30 (37.5)	41 (51.2)
2nd	0 (0.0)	1 (100.0)	0 (0.0)
Years in the US			
<5years	1 (8.3)	4 (33.3)	7 (58.3)
5-14 years	1 (3.7)	12 (44.4)	14 (51.9)
>15 years	7 (16.7)	15 (35.7)	20 (47.6)
Vote in Last U.S. Election			
Yes	6 (17.1)	15 (42.9)	14 (40.0)
No	3 (6.5)	16 (34.8)	27 (58.7)
Church Language			
Creole	2 (11.8)	8 (47.1)	7 (41.2)
French	0 (0.0)	1 (50.0)	1 (50.0)
All	3 (7.5)	17 (42.5)	20 (50.0)
Creole and French	3 (17.6)	5 (29.4)	9 (52.9)
French and English	0 (0.0)	0 (0.0)	1 (100.0)
Creole and English	1 (25.0)	0 (0.0)	3 (75.0)
Spoken Language			
Creole	3 (13.0)	8 (34.8)	12 (52.2)
English	1 (50.0)	1 (50.0)	0 (0.0)
All	2 (8.3)	12 (50.0)	10 (41.7)
Creole and French	1 (12.5)	3 (37.5)	4 (50.0)
French and English	0 (0.0)	0 (0.0)	1 (100.0)
English and Creole	2 (8.7)	7 (30.4)	14 (60.9)
Haitian Events			
Often	2 (18.2)	4 (36.4)	5 (45.5)
Sometimes	2 (7.4)	9 (33.3)	16 (59.3)
Rarely	1 (7.1)	6 (42.9)	7 (50.0)
Never	4 (13.8)	12 (41.4)	13 (44.8)
Eat Traditional Haitian Food			
Very Often	5 (10.9)	18 (39.1)	23 (50.0)
Often	2 (8.7)	8 (34.8)	13 (56.5)
Somewhat Often	2 (22.2)	4 (44.4)	3 (33.3)
Rarely	0 (0.0)	1 (33.3)	2 (66.7)
Serve Haitian Food			
Yes	9 (11.7)	29 (37.7)	39 (50.6)
No	0 (0.0)	2 (50.0)	2 (50.0)

Prepare Haitian Food			
Yes	9 (11.4)	31 (39.2)	39 (49.4)
No	0 (0.0)	0 (0.0)	2 (100.0)
Foods mostly eat			
Only Haitian	2 (9.1)	6 (27.3)	14 (63.6)
More Haitian than American	3 (8.3)	15 (41.7)	18 (50.0)
Equal amounts of Haitian and American	4 (18.2)	9 (40.9)	9 (40.9)
More American than Haitian	0 (0.0)	1 (100.0)	0 (0.0)
Fast Food			
Often	0 (0.0)	3 (100.0)	0 (0.0)
Somewhat Often	3 (25.0)	3 (25.0)	6 (50.0)
Rarely	2 (6.7)	12 (40.0)	16 (53.3)
Never	4 (11.1)	13 (36.1)	19 (52.8)

Body Mass Index: Normal (<25 kg/m²); Overweight (25-29.9 kg/m²); Obese (>30 kg/m²)

Table 5: Association between Acculturation and Body Fat Percent

	Body Fat %		
	Moderately Lean n (%)	Excess Fat n (%)	Risky Fat n (%)
Self-Identification			
Black	1 (10.0)	6 (60.0)	3 (30.0)
Haitian	3 (5.0)	31 (51.7)	26 (43.3)
Haitian-American	0 (0.0)	3 (27.3)	8 (72.7)
Generation			
1st	4 (5.0)	39 (48.8)	37 (46.3)
2nd	0 (0.0)	1 (100.0)	0 (0.0)
Years in the US			
<5years	1 (8.3)	5 (41.7)	6 (50.0)
5-14 years	2 (7.4)	13 (48.1)	12 (44.4)
>15 years	1 (2.4)	22 (52.4)	19 (45.2)
Vote in Last U.S. Election			
Yes	1 (2.9)	19 (54.3)	15 (42.9)
No	3 (6.5)	21 (45.7)	22 (47.8)
Church Language			
Creole	1 (5.9)	8 (47.1)	8 (47.1)
French	0 (0.0)	2 (100.0)	0 (0.0)
All	2 (5.0)	20 (50.0)	18 (45.0)
Creole and French	1 (5.9)	8 (47.1)	8 (47.1)
French and English	0 (0.0)	0 (0.0)	1 (100.0)
Creole and English	0 (0.0)	2 (50.0)	2 (50.0)
Spoken Language			
Creole	2 (8.7)	14 (60.9)	7 (30.4)
English	0 (0.0)	2 (100.0)	0 (0.0)
All	0 (0.0)	12 (50)	12 (50.0)
Creole and French	1 (12.5)	3 (37.5)	4 (50.0)
French and English	0 (0.0)	0 (0.0)	1 (100.0)
English and Creole	1 (4.3)	9 (39.1)	13 (56.5)
Haitian Events			
Often	0 (0.0)	7 (63.6)	4 (40.0)
Sometimes	1 (3.7)	10 (37.0)	16 (59.3)
Rarely	1 (7.1)	7 (50.0)	6 (42.9)
Never	2 (6.9)	16 (55.2)	11 (37.9)
Eat Traditional Haitian Food			
Very Often	3 (6.5)	23 (50.0)	20 (43.5)
Often	0 (0.0)	14 (60.9)	9 (39.1)
Somewhat Often	1 (11.1)	2 (22.2)	6 (66.7)
Rarely	0 (0.0)	1 (33.3)	2 (66.7)
Serve Haitian Food			
Yes	3 (3.9)	39 (50.6)	35 (45.5)
No	1 (25.0)	1 (25.0)	2 (50.0)

Prepare Haitian Food			
Yes	4 (5.1)	40 (50.6)	35 (44.3)
No	0 (0.0)	0 (0.0)	2 (100.0)
Foods mostly eat			
Only Haitian	0 (0.0)	9 (40.9)	13 (59.1)
More Haitian than American	2 (5.6)	21 (58.3)	13 (36.1)
Equal amounts of Haitian and American	2 (9.1)	9 (40.9)	11 (50.0)
More American than Haitian	0 (0.0)	1 (100.0)	0 (0.0)
Fast Food			
Often	0 (0.0)	3 (100)	0 (0.0)
Somewhat Often	0 (0.0)	4 (33.3)	8 (66.7)
Rarely	2 (6.7)	14 (46.7)	14 (46.7)
Never	2 (5.6)	19 (52.8)	15 (41.7)

Body Fat Percent: Moderately Lean (23-30%); Excess Fat (30.1-40%); Risky Fat (>40%)

Table 6: Association between Participant Demographics and Blood Pressure

	Blood Pressure		
	Normal n (%)	Pre- Hypertensive n (%)	Hypertensive n (%)
Age**			
18-29	2 (100.0)	0 (0.0)	0 (0.0)
30-49	19 (42.2)	16 (35.6)	10 (22.2)
50-64	4 (12.9)	12 (38.7)	15 (48.4)
≥65	0 (0.0)	0 (0.0)	3 (100.0)
State of Residence			
Georgia	3 (21.4)	4 (28.6)	7 (50.0)
Florida	22 (32.8)	24 (35.8)	21 (31.3)
Marital Status			
Married/Cohabiting	19 (34.5)	20 (36.4)	16 (29.1)
Single	6 (23.1)	8 (30.8)	12 (46.2)
Monthly Household Income*			
0-\$500	2 (20.0)	0 (0.0)	8 (80.0)
\$501-\$1000	4 (25.0)	7 (43.8)	5 (31.3)
\$1001-\$1500	6 (42.9)	3 (21.4)	5 (35.7)
\$1501-\$2000	4 (21.1)	9 (47.4)	6 (31.6)
> \$2000	9 (40.9)	9 (40.9)	4 (18.2)
Employment**			
Fulltime > 35 hours	17 (42.5)	17 (42.5)	16 (15.0)
Part-time < 35 hours	3 (27.3)	4 (36.4)	4 (36.4)
Unemployed	5 (16.7)	7 (23.3)	18 (60.0)
Education			
Eight grade or less	7 (23.3)	7 (23.3)	16 (53.3)
High School	6 (28.6)	9 (42.9)	6 (28.6)
College or Higher/Trade School	12 (40.0)	12 (40.0)	6 (20.0)
Number of Children			
Primiparous	5 (50.0)	3 (30.0)	2 (20.0)
Multiparous	20 (28.2)	25 (35.2)	26 (36.6)
Religion			
Seventh Day Adventist	24 (33.3)	23 (31.9)	25 (34.7)
Other	1 (11.1)	5 (55.6)	3 (33.3)

*p≤0.05

**p≤0.01

Blood Pressure: Normal (<120/80 mmHg); Pre-Hypertensive (120-139/80-89 mmHg); Hypertensive (>140/90 mmHg)

Table 7: Association between Participant Demographics and Blood Glucose

	Blood Glucose		
	Normal n (%)	Pre- Diabetic n (%)	Diabetic n (%)
Age			
18-29	2 (100.0)	0 (0.0)	0 (0.0)
30-49	17 (37.8)	13 (28.9)	15 (33.3)
50-64	6 (19.4)	8 (25.8)	17 (54.8)
≥65	2 (66.7)	0 (0.0)	1 (33.3)
State of Residence			
Georgia	5 (35.7)	1 (7.1)	8 (57.1)
Florida	22 (32.8)	20 (29.9)	25 (37.3)
Marital Status			
Married/Cohabiting	21 (38.2)	15 (27.3)	19 (34.5)
Single	6 (23.1)	6 (23.1)	14 (53.8)
Monthly Household Income			
0-\$500	2 (20.0)	2 (20.0)	6 (60.0)
\$501-\$1000	3 (18.8)	7 (43.8)	6 (37.5)
\$1001-\$1500	5 (35.7)	3 (21.4)	6 (42.9)
\$1501-\$2000	6 (31.6)	6 (31.6)	7 (36.8)
> \$2000	11 (50.0)	3 (13.6)	8 (36.4)
Employment			
Fulltime > 35 hours	13 (32.5)	11 (27.5)	16 (40.0)
Part-time < 35 hours	4 (36.4)	5 (45.5)	2 (18.2)
Unemployed	10 (33.3)	5 (16.7)	15 (50.0)
Education			
Eight grade or less	9 (30.0)	10 (33.3)	11 (36.7)
High School	8 (38.1)	4 (19.0)	9 (42.9)
College or Higher/Trade School	10 (33.3)	7 (23.3)	13 (43.3)
Number of Children			
Primiparous	4 (40.0)	5 (50.0)	1 (10.0)
Multiparous	23 (32.4)	16 (22.5)	32 (45.1)
Religion			
Seventh Day Adventist	26 (36.1)	16 (22.2)	30 (41.7)
Other	1 (11.1)	5 (55.6)	3 (33.3)

Blood Glucose: Normal (<120 mg/dL); Pre-Diabetic (120-140 mg/dL); Diabetic (>140 mg/dL)

