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Immigration and obesity in African American adults residing in the United States

Julius N. Ade
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COLLEGE OF HEALTH SCIENCES

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Julius Ade

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2010

Abstract

Immigration and Obesity in African American Adults Residing in the United States

by

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MD, University of Padova Italy, 1997

MPH, New York Medical College, 2006

Dissertation Submitted in Partial Fulfillment of the

Requirements for the Degree of

Doctor of Philosophy

Public Health

Walden University

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Abstract

Obesity increases risk for heart disease, hypertension and other chronic diseases, and it affects minority ethnic groups disproportionately. However, it is unknown if African American immigrant adults, an increasing segment of the population, are at higher risk for obesity than African American non-immigrant adults residing in the United States. This study examined the association of obesity and immigrant status by comparing African American immigrant adults now residing in the United States to the general population of African American adults. The socio-ecological model provided the conceptual framework for this study. This study used a cross-sectional quantitative self-administered web-based survey to collect primary data on 303 adult African American immigrants and non-immigrants residing in the United States. Data were analyzed using EpiInfo statistical software. It was hypothesized that the risk of obesity in African American adults is associated with immigration status after adjusting for other factors. The data revealed no significant relationship between obesity and immigration status in African American adults. However, binge drinking and other variables were revealed to be risk factors for morbid obesity in African American immigrants. The results impact social change by demonstrating that obesity control programs targeted at African American immigrant communities should incorporate socio-ecological risk factors. Specific interventions that could be implemented should include screening for alcohol consumption.

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Dedication

I dedicate this dissertation to my Dad, William Chimalang Ade, in blessed memory and Mom, Janet Mambo Ade. No words can match the love and support you've given me.

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Many people have contributed to my work and thinking and I am grateful to them all. During this journey in conquest for this degree, there have been many challenges and temptations but success was in the Hands of the Lord by whom in his teachings I draw strength and have no fear for what man can do. "Thank you Lord Jesus."

Thanks to Dr. Rohrer for being so patient, relentless in putting me back on track, believing in me and giving me that re-assurance needed to rekindle my internal flame. You are and always will be my "True Mentor." Thanks to Dr. Schulze, Dr. Merchant and Dr. Nancy Rea, your guidance and support significantly helped me through this process.

My daughter and princess Kelly'Yvonne, my sons William and Jacques, and the love of my life Liliane Ade; your patience, support, encouragement and love are beyond description and I will never stop thanking you all. You believed in me and I did not let you down. I promised you and here is the delivery. Enjoy, let us all be glad and happy because this is a day that the lord has made (Psalm 118; 24).

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Chapter 1: Introduction to the Study

Obesity is epidemic among the African American community in the United States (Lutfiyya, Garcia, Dankwa & Young, 2008; Terrell, 2002). Despite the millions of dollars spent on research for obesity and weight loss, the obesity and overweight remains a major public health concern for adults and children living in the United States. The World Health Organization (WHO) adopted the criteria for body mass index (BMI) as the universal standard for defining overweight and obesity. WHO described obesity to a person with very high amount of body fat in relation to lean body mass. A BMI of less than 18.5 signifies malnutrition, from 18.5 to 24 signifies normal, from 25 to 29 signifies overweight, above 30 indicates obese, and above 35 indicates morbidly obese (WHO, 2004).

Obesity is a complex multifactorial chronic disease that develops from interaction of genotype and the environment. Although some studies suggest the integration of social, behavioral, cultural, and environmental factors as being the main contributing factors leading to obesity (Arif & Rohrer, 2005; Borders, Rohrer, Rohrer, & Cardelli, 2006; Elder, Lytle, et al., 2006; Ewing, Schmid, Killingsworth, Zlot, & Raudenbush, 2003; Fleury & Lee, 2006; Frank, Andresen, & Schmid, 2004; Rohrer, Rohland, & Denison, 2005; Sallis, Cervero et al., 2006), little research explains the development of obesity

Cases of obesity in the United States are increasing over the past 20 years. In 1991, four states reported obesity prevalence rates of 15-19% with no states reporting rates at or above 20%. In 2004, seven states reported obesity prevalence rates of 15-19%,

33 states had rates of 20-24%, and nine states had rates more than 25% (Centers for Disease Control [CDC], 2004). These statistics illustrate the growing rates of obesity, and call for more empirical research to counter the prevalence of obesity among U.S citizens.