Table 8: Association between Participant Demographics and Body Mass Index

	Body Mass Index		
	Normal n (%)	Overweight n (%)	Obese n (%)
Age			
18-29	0 (0.0)	0 (0.0)	2 (100.0)
30-49	7 (15.6)	16 (35.6)	22 (48.9)
50-64	1 (3.2)	15 (48.4)	15 (48.4)
≥65	1 (33.3)	0 (0.0)	2 (66.7)
State of Residence			
Georgia	1 (7.1)	8 (57.1)	5 (35.7)
Florida	8 (11.9)	23 (34.3)	36 (53.7)
Marital Status			
Married/Cohabiting	7 (12.7)	22 (40.0)	26 (47.3)
Single	2 (7.7)	9 (34.6)	15 (57.7)
Monthly Household Income			
0-\$500	1 (10.0)	2 (20.0)	7 (70.0)
\$501-\$1000	2 (12.5)	4 (25.0)	10 (62.5)
\$1001-\$1500	1 (7.1)	7 (50.0)	6 (42.9)
\$1501-\$2000	2 (10.5)	10 (52.6)	7 (36.8)
> \$2000	3 (13.6)	8 (36.4)	11 (50.0)
Employment			
Fulltime > 35 hours	4 (10.0)	14 (35.0)	22 (55.0)
Part-time < 35 hours	0 (0.0)	8 (72.7)	3 (27.3)
Unemployed	5 (16.7)	9 (30.0)	16 (53.3)
Education			
Eight grade or less	2 (6.7)	14 (46.7)	14 (46.7)
High School	3 (14.3)	4 (19.0)	14 (66.7)
College or Higher/Trade School	4 (13.3)	13 (43.3)	13 (43.3)
Number of Children			
Primiparous	1 (10.0)	5 (50.0)	4 (40.0)
Multiparous	8 (11.3)	26 (36.6)	37 (52.1)
Religion			
Seventh Day Adventist	9 (12.5)	28 (38.9)	35 (48.6)
Other	0 (0.0)	3 (33.3)	6 (66.7)

Body Mass Index: Normal (<25 kg/m²); Overweight (25-29.9 kg/m²); Obese (>30 kg/m²)

Table 9: Association between Participant Demographics and Body Fat Percent

	Body Fat %		
	Moderately Lean n (%)	Excess Fat n (%)	Risky Fat n (%)
Age			
18-29	0 (0.0)	0 (0.0)	2 (100.0)
30-49	2 (4.4)	23 (51.1)	20 (44.4)
50-64	2 (6.5)	15 (48.4)	14 (45.2)
≥65	0 (0.0)	2 (66.7)	1 (33.3)
State of Residence			
Georgia	1 (7.1)	7 (50.0)	6 (42.9)
Florida	3 (4.5)	33 (49.3)	31 (46.3)
Marital Status			
Married/Cohabiting	2 (3.6)	26 (47.3)	27 (49.1)
Single	2 (7.7)	14 (53.8)	10 (38.5)
Monthly Household Income			
0-\$500	1 (10.0)	5 (50.0)	4 (40.0)
\$501-\$1000	0 (0.0)	6 (37.5)	10 (62.5)
\$1001-\$1500	2 (14.3)	6 (42.9)	6 (42.9)
\$1501-\$2000	0 (0.0)	12 (63.2)	7 (36.8)
> \$2000	1 (4.5)	11 (50.0)	10 (45.5)
Employment			
Fulltime > 35 hours	1 (2.5)	20 (50.0)	19 (47.5)
Part-time < 35 hours	2 (18.2)	5 (45.5)	4 (36.4)
Unemployed	1 (3.3)	15 (50.0)	14 (46.7)
Education			
Eight grade or less	1 (3.3)	18 (60.0)	11 (36.7)
High School	1 (4.8)	7 (33.3)	13 (61.9)
College or Higher/Trade School	2 (6.7)	15 (50.0)	13 (43.3)
Number of Children			
Primiparous	1 (10.0)	4 (40.0)	5 (50.0)
Multiparous	3 (4.2)	36 (50.7)	32 (45.1)
Religion			
Seventh Day Adventist	3 (4.2)	38 (52.8)	31 (43.1)
Other	1 (11.1)	2 (22.2)	6 (66.7)

Body Fat Percent: Moderately Lean (23-30%); Excess Fat (30.1-40%); Risky Fat (>40%)

Table 10: Acculturation Score and Health Indicators

	Categorization of Acculturation Score		
	Less Acculturated n (%)	Moderately Acculturated n (%)	Acculturated n (%)
Blood Pressure			
Non-hypertensive	8 (20.5)	18 (46.2)	13 (33.3)
Hypertensive	11 (26.2)	18 (42.9)	13 (31.0)
Blood Glucose			
Non-diabetic	12 (28.6)	19 (45.2)	11 (26.2)
Diabetic	7 (17.9)	17 (43.6)	15 (38.5)
Blood Hemoglobin			
Normal	7 (19.4)	15 (41.7)	14 (38.9)
Anemic	12 (26.7)	21 (46.7)	12 (26.7)
Body Mass Index			
Normal	1 (11.1)	7 (77.8)	1 (11.1)
Overweight/Obesity	18 (25.0)	29 (40.3)	25 (34.7)
Body Fat Percent			
Excess Fat	12 (27.3)	19 (43.2)	13 (29.5)
Risky Fat	7 (18.9)	17 (45.9)	13 (35.1)

Table 11: Association between Acculturation Score and Health Indicators

	OR (95% Confidence Interval)				
	Hypertension	Diabetes	Anemia	Obesity	Body Fat %
Less Acculturated	1.38 (0.42-4.53)	0.43 (0.13 - 1.44)	2.00 (0.60-6.71)	0.72 (0.04-12.29)	0.58 (0.17-2.00)
Moderately Acculturated	1.00 (0.37-2.74)	0.66 (0.24-1.81)	1.63 (0.60-4.51)	0.17 (0.02-1.44)	0.90 (0.33-2.46)
More Acculturated	1.00	1.00	1.00	1.00	1.00

Table 12: Validation of SECA SENSa Digital Scale against the BOD POD

	Body Weight		Body Fat %	
N	6		6	
Correlation	0.99		0.79	
Sig. (2-tailed)	0.00		0.063	
	BOD POD Body Weight	Digital Scale Body Weight	BOD POD Body Fat %	Digital Scale Body Fat %
Mean	132.07	132.02	22.68	23.74

Figure 1: Association between Anemia Acculturation variables

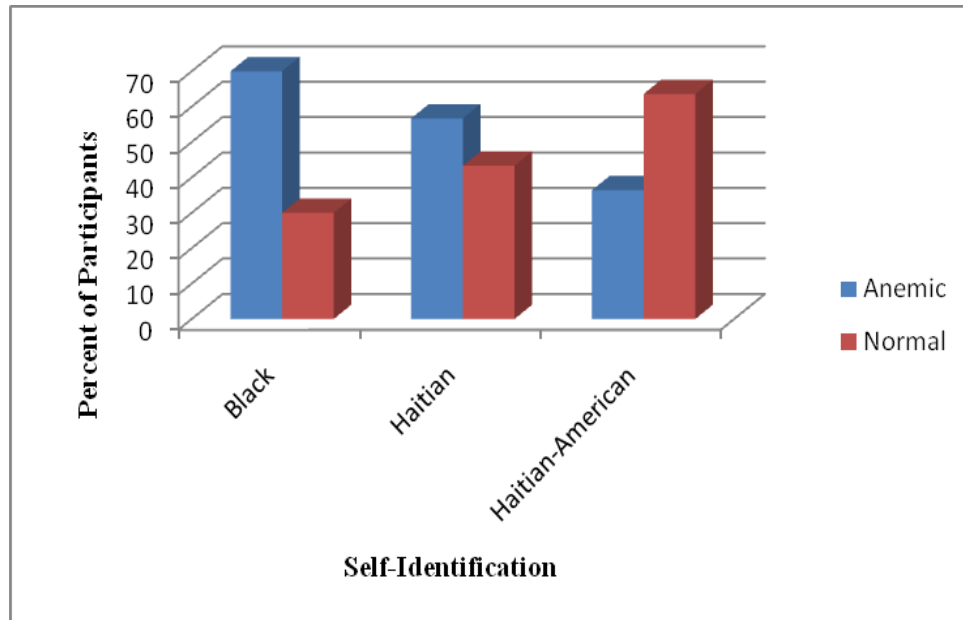


Figure 1a. Association between Anemia and Self-Identification

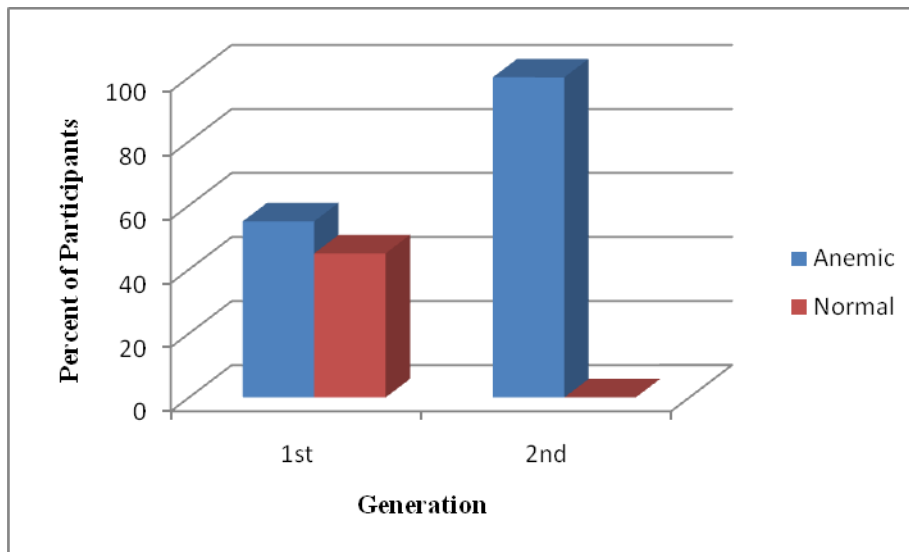


Figure 1b. Association between Anemia and Generation of Participants

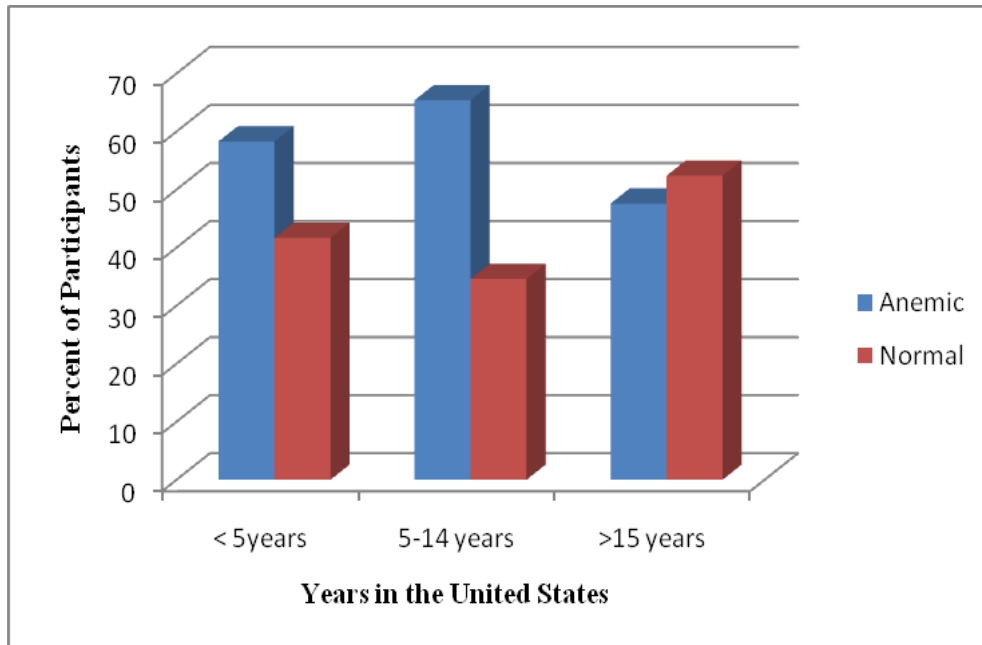


Figure 1c. Association between Anemia and Years in the United States

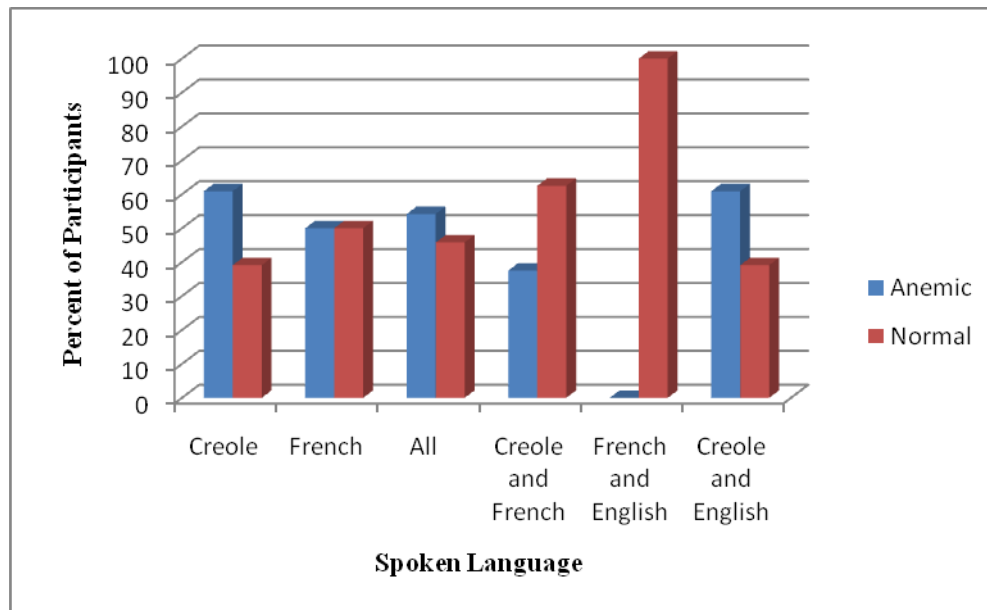


Figure 1d. Association between Anemia and Spoken Language

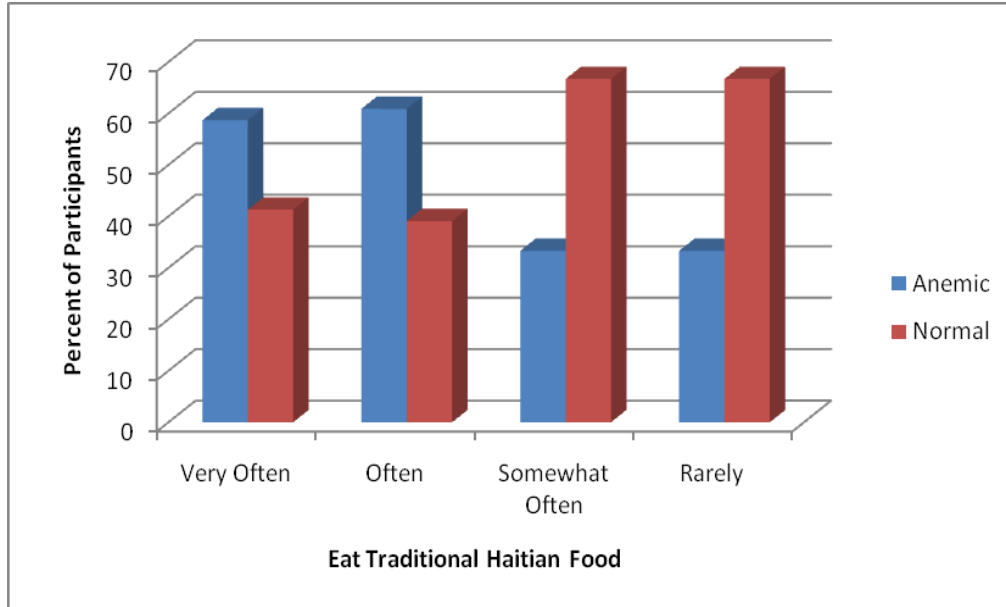


Figure 1e. Association between Anemia and Eating Traditional Haitian Food

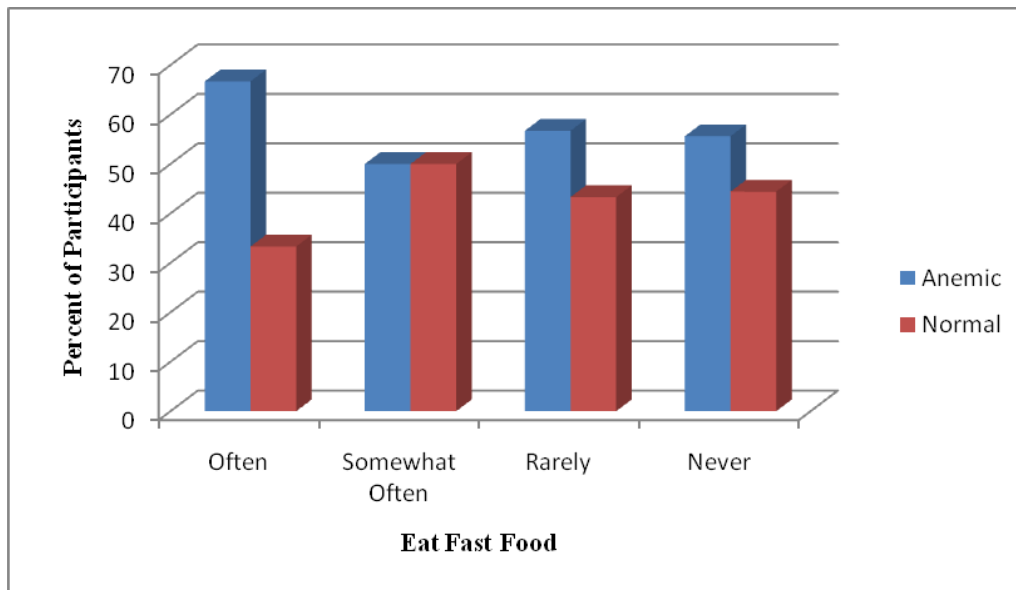
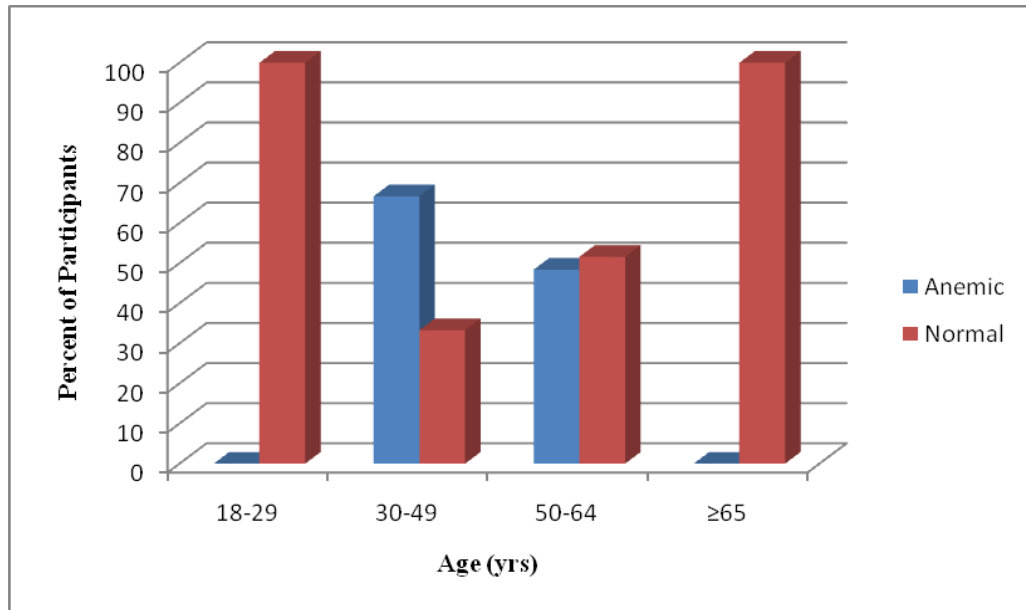