According to CDC (2008), the government through the Healthy People 2010 national health program aims to reduce the prevalence of overweight and obesity among adults to less than 15% and among children and adolescents to less than 5%. It is in this context that the program targets all races in the U.S. population. While immigrants are the fastest growing segment of the U.S. population, little is known about obesity and the factors associated with immigrants becoming obese. Sanghavi, McCarthy, Phillips, and Wee (2004) used data from the Sample Adult Module of the 2000 National Health Interview Survey (NHIS), which associated the duration of residence to the prevalence of obesity among immigrant subgroups. Sanghavi et al. found a positive relationship between the number of years of U.S. residence among immigrant subgroups and the BMI of those sub-groups. Self-reported diet and exercise were the two main factors associated with immigrants' obesity in the United States (Sanghavi et al., 2004). This finding implies that obesity correlates to the practices of the U.S residents in general.

Little is known about the factors underlying the increase in overweight occurring between first and second generation among immigrants. Gordon-Larsen, Harris, Ward, and Popkin (2003) reported that obesity in the U.S. born and second generation immigrants is associated with longer U.S. residence and rapid acculturation of overweight behaviors such as diet, smoking, and inactivity of the U.S population. Studies

such as this one demonstrate that the relationship between recent immigration and obesity deserve further examination.

Understanding the impact of social inequalities particularly the incidence of obesity has become a major public health obligation in the new millennium. The continual rise in the prevalence of obesity in the U.S. is of concern to public health agencies because of its burden on the health of individuals and the national health care system.

Statement of the Problem

African American and Mexican American immigrants in the United States continue to experience a higher prevalence of obesity than non-Hispanic European American persons (Freedman, Khan, Serdula, Ogden, & Dietz, 2006). Although considerable epidemiological literature has reported on socio-cultural aspects of obesity in the U.S. (Kumanyika, 2007), much of it has been focused on diet and exercise in the general population of American adults (Carlos, Smit, Carter-Pokras, & Anderson, 2001). No research has examined African American immigrant residents in the United States. The immigrant population in the United States is increasing according to researchers (Passel & Suro, 2005); therefore, there is a need for more targeted and in-depth research investigating the risk factors for obesity in this population.

The degree to which immigration may independently affect obesity was assessed after adjusting for other factors such as income, physical activity, education, diet quality, mental distress, smoking, age, race/ethnicity, and gender. Finally the degree to which

immigration may independently affect morbidly obesity was assessed after adjusting for the same social, behavioral and demographic factors.

Nature of the Study

A quantitative, cross-sectional survey design was used to investigate the relationship between obesity and income in 303 adult African American immigrants living in the U.S compared to African Americans who are not immigrants. Adult African American participants were surveyed by a web-based internet survey.

Research Question and Hypothesis

The following research question and hypothesis guide the study on overweight and obesity among immigrants:

RQ₁. Is the risk of obesity higher among immigrant African American adults than among nonimmigrant African American adults after adjusting for other risk factors?

*H*₁₀: The risk of obesity in African American adults is not associated with immigration after adjusting for other factors.

*H*_{1a}: The risk of obesity in African American adults is associated with immigration after adjusting for other factors.

The Purpose of the Study

The purpose of this quantitative study using cross-sectional survey research was to discover the relationship between immigrant status and obesity in African American adults residing in the United States. This study used primary data on adult African American immigrants collected via self-administered web-based questionnaires. Physical

activity, income, gender, and other potentially confounding variables were adjusted during the analysis to isolate whether prevalence of obesity in African American adults could be explained by immigrant status.

Conceptual Framework

The conceptual framework for this study was based on the socio-ecological model supported by acculturation theory as an alternative explanation of behavioral change within a population. Significantly, the risk factors associated to obesity were reviewed in manner that relates to the acculturation of the immigrants to the practices and attitudes of the U.S population in general.

Socio-ecological Model

The socio-ecological model provided the conceptual framework for this study. Social ecological models acknowledge influences of various sectors that fosters' behavior change. The potential of behavior change within a population group is considered within the social context which includes family, friends, work, neighborhood associates, and community organizations (Fleury & Lee, 2006). This alternative approach to improve health behavior based on the socio-ecological model would improve health status in low income neighborhoods through positive social interaction, improvement in public transportation, and building recreation areas and facilities in order to increase physical activity and diet quality (Fleury & Lee, 2006; Sallis, Cervero, Ascher, Henderson, Kraft, & Kerr, 2006).