Figure 1f. Association between Anemia and Eating Fast Food

Figure 2: Association between Anemia Demographic variables



*Figure 2a. Association between Anemia and Age of Participants

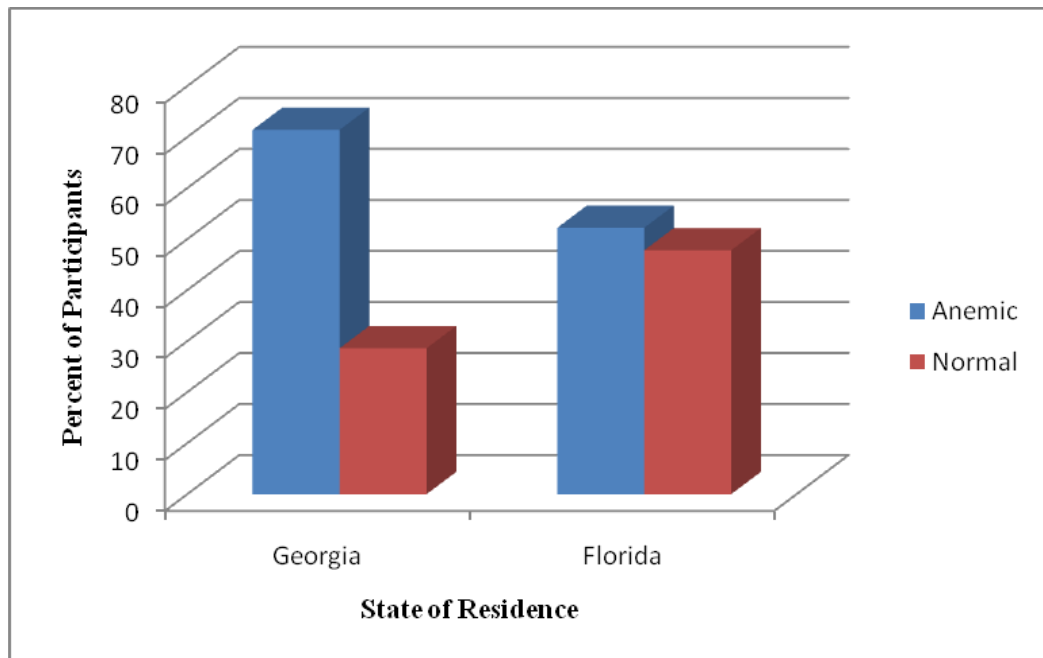


Figure 2b. Association between Anemia and State of Residence

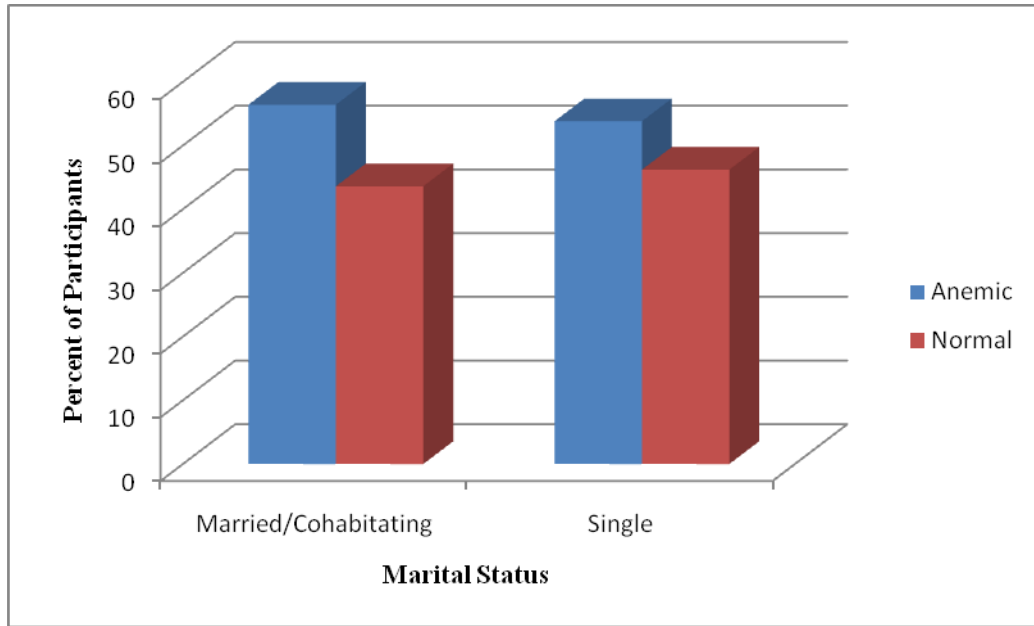


Figure 2c. Association between Anemia and Marital Status

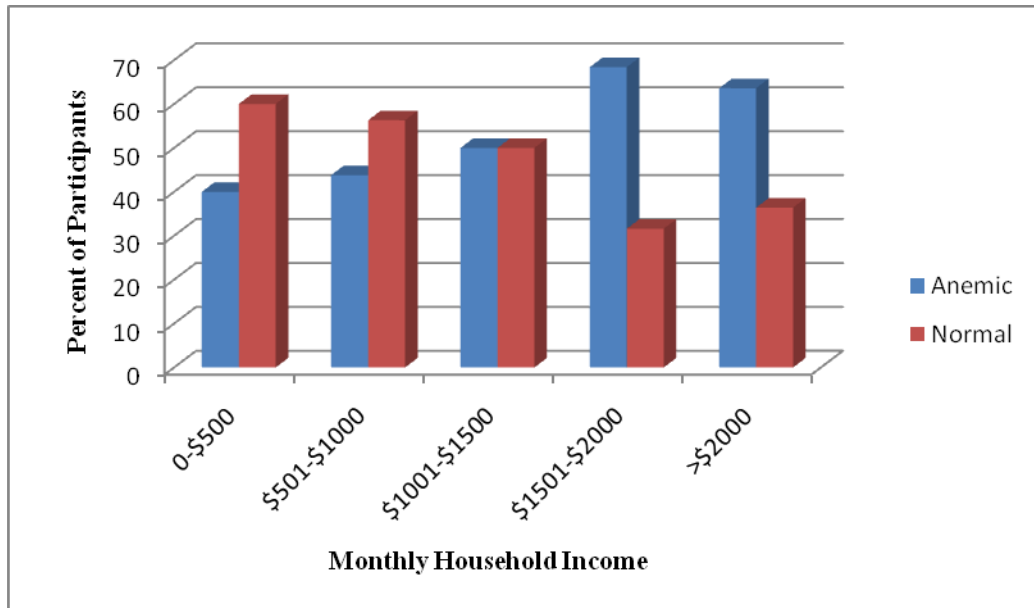


Figure 2d. Association between Anemia and Monthly Household Income

*p≤0.05

Blood Hemoglobin: Anemic (<12 gm/dL); Normal (12.0-15.5 gm/dL)

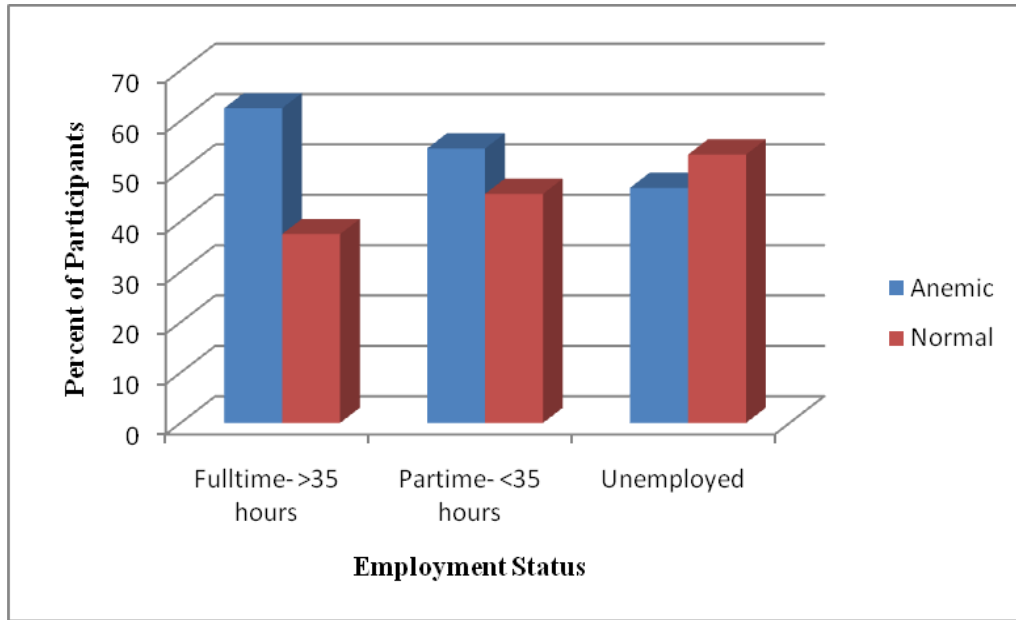


Figure 2e. Association between Anemia and Employment Status

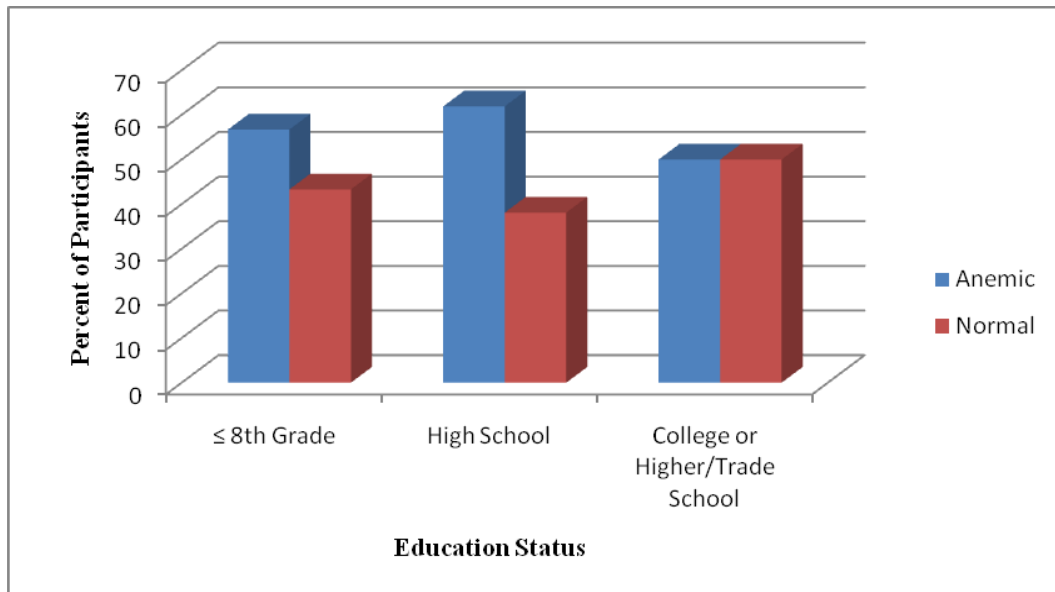


Figure 2f. Association between Anemia and Education Status

* $p \leq 0.05$
 Blood Hemoglobin: Anemic (<12 gm/dL); Normal (12.0-15.5 gm/dL)

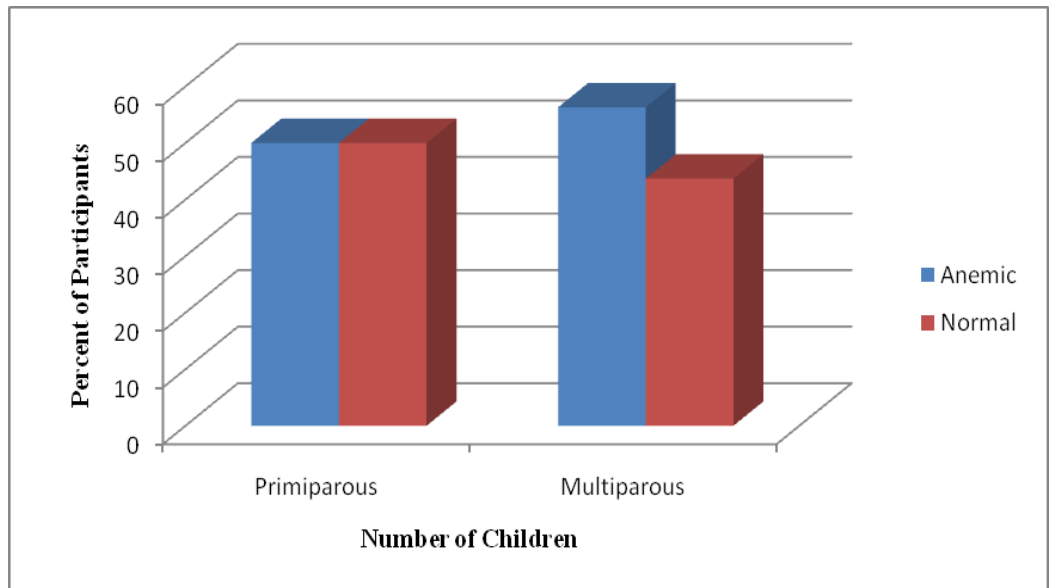


Figure 2g. Association between Anemia and Number of Children

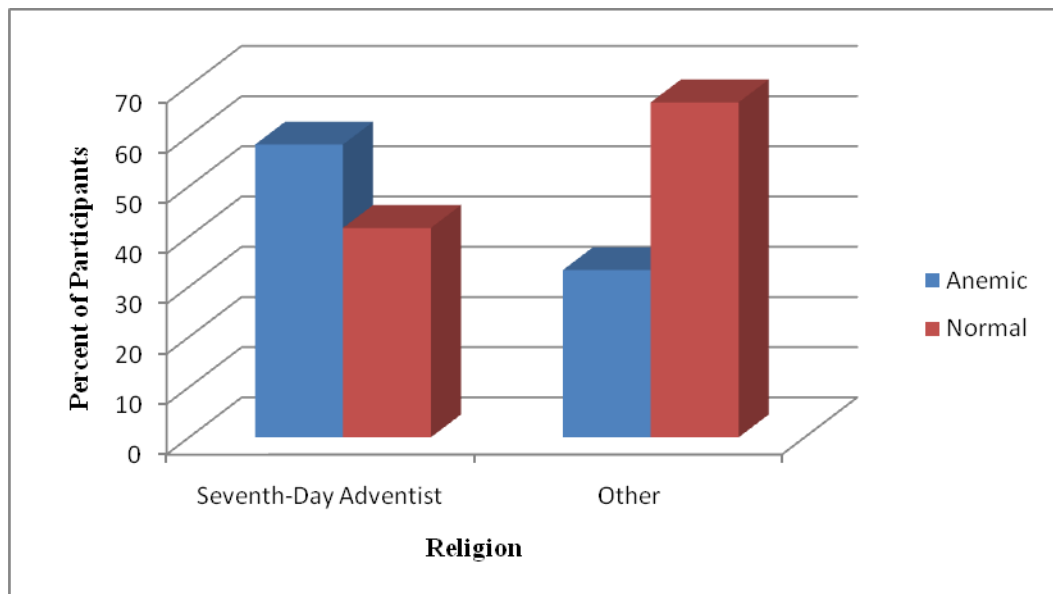
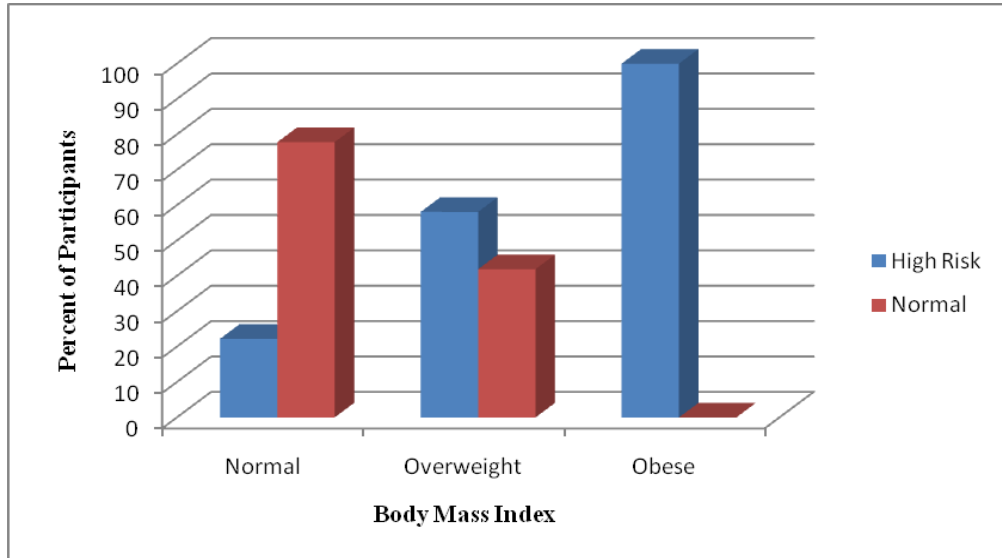


Figure 2h. Association between Anemia and Religion

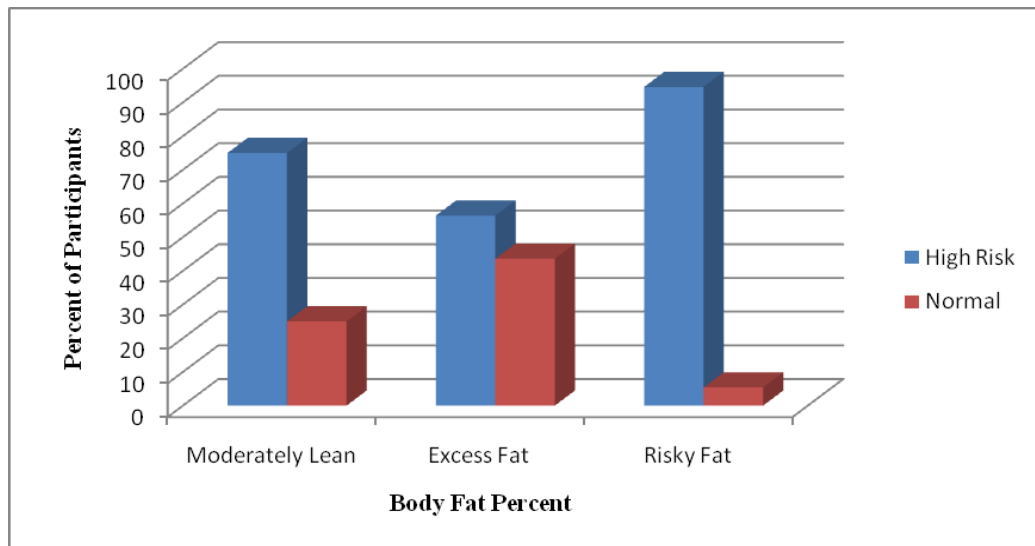
*p<0.05

Blood Hemoglobin: Anemic (<12 gm/dL); Normal (12.0-15.5 gm/dL)

Figure 3: Association between Body Fat Percent, Body Mass Index and Waist Circumference



**Figure 3a. Association between Waist Circumference and Body Mass Index



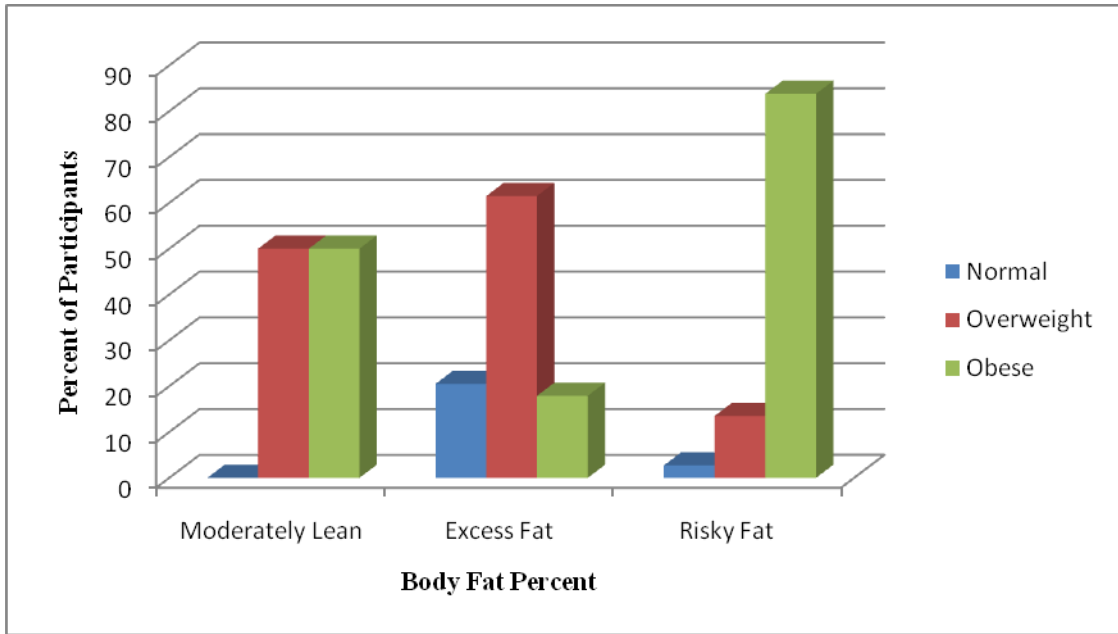
**Figure 3b. Association between Waist Circumference and Body Fat Percent

** $p \leq 0.01$

Body Mass Index: Normal ($<25 \text{ kg/m}^2$); Overweight ($25\text{-}29.9 \text{ kg/m}^2$); Obese ($>30 \text{ kg/m}^2$)

Body Fat %: Moderately Lean (23-30%); Excess Fat (30.1-40%); Risky Fat ($>40\%$)

Waist Circumference: Normal (≤ 35 inches); High Risk (>35 inches)



**Figure 3c. Association between Body Mass Index and Body Fat Percent

** $p \leq 0.01$

Body Mass Index: Normal ($<25 \text{ kg/m}^2$); Overweight ($25\text{-}29.9 \text{ kg/m}^2$); Obese ($>30 \text{ kg/m}^2$)

Body Fat %: Moderately Lean (23-30%); Excess Fat (30.1-40%); Risky Fat ($>40\%$)

Waist Circumference: Normal (≤ 35 inches); High Risk (>35 inches)

CHAPTER 5

DISCUSSION

The importance of this study is that it is the first of its kind, to the best of our knowledge, conducted within the continental United States examining the association between acculturation, and health and nutritional status of Haitian-American women. Acculturation was assessed via participant responses to questions such as self-identification, language spoken, years lived in the US, and food choice. Respondents were also asked about their social relations and attendance at Haitian cultural events as Haitians living in the US. Respondents' level of acculturation was assessed using selected individual variables from those mentioned above. Despite our small sample size an acculturation score was also created to assess the level of acculturation of our participants. Based on our acculturation score, we have found that participants who were moderately acculturated or acculturated had poor health indicators compared to those who had low acculturation. This is similar to findings by Kandula et al. who examined the associations between acculturation and diabetes among a multi-ethnic group⁽⁴²⁾. The authors found that Hispanics of non-Mexican origin with high levels of acculturation were more likely to be diabetic while those of Mexican origin were more likely to be diabetic at lower levels of acculturation⁽⁴²⁾. We have found that depending on the health and nutritional outcome being considered among Haitian-American women living in the US, acculturation may have either negative or positive influence.

The literature shows an association between acculturation, health status and dietary habits among immigrants of diverse ethnic background ^(13-17, 43-45). In a study by Franzen et al, the authors found that migration to a new country as well as changes in surroundings influenced one's dietary habits ⁽⁴⁴⁾, which is confirmed by findings from the present study.

Time in the US

Compared to women who identified themselves as Haitian, those who identified themselves as Haitian-American were more likely to have higher blood pressure an indication of the negative association influence of acculturation on health. However, more years in the US did not appear to increase blood pressure of participants as a higher proportion of those who have been in the US for less than 5.0 years (less acculturated in terms of time in the US) had blood pressure and blood glucose levels in the hypertensive and diabetic ranges, respectively. Also, participants who have been in the US for less than 5.0 years tended to be obese and to have body fat percent in the risky body fat range than those who have been in the US for more than 15.0 years (more acculturated in terms of time). This finding supports earlier research among Korean Americans in which the authors found an inverse association between length of residence in the United States and digestive diseases, an indication of the positive influence of acculturation on health ⁽¹⁶⁾. Eamranond et al. observed increased risk of hypertension, hypercholesterolemia and diabetes among Hispanics who have lived in the US for less than half their life compared to their US-born counterparts ⁽³⁹⁾. In the same study by Eamranond et al., among Hispanics in the United States they found that cardiovascular disease risk increased for foreign-born Hispanics who have lived in the United States for less time compared to

their US born and other foreign-born counterparts who have lived in the US for longer duration ⁽³⁹⁾, which is supported by the current study. In another multiethnic study, Moran et al., reported increased risk for hypertension with more time spent in the US compared to less time in the US ⁽⁴⁶⁾. A related study by Mooteri et al. also reported an increased risk of cardiovascular disease with time spent in the US, especially for Indians who have lived in the US for > 20 years ⁽⁴⁷⁾ an indication of the negative influence of acculturation. These observations go to show the inconsistencies in the association between acculturation and health outcomes or disease risk. These inconsistencies may be due to race/ethnicity, genetics and environmental exposures in the country of origin and their individual interaction with the new environment they find themselves.