Acculturation Theory

The theory of acculturation suggests that the individual engages in new culture may necessarily lose the original culture. Park (2008) argued that acculturation happens when the exposure to the new culture is greater than the exposure of the original culture. Although the theory is widely used in empirical studies that relates to understanding behavior (Bickel, and Marsch, 2001), attempts to use the theory remains with limited success in explaining variations of health impact among the Mexican American in the U.S. (Abraido, Armbrister, Florez, & Aguirre, 2006). Significantly, the poverty, inadequate access to health care, and discrimination are factors that confronted Mexican American deterring health situation in the U.S. (Abraido et al., 2006). These authors concluded that in order to understand how acculturation might affect health of Mexican American in the U.S., a multidimensional and more comprehensive public health research agenda on acculturation and health which incorporate and expand on social and behavioral science across disciplinary boundaries is required.

Acculturation is a proxy for other variables such as physical activity, diet, and smoking which have relative impact on health of immigrants in the U.S. As used in the study, this theory assumed that income influences contextual variables as well as eating habits and lifestyles which increase the possibility that immigrants may become obese or morbidly obese over a 10-year period as they become assimilated into the general population (Gordon-Larsen et al., 2003). However, experience with public clinics serving immigrants suggests that immigrants are at greater risk of obesity than the general population of African Americans. More research was needed to clarify the risk factors for

obesity in immigrants and how they differ from the general population of African American adults.

Risk Factors and Obesity

Other risk factors such as income, age, and gender may confound the relationship between immigrant status and obesity. Sheehan et al. (2003) conducted a study on weight change for African Americans and European Americans over a twenty20-year period. The variables age, gender, and race were examined to associate its impact to the rate of weight gain among American. The scientific samples of 5,117 Americans, ages 25-74 years in 1971, were followed for 20 years. The longitudinal study, conducted over a 20 period, provides comprehensive information on weight gain among adult Americans . The study concluded that gain weight of Americans is at peak during the middle age and losses weight during old age. According to findings in this study, African American women observe weight gain pattern that illustrates at faster rate at young age and easily losses weight earlier than European American counterpart. A 7.7 kg. weight gain was recorded in European American women between ages 25-35 years over a 20 year period while European American men gained 7.3 kg in that same time period. The youngest African American women gained 10.9 kg while the younger African American men gained 8.2 kg. European American men and women 36-47 years gained 4.5 kg. On the other hand, African American men and women 36-47 years of age showed similar trends as the white subjects. European American 48-60 years old leveled off, with men gaining 0.5kg and women gaining 0.9 kg. African American in the 48-60 age groups still losing

weight, while European American were stable. African American women lost 5.0 kg while African American men gained 2.7 kg.

Ogden et al. (2006) conducted a similar study on the prevalence of overweight and obesity in the U.S. with the main objective to provide the current estimates of prevalence and trends of overweight in children and adolescents and obesity in adults. Analysis in height and weight measurements from 3,958 children and adolescents aged 2 to 19 years and 4,431 adults aged 20 years and older obtained in 2003-2004 formed part of the National Health and Nutrition Examination Survey (NHANES). Data from the NHANES obtained in 1999-2000 and in 2001-2002 were compared with data from 2003 to 2004. The study concluded that the prevalence of overweight among children and adolescents and obesity among men increased significantly during the 6 year period from 1999 to 2004.

In conclusion, while acculturation theory suggests new immigrants might have lower rates of obesity and associated risk factors than the general population of African American adults, this health issue requires additional research before the causes of obesity in immigrants can be understood and addressed. Low income, gender, and age may prove to be more important risk factors for obesity than immigrant status. Guided by the socio-ecological model, this study analyzed the independent effects of these potential risk factors as well as their interactions to advance understanding of the determinants of obesity in this vulnerable population.

Definition of Terms

Socioeconomic Status: a combination of variables including occupation, income, education, wealth and place of residence.

Overweight, Obesity and Morbid Obesity: labels for ranges of weight that are greater than what is generally considered healthy for a given height. The terms also identify ranges of weight that have been shown to increase the likelihood of certain diseases and other health problems.

Behavioral Risk Factor Surveillance System (BRFSS): the world's largest, on-going telephone survey system, tracking health conditions and risk behaviors in the United States yearly since 1984 (CDC 2008).