Nutrition Transition

Nutrition transition in Haiti as well as migration to the US may play a large role in our findings of the negative influence of acculturation on disease risk among the less acculturated immigrant population. Because westernized food items have spread to even the poorest of developing countries in addition to the poor access and health seeking behavior ⁽⁴⁸⁾, the risk of chronic disease development may be increasing in countries such as Haiti. Although food items are scarce and poverty rates are high ^(1, 3), those with purchasing power are likely to consume non-traditional food items (i.e. processed foods) to show economic status thereby increasing their risks of chronic diseases. Likewise, migration to a country with endless access to food items at low prices such as the US can lead to over consumption in the first few years after migration ⁽⁴⁴⁾. These therefore may account for the increased risk of high blood pressure, high blood glucose levels and excess body fat observed among our study participants who have lived in the US for a

shorter period. In the study by Franzen et al, participants who had left Laos/Thailand and migrated to the US reported purchasing and consuming food items regardless of satiety compared to when they were in their home country ⁽⁴⁴⁾.

Language Proficiency

Language proficiency as an indication of one's level of acculturation has also been reported to influence health status. In our study, participants who spoke English in combination with the primary languages (the more acculturated group in terms of language) were in the high risk categories for BMI. These findings are supported by Lopez-Quintero et al who examined the relation between proficiency in the English language and physical activity and diet among Hispanics adults ⁽⁴⁹⁾, and found obesity to be dominant in Hispanics with high English proficiency.

Body Mass Index and Body Fat Percent

Another interesting finding from the current study has to do with participant BMI and percent body fat. Participants who had a normal BMI had an excess body fat or a risky BF%. This observation of individuals of normal BMI having excess percent body fat is defined as normal weight obesity by Romero-Corral et al ⁽⁵⁰⁾. Their study examined the risks associated with normal weight obesity in a multi-race group of 6171 participants. Normal weight obesity was defined as normal BMI (18.5-24.9 kg/m²) and an excess body fat as BF% of >23.1% in men and >33.3% in women. Romero-Corral et al. reported that women who were considered to be normal weight obese had a higher risk for cardiovascular death ⁽⁵⁰⁾.

Seventh-Day Adventism

Almost all of our participants (72 of 81) were of the Seventh-Day Adventist denomination. One of the core beliefs of this religious group is to live a healthy lifestyle through diet and physical activity ⁽⁵¹⁻⁵⁴⁾. Certain items such as pork and crustaceans, tobacco, and alcohol are prohibited, while the abstinence from other foods such as all meats, and caffeinated beverages and foods are encouraged ^(51, 52, 54). One of the largest studies done on this group, the Adventist Health Study, a prospective cohort study lasting 6 years consisted of approximately 34,000 Caucasian Seventh-Day Adventists in Loma Linda, California ⁽⁵²⁾. The goal of that study was to examine the association of chronic disease and lifestyle amongst the population ^(52, 54). Findings from that cohort study revealed that there is a low risk of chronic disease in the Seventh-Day Adventist population. However, our findings do not support this. Most of the Seventh-Day Adventists in our study had higher blood pressure, blood glucose, BMI, BF%, and lower blood hemoglobin. This difference may be attributed to the cultural differences within the two populations (Haitians versus non-Haitians). Over half of our study participants reported eating traditional Haitian foods either often or very often. Although both groups follow the same guidelines as far as what to eat, the preparation methods of our Haitian-American population, influenced by their Afro-Caribbean culture which includes a consumption of high fat, high sodium foods, may possibly have contributed to an increase in the measured outcomes as proxies for various chronic diseases not seen in their Caucasian counterparts as reported by Beeson et al ⁽⁵²⁾ and Mills et al ⁽⁵⁴⁾.

CHAPTER 6

LIMITATIONS

There were several limitations to this study. First of all, the sample size estimation of 180 was not attained and may have led to the lack of statistical significance in our results. Due to the cross-sectional study design we cannot talk about causation but association between acculturation and the health indicators measured. Secondly, some of the information/data collected about the participants were self-reported and recalled from many years past. It is possible that food habits were over- or understated, thus impacting our results. In addition, our study used random blood sugar testing which could have led to the higher prevalence of participants having diabetic-level results for blood glucose. Finally, because of the use of convenience sample and that the majority of the population were Seventh-Day Adventist Haitian-Americans, findings may not be representative of the entire Haitian-American population, and may limit the generalizability of our results. Thus, caution should be used when interpreting the results.

CHAPTER 7

CONCLUSION AND RECOMMENDATION

The literature on Haitian-Americans in general is very limited. From this study we were able to assess the association between acculturation on and a number of health indicators, such as hypertension and diabetes in Haitian-American women living in the Greater Atlanta Metropolis and Central Florida areas. Although the association between acculturation and the health indicators (blood pressure, blood glucose, body mass index, body fat percent and blood hemoglobin) were not statistically significant, our results may help to shed light in explaining the decline in health in Black America today – specifically Black immigrants in which Haitian-Americans are part. Future studies with adequate sample size are recommended and should include Haitian-American males. These studies may not only lead to identifying as well as understanding factors contributing to the poor health of migrants and minorities in the US, but it may also contribute to the development of appropriate and cultural specific health education programs targeting these populations who have not been previously studied.

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APPENDIX A

A TRADITIONAL HAITIAN MEAL

A Traditional Haitian Meal

Desilets et al. (4)

White rice with sauce made from fried red meat (or fish or poultry depending on the socio-economic level of the family) which is mixed with vegetables (onions, tomato fresh and/or paste, green pepper, garlic, oil and broth)

The rice dish is habitually served with a puree of red or black beans called *sauce-pois* (or beans mixed and cooked with rice – *riz-collé*)

The rice dish is sometimes accompanied by non-fried tubers

The most common beverages are water and fruit juice (or fruit drinks)

Desserts, if eaten at all, are mostly fruits

APPENDIX B

INFORMED CONSENT FORM

INFORMED CONSENT FORM
Department of Foods and Nutrition
University of Georgia, Athens

Study Title: The effects of acculturation on the health and nutritional status of Haitian-American mothers

Principal Investigator: Alex Anderson, PhD, MPH

Purpose of Study

I am being asked to participate as a subject in a research study from the Department of Foods and Nutrition, University of Georgia. The purpose of this study is to evaluate the effects of acculturation on my health and nutritional status.

Study Procedure

If I choose to participate, the evaluation will take place on the same day that I have given my consent. This will involve an interview in the language of my choice (English, French, or Creole) and body composition measurements of me. I can refuse to participate in any of the tests listed in the consent form.

The Body Composition and Health Status Measurements to be made

Weight, height, percent body fat and body mass index: These measurements will be taken in duplicates using the SECA SENSE 804 Scale and the SECA Stadiometer during my evaluation.

Waist and hip circumference: These measurements will be taken using a non-elastic tape measure during my evaluation

Blood Pressure: My blood pressure will be measured in duplicates using the Reli On-Easy Wrap Automatic Blood Pressure Monitor

Fasting blood glucose and blood hemoglobin: My fasting blood glucose and blood hemoglobin

If I agree to participate, I would be evaluated in the language of my choice (English, French or Creole) on the same day of signing the consent form. I will be asked questions that will assess my health, lifestyle and dietary habits as well as the socioeconomic condition of my household. I will also be asked questions about my participation in food assistant programs. My interview will be followed by anthropometric (weight, height, waist circumference, hip circumference), blood pressure, blood glucose and blood hemoglobin measurements. My weight, height, percent body fat and body mass index will be measured using the SECA SENSE 804 Scale and the SECA Stadiometer while my waist and hip circumference will be measured using a non-elastic tape measure. My waist and hip circumference will be measured using a non-elastic tape measure. I expect

that the interview will take about 30-45 minutes while the body composition measurements will take about 20-30 minutes of my time.

Benefits

All participants will be provided with the results of all measurements taken at the end of the body composition measurements. Finding from this study may be used to design culturally appropriate interventions to improve health and nutritional status of Haitian-American mothers.

Economic Considerations

I understand that there will be no compensation for my time upon completion of the interview and all measurements.

Confidentiality

All the information collected through this project will be kept in a secure place at the Department of Foods and Nutrition, University of Georgia. Only highly trained staff members working for the research project will have primary access to this information. The researchers will not use my name, address, telephone number or any other identification information in any publications or reports of this project, my identity will remain completely confidential.

Risk and Discomforts

There are no foreseeable risks or discomforts associated with participating in this research study. Should I become uncomfortable at any stage during the body composition measurements, I will make sure to verbalize this to the investigator and the measurements will be discontinued immediately on request until I am able to continue.

My Participation

My participation in this study is completely voluntary, and I do not have to answer questions I do not wish to. I am free to withdraw from the study at any time. If I choose not to participate, it will not affect me or my family in any way or form. There will be no cost to me for participating in this study regardless of the length of time I choose to participate.

Questions?

If I have any questions or concerns, I will contact the principal investigator of this study Dr. Alex Anderson at (706) 542-7614.

If I have further questions about this project or if I have a research-related problem, I may contact the principal investigator, (Dr. Alex Anderson at 706-542-7614). If I have any questions concerning my rights as a research subject, I may contact the University of Georgia Institutional Review Board (IRB) at (706)-542-3199; Email IRB@uga.edu. An IRB is a group of people that review research studies and protects the rights of the people involved in research.

Authorization:

I have read this form and decided that I, _____
(*name of participant*)

will participate in the project described above. Its general purposes, the particulars of involvement and possible risks and inconveniences have been explained to my satisfaction. My signature also indicates that I have received a copy of this consent form.

Signature of participant: _____

Date: _____

Signature of PI: _____

Printed name of PI: _____

APPENDIX C

HAITIAN-AMERICAN NUTRITION ACCULTURAION (HANA) SCALE



HAITIAN-AMERICAN NUTRITIONAL ACCULTURATION (HANA) SCALE

Hello my name is *** and I am working with the Nutrition Department at the University of Georgia. We are conducting this study to find the effects of acculturation on the nutritional and health status of Haitian-American women.

Demographics/ Ethnicity (culture/background)

1. How old are you?

2. How do you identify yourself?

₁ Black

₂ Haitian

₃ Haitian-American

₄ African-American

₅ Other (please specify) _____

₆ Refuse

3. What generation are you?

₁ 1st generation American (I was born in Haiti and migrated to the United States)

₂ 2nd generation American (My parents were born in Haiti but I was born in the United States)

₃ 3rd generation American (My grandparents were born in Haiti but my parents and I were born in the United States)

4. Where were you born?

City: _____ State: _____ Country: _____

5. Where do you reside?

City: _____ State: _____

6. How long have you lived in the United States?

_____ Months

_____ Years

7. Did you vote in the last U.S. national or local election?

₁ Yes

₂ No

₃ Don't know

8. Where was your father/mother born?

Father _____

Mother _____

9. Do you follow a specific religion?

₁ Yes, (please specify) _____

₂ No

10. Do you attend church?

₁ Yes

₂ No, (go to question #12)

11. What language is spoken there?

₁ English

₂ Creole

₃ French

₄ All

₅ Other (please specify): _____

12. How many children do you have? _____

13. Where were your children born (please specify where each was born)?

14. Do you attend Haitian cultural events (e.g. concerts, carnival, flag day, etc.)?

₁ Often

₂ Sometimes

₃ Rarely

₄ Never attend cultural events

15. It would bother me to live in an area where there aren't many Haitians

₁ Yes

No

Language Use

16. What language(s) do you usually speak?

17. Do you speak any language better than another?

18. What language do you normally speak with your friends?

- Creole
- French
- English
- All

Education, Employment & Marital status

19. What is your current marital status?

- Single/no partner
- Married
- Separated
- Divorced
- Widowed
- Living together (not married)
- Other, (please specify) _____

20. What is the last grade of school you completed?

- No formal schooling
- Eighth grade or less/primaire ou moins
- Some high school
- High school graduate or GED/fini bacheloreate
- Trade or technical training/l'ecole professionnel
- Some college
- Finished 4 years of college/fini l'université
- Other, (please specify) _____

21. Which of the following best describes your current employment status?

- ₁ Working full-time, 35 hours or more a week
- ₂ Working part-time, less than 35 hours a week
- ₃ Unemployed or laid off and looking for work
- ₄ Unemployed and not looking for work
- ₅ Homemaker: who provides the monetary support
for you and/or your family? _____
- ₆ In school/student
- ₇ Retired
- ₈ Disabled, not able to work
- ₉ Something else? (please specify) _____

22. What is the total amount of money your household (includes everyone who lives with you and contributes financially) receives **per month** from employment and government assistance?

- ₁ \$0-500
- ₂ \$501-1000
- ₃ \$1001-1500
- ₄ \$1501-2000
- ₅ More than \$2000

Dietary Pattern (foods you eat)

23. What type of foods do you eat mostly of?

- ₁ Only Haitian
- ₂ More Haitian than American
- ₃ Equal amounts of Haitian and American
- ₄ More American than Haitian
- ₅ Only American

24. Do you or anyone in your household currently receive any of the following assistance from the government?

- ₁ TANF (cash only)

- ₂ School Lunch
- ₃ School Breakfast
- ₄ Food Bank/Pantries
- ₅ Soup Kitchens
- ₆ Summer school food program
- ₇ S. S. I
- ₈ Title 19/Medicaid
- ₉ Meals on Wheels
- ₁₀ WIC
- ₁₁ Food Stamps
- ₁₂ Emergency Food Assistance
- ₁₃ Does not apply

TANF- *Temporary Assistance for Needy Families*

SSI-*Supplemental Security Income- makes payments to people with low income who are age 65 or older or are blind or have a disability*

Title 19- *Medicaid*

25. Have you or anyone in your household ever received any of the following assistance from the government?

- ₁ TANF (cash only)
- ₂ School Lunch
- ₃ School Breakfast
- ₄ Food Bank/Pantries
- ₅ Soup Kitchens
- ₆ Summer school food program
- ₇ S. S. I
- ₈ Title 19/Medicaid
- ₉ Meals on Wheels
- ₁₀ WIC
- ₁₁ Food Stamps
- ₁₂ Emergency Food Assistance
- ₁₃ Does not apply

26. Do you prepare traditional Haitian food in your household?

- ₁ Yes
- ₂ No, (specify type of meals prepared) _____

- 27.** Do you serve traditional Haitian food in your household?
- ₁ Yes
 - ₂ No, (specify type of meals served) _____
- 28.** During the week, how often do you eat traditional Haitian food?
- ₁ Very Often
 - ₂ Often
 - ₃ Somewhat Often
 - ₄ Rarely
 - ₅ Never
- 29.** Do you usually cook at home?
- ₁ Yes
 - ₂ No, (specify where you receive your meals) _____
- 30.** Do you usually shop for foods for your household?
- ₁ Yes
 - ₂ No, who does? _____
- 31.** How many times per week do you eat out?
- ₁ Less than once/week
 - ₂ Once/week
 - ₃ Twice/week
 - ₄ More than twice/week, (please specify) _____
 - ₅ Never eat out
- 32.** How often do you eat at fast food restaurants?
- ₁ Very Often
 - ₂ Often
 - ₃ Somewhat Often
 - ₄ Rarely
 - ₅ Never
- 33.** Are you on a special diet? (low fat, low sodium, vegetarian)
- ₁ Yes
 - ₂ No, (go to question #36)
- 34.** What type of diet is this? _____

35. How long have you been on this diet? _____

Infant Feeding Practice

36. Were you breastfed as an infant?

- ₁ Yes
- ₂ No
- ₃ Don't know

37. Have you heard about Exclusive Breastfeeding?

- ₁ Yes, Where? _____
- ₂ No, (go to question #39)

38. How would you define Exclusive Breastfeeding?

39. Were you exclusively breastfed?

- ₁ Yes
- ₂ No, (go to question #41)
- ₃ Don't know, (go to question #41)

40. How long were you exclusively breastfed? _____

41. How were your children fed when they were infants?

- ₁ Exclusively Breastfed (breastmilk as the only food or fluid given to the child until 6 months)

Number of children exclusively breastfed _____

- ₂ Breast and Formula feeding

Number of children breast and formula fed _____

- ₃ Formula feeding only

Number of children formula fed only _____

42. If you did not exclusively breastfeed or exclusively formula feed your children, what proportion of their nutrition came from breastmilk? _____ %

43. How old were your children when you first introduced foods other than breastmilk or formula? _____

44. How long did you breastfeed your children?

45. If you had children born both in Haiti and in the United States, was there a difference in how you fed them as an infant?

- ₁ Yes
- ₂ No, (go to question #47)
- ₃ Does not apply, (go to question #47)

46. If you answered yes to the above question, please select all that applies in the following

- ₁ Those born in Haiti were breastfed exclusively
- ₂ Those born in the United States were breastfed exclusively
- ₃ Those born in Haiti were breastfed and formula fed
- ₄ Those born in the United States were breastfed and formula fed
- ₅ Those born in Haiti were only formula fed
- ₆ Those born in the United States were only formula fed

47. If applicable, when you stopped breastfeeding your children, what made you stop?

48. If you did not breastfeed your children at all, what made you decide NOT to breastfeed them (if response is “I did not want to or did not feel like it” probe for a more specific answer)?

In Haiti

49. Were you advised to breastfeed your children during prenatal visits?

- ₁ Yes
- ₂ No
- ₃ Does not apply

50. Were you advised to breastfeed at the hospital where you delivered your child?

- ₁ Yes
- ₂ No
- ₃ Does not apply

51. Were you advised to bottlefeed at the hospital when you delivered your child?

- ₁ Yes
- ₂ No
- ₃ Does not apply

In the United States

52. Your children that were born in the United States, were you advised to breastfeed them during prenatal visits?

- ₁ Yes
- ₂ No
- ₃ Does not apply

53. Were you advised to breastfeed at the hospital where you delivered your child?

- ₁ Yes
- ₂ No
- ₃ Does not apply

54. Were you advised to bottlefeed at the hospital when you delivered your child?

- ₁ Yes
- ₂ No
- ₃ Does not apply

Dietary Habits

55. In the following box, please fill in the number of meals, the time of the day and the location that you have your meals:

	# of times per week	Time of the day	Place
Breakfast			
Lunch			
Dinner			
Snacks			

Eating out			
# of Snacks/day			

56. What is your biggest meal during the day?

- ₁ Breakfast
- ₂ Lunch
- ₃ Dinner

57. If born and raised in Haiti, what was your biggest meal during the day?

- ₁ Breakfast
- ₂ Lunch
- ₃ Dinner
- ₄ Don't remember
- ₅ Does not apply

Nutrition Knowledge

58. Have you received nutrition education before?

- ₁ Yes
- ₂ No (go to question #60)

59. From whom did you receive nutrition education?

- ₁ Doctor's office
- ₂ WIC
- ₃ Relative
- ₄ School
- ₅ Other, (please specify) _____

60. Do you know what the Nutrition Food Label is?

- ₁ Yes
- ₂ No (go to question #65)

61. Do you know how to use the Nutrition Food Label?

- ₁ Yes
- ₂ No

62. How comfortable do you feel using the Nutrition Food Label?

- ₁ Very comfortable
- ₂ Comfortable
- ₃ Somewhat comfortable
- ₄ Not comfortable at all

63. Do you look at the Nutrition Food Label when you go shopping for food?

- ₁ Yes
- ₂ No

64. What kind of things do you look for on the Nutrition Food Label?

- ₁ Fat
- ₂ Sugar
- ₃ Salt
- ₄ Cholesterol
- ₅ Ingredients, (specify) _____

- ₆ Other, (specify) _____

Food Preparation Skills-How do you usually/currently prepare the following meals (please select all that apply)?

65. Di riz collé a pois (Rice and Beans)

- ₁ Graisse/l'huile vegetable (Vegetable oil)
- ₂ Graisse/l'huile cochon (Lard)
- ₃ L'huile d'olive (Olive oil)
- ₄ Peanut oil
- ₅ Canola oil
- ₆ Beurre (Butter)
- ₇ Lait cocoyé (Coconut milk)
- ₈ Maggie (Bouillon cubes)
- ₉ Sel (Salt)

₁₀ Herbs, type: _____

66. Bouillons (Soup)

₁ Graisse/l'huile vegetable (Vegetable oil)

₂ Graisse/l'huile cochon (Lard)

₃ L'huile d'olive (Olive oil)

₄ Peanut oil

₅ Canola oil

₆ Beurre (Butter)

₇ Banann (Plantain)

₈ Malanga (Malanga root)

₉ Yam

₁₀ Pomme de terre (potatoes)

₁₁ Carrot

₁₂ Boy (Dumplings)

₁₃ Epinards (Spinach)

₁₄ Chou (Cabbage)

₁₅ Cresson (Watercress)

₁₆ Pois tendre (String Beans)

₁₇ Viande (Meat), type: _____

₁₈ Herbs, type: _____

67. Mais Moulin a sauce pois (Corn meal with bean sauce)

₁ Graisse/l'huile vegetable (Vegetable oil)

₂ Graisse/l'huile cochon (Lard)

₃ L'huile d'olive (Olive oil)

₄ Peanut oil

₅ Canola oil

₆ Beurre (Butter)

₇ Lait cocoyé (Coconut milk)

₈ Maggie (Bouillon cubes)

₉ Sel (Salt)

₁₀ Herbs, type: _____

68. Legume (Mixture of Vegetables)

- ₁ Graisse/l'huile vegetable (Vegetable oil)
- ₂ Graisse/l'huile cochon (Lard)
- ₃ L'huile d'olive (Olive oil)
- ₄ Peanut oil
- ₅ Canola oil
- ₆ Beurre (Butter)
- ₇ Beregene (Eggplant)
- ₈ Mirliton (Chayote Squash)
- ₉ Epinards (Spinach)
- ₁₀ Chou (Cabbage)
- ₁₁ Cresson (Watercress)
- ₁₂ Pois tendre (String Beans)
- ₁₃ Carrot
- ₁₄ Green papaya
- ₁₅ Viande (Meat), type: _____
- ₁₆ Herbs, type: _____

69. Poisson (Fish)

- ₁ Frit (Fried)
 - _{1a} Graisse/l'huile vegetable (Vegetable oil)
 - _{1b} Graisse/l'huile cochon (Lard)
 - _{1c} L'huile d'olive (Olive oil)
 - _{1d} Peanut oil
 - _{1e} Canola oil
- ₂ Kreyol (In sauce)
 - _{2a} Graisse/l'huile vegetable (Vegetable oil)
 - _{2b} Graisse/l'huile cochon (Lard)
 - _{2c} L'huile d'olive (Olive oil)
 - _{1d} Peanut oil
 - _{1e} Canola oil

70. Cochon (Pork)

- ₁ Griot (Fried)
 - _{1a} Graisse/l'huile vegetable (Vegetable oil)
 - _{1b} Graisse/l'huile cochon (Lard)
 - _{1c} L'huile d'olive (Olive oil)
 - _{1d} Peanut oil
 - _{1e} Canola oil
- ₂ A sauce (With sauce)
 - _{2a} Graisse/l'huile vegetable (Vegetable oil)
 - _{2b} Graisse/l'huile cochon (Lard)
 - _{2c} L'huile d'olive (Olive oil)
 - _{1d} Peanut oil
 - _{1e} Canola oil

<u>24 HR Recall</u>	
Breakfast	
Lunch	
Dinner	
Snacks	

Food Frequency Questionnaire

Haiti	How often did you eat...									
<input type="checkbox"/> Does not apply										
Did you eat...	Yes₁ or No₂	Rarely or Never	1 per mo	2-3 per mo	1 per wk	2 per wk	3-4 per wk	5-6 per wk	1 per day	2+ per day
71. Fruits (excluding juices)										
72. Sauce- Pois/pureed beans (france, noir, rouge ect.)										
73. Starchy vegetables (malanga, yam, patate douce, banann, corn, squash)										
74. Green leafy vegetables (lettuce, spinach, collard greens) raw										
Did you eat...	Yes₁ or No₂	Rarely or Never	1 per mo	2-3 per mo	1 per wk	2 per wk	3-4 per wk	5-6 per wk	1 per day	2+ per day
75. Legume (Mixture of Vegetables)										
76. Tomato and other vegetables (okra, beets, celery ect.)										

77. Bouillons (Soup)										
78. Soup Joumou (squash soup)										
79. Banann a oeuf (plantain and eggs)										
80. Milk, type of milk: whole, 2%, 1%, skim, soy	Type :									
81. Cheese										
82. Meats/Viande: Chicken, beef, pork, ham, goat, turkey veggie meat (if yes, write type of meat eaten)	Type :									
83. Breaded Meat already prepared frozen										
84. Fish and shellfish (salmon, tuna, red or yellow snapper, shrimp(krevette) , lambi)										
Did you eat...	Yes ₁ or No ₂	Rarely or Never	1 per mo	2-3 per mo	1 per wk	2 per wk	3-4 per wk	5-6 per wk	1 per day	2+ per day
85. Eggs										

86. Cakes, pastries										
87. Rice and Beans										
88. Mais Moulin a sauce pois (Corn meal with bean sauce)										
89. Pasta, breads, and breakfast cereals										
90. Regular soda										
91. Diet Soda										
92. 100% fruit juices										
93. Artificial drinks (Sunny Delight, Tang, Kool aid)										
94. Coffee										
95. Herbal teas										
96. Alcohol										
97. Water										
98. Snack foods (chips, cookies...)										

United		How often did you eat...
---------------	--	---------------------------------

States											
In the last year (12 months) did you eat...	Yes₃ or No₄	Rarely or Never	1 per mo	2-3 per mo	1 per wk	2 per wk	3-4 per wk	5-6 per wk	1 per day	2+ per day	Since you've lived in the United States, do you eat more, less or the same
99. Fruits (excluding juices)											
100. Sauce-Pois/pureed beans (france, noir, rouge ect.)											
101. Starchy vegetables (malanga, yam, patate douce, banann, corn, squash)											
102. Green leafy vegetables (lettuce, spinach, collard greens)											

raw											
103. Legume (Mixture of Vegetabl es)											
104. Tomato and other vegetabl es (okra, beets, celery ect.)											
105. Bouillon s (Soup)											
In the last year (12 months) did you eat...	Yes ₃ or No ₄	Rarely or Never	1 per mo	2-3 per mo	1 per wk	2 per wk	3-4 per wk	5-6 per wk	1 per day	2+ per day	Since you've lived in the United States, do you eat more, less or the same
106. Soup Joumou (squash soup)											
107. Bananna oeuf (plantain and eggs)											
108. Milk, type of milk: whole, 2%, 1%,	Type:										

skim, soy											
109. Cheese											
110. Meats/Vi ande: Chicken, beef, pork, ham, goat, turkey veggie meat (if yes, write type of meat eaten)	Type:										
111. Breaded Meat already prepare d frozen											
112. Fish and shellfish (salmon, tuna, red or yellow snapper, shrimp (krevette , lambi)											
113. Eggs											
114. Cakes, pastries											

115. Rice and Beans											
In the last year (12 months) did you eat...	Yes ₃ or No ₄	Rarely or Never	1 per mo	2-3 per mo	1 per wk	2 per wk	3-4 per wk	5-6 per wk	1 per day	2+ per day	Since you've lived in the United States, do you eat more, less or the same
116. Mais Moulin a sauce pois (Corn meal with bean sauce)											
117. Pasta, breads, and breakfast cereals											
118. Regular soda											
119. Diet Soda											
120. 100% fruit juices											
121. Artificial drinks (Sunny Delight, Tang, Kool aid)											

122. Coffee											
123. Herbal teas											
124. Alcohol											
125. Water											
126. Snack foods (chips, cookies ...)											

Anthropometrics/Body Composition

127. Height: 1st: _____ 2nd: _____ Mean: _____
128. Weight: 1st: _____ 2nd: _____ Mean: _____
129. Body Fat (%): 1st: _____ 2nd: _____ Mean: _____
130. Body Mass Index (BMI): 1st: _____ 2nd: _____ Mean: _____
131. Waist Circumference: 1st: _____ 2nd: _____ Mean: _____
132. Hip Circumference: 1st: _____ 2nd: _____ Mean: _____

Health Status

133. Have you ever been diagnosed with any of the following?

- ₁ High Blood Pressure
- ₂ Diabetes
- ₃ Gestational Diabetes

134. Where were you diagnosed?

135. How long have you been diagnosed?

- ₁ High Blood Pressure _____
- ₂ Diabetes _____

₃ Gestational Diabetes _____

136. Current status

₁ Blood Pressure _____

₂ Blood Glucose _____

₃ Blood Hemoglobin _____

137. How often do you exercise or participate in any form of physical activity?

138. How long are you exercising or participating in any form of physical activity?

APPENDIX D

COMMON HAITIAN AND AMERICAN FOOD ITEMS

Common Haitian Food Items		Common American Food Items	
Food	n (%)	Food	n (%)
Pureed Beans/Sauce Pois	78 (96.3)	Leafy Vegetables	78 (96.3)
Malanga, Yams, Plantains	75 (92.6)	Cheese	53 (65.4)
Legume (mixture of vegetables)	80 (98.8)	Breaded Meat	21 (25.9)
Bouillons (soup)	77 (95.1)	Cakes and pastries	62 (76.5)
Soup Joumou (squash soup)	70 (86.4)	Regular Soda	31 (38.3)
Plantain and eggs	58 (71.6)	Diet Soda	12 (14.8)
Rice and Beans	80 (98.8)	Pasta, Bread and Breakfast Cereals	74 (91.4)
Mais Moulin a sauce pois (corn meal and pureed beans)	71 (87.7)	Snack foods (chips, cookies)	58 (71.6)

APPENDIX E

HANA FLYER

Haitian-American Mothers Needed



The University of Georgia

- A study is being conducted by the the University of Georgia, Department of Nutrition on Haitian American mothers.
- We will be examining the effects of acculturation on diet and health status
- If you are between the age of 18 and 65, you may be eligible to participate
- Weight, Blood Pressure, Blood Glucose, Blood Hemoglobin will be measured for FREE at this study

If interested please contact:

Johane M. Filemon
407-616-1947
johanem@uga.edu

Dr. Alex K. Anderson
706-542-7614
anderson@fcs.uga.edu



APPENDIX F

BROCHURE OF MEASUREMENT GUIDELINES

If any of your results do not fall within normal ranges you should contact your physician for further advice.

<http://www.consumer.gov/weightloss/bmi.htm>

<http://www.consumer.gov/weightloss/bmi.htm>

www.americanheart.org

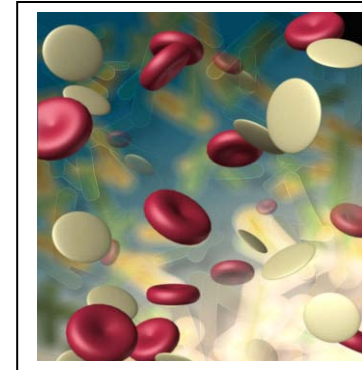
www.diabetes.org

<http://www.nlm.nih.gov/medlineplus/ency/article/003645.htm>



The University of Georgia •
Athens, GA 30602 | UGA
Directory Assistance
706/542-3000

Guidelines for All Measures



**University of Georgia
Department of Foods and Nutrition**

If any of your results do not fall within normal ranges you should contact your physician for further advice.

Percent Body Fat for Women

Risky (Low Body Fat)	<15%
Ultra Lean	15-18%
Lean	19-22%
Moderately Lean	23-30%
Excess Fat	31-40%
Risky (High Body Fat)	>40%

Your Results: _____

Body Mass Index (BMI)

<u>BMI</u>	<u>Classification</u>
18.5 or less	Underweight
18.5 – 24.9	Normal
25.0 – 29.9	Overweight
30.0 – 34.9	Obese I
35.0 – 39.9	Obese II
40 or greater	Extremely Obese

Your Results: _____

Blood Pressure Classification For Adults

Normal

Systolic: <120 mm/Hg
And
Diastolic: <80 mm/Hg

Pre-Hypertension

Systolic: 120-139 mm/Hg
Or
Diastolic: 80-89 mm/Hg

Stage 1 Hypertension

Systolic: 140-159 mm/Hg
Or
Diastolic: 90-99 mm/Hg

Stage 2 Hypertension

Systolic: 160 or higher
Or
Diastolic: 100 or higher

Your Results: _____

Waist Circumference for Women

Less than or equal to 35 inches

Your Results: _____

Blood Hemoglobin for Women

12.1 – 15.1 gm/dL

Your Results: _____

Blood Glucose

Before a meal

70-130 mg/dl

After a meal

Less than 180 mg/dl

Your Results: _____