Body Mass Index (BMI): Body mass index (BMI) is a number calculated from a person's weight and height. BMI is a reliable indicator of body fatness for people. BMI does not measure body fat directly, but research has shown that BMI correlates to direct measures of body fat, such as underwater weighing and dual energy x-ray absorptiometry (DXA). BMI can be considered an alternative for direct measures of fat (CDC, 2008). The BMI Formula is expressed as $\text{weight (kg)} / [\text{height (m)}]^2$. With the metric system, the formula for BMI is weight in kilograms divided by height in meters squared. Since height is commonly measured in centimeters, divide height in centimeters by 100 to obtain height in meters.

Immigrant Status: Persons born in the U.S. territories or who became U.S. citizens by naturalization. Foreign birth is birth place either in a U.S. territory or outside of the United States. All naturalized citizens, legal permanent residents, undocumented

immigrants, and non-immigrants (students, guest workers) fall in foreign born category. U.S. or native born refers to individuals born in the 50 contiguous states and the District of Columbia (Deepika & Egede, 2007).

African American Immigrants: People from the South of Sahara, Black Caribbean and Black people of Australian Aboriginal ancestry.

Built environment: Metropolitan areas, as defined by the U.S. office of Management and Budget, consist of one or more counties having a degree of economic and social integration with one another (Ewing, Schmid, Killingsworth, Zlot & Raudenbush, 2003).

Acculturation: The process by which individuals adopt the attitudes, values, customs, beliefs, and behaviors of another culture (Abraido et al., 2006).

Insurance Coverage: Health insurance is defined as government insurance, private insurance, and no insurance. Source of care is defined as having a source of health care when sick (Deepika & Egede 2007).

Smoker: Categorized as current smoker, former smoker, or never smoked. A current smoker is someone who smokes at least 100 cigarettes in their lifetime and is currently smoking (Deepika & Egede 2007).

Limitations of the Study

Data on immigrant health in the United States are difficult to find in the medical literature even though millions of visitors for tourism, education, business, or a better way of life arrive in the United States every year (Hunter College/City University of New York, 2010). Undocumented immigrants may be reluctant to participate in surveys

because of fears about deportation. Selection bias could result from nonparticipation. The target population for this study is African American adults residing in the United States. Self-reported information may have been subject to recall bias. Participants might not have been honest in their response to survey questions. Age and gender variables might have been under represented or over-represented in the study. Participants might not have been literate enough to answer correctly all questions in survey. Results of the study were generalized to internet users only.

The data were cross-sectional and thus cannot permit drawing causal conclusions. However, use of cross-sectional surveys for identification of potential risk factors is a standard public health practice (Andresen et al., 2004; Arif & Rohrer, 2005; Denison et al., 2006; Ewing et al., 2003; Frank, Andresen, & Schmid, 2004; Pierce, Rohrer, Denison, & Arif, 2007). Findings should be confirmed with longitudinal studies.

Significance and Scope of the Study

Health policy experts have recently raised awareness about the severe health and economic consequences of growing rates of obesity in America. The political debate on obesity is minimal and there are no clear data whether Americans support obesity-related policies. Americans express relatively low support for obesity targeted policies (Trust for America's Health, 2009) and view obesity as resulting from individual failure rather than environmental or genetic consequences (Speakman, 2004). This study helped identify issues affecting immigrant groups to design intervention programs and policies that help reduce obesity rates in this ethnic group. The population of African American immigrants in the U.S. is growing. In studying if they are at risk of developing the same health

problems as their African American counterparts, it is beneficial in designing obesity educational preventive programs targeting this ethnic group.

Federal and state programs currently seek to address the obesity epidemic in the United States through a broad range of interventions which include publicly funded scientific research to examine the biomedical mechanisms of weight control. Other interventions include food labeling and nutritional regulations to help consumers make healthy food choices, educational programs to improve the public's awareness of healthy diet choices and the importance of physical activity. The ultimate goal for this survey research study will be an increase in healthy behavioral habits in African American immigrants which will reduce frequent health care usage by overweight and obese patients.

Summary

This study investigated the relationship between obesity and immigrant status in African American adults residing in the U.S. The overall goal of this research is to provide insight on pitfalls and other variables which could aid in the design of community health programs targeted at the immigrant population. Chapter 2 provides a review of the current literature associated with an overview of obesity research in immigrant population; the gaps related to research in the African American immigrant population; and links between obesity and age, gender, race/ethnicity and socioeconomic factors. This chapter provides a description of the conceptual framework of the study based on the socio-ecological model and a competitive approach based on acculturation theory. Chapter 3 describes the research design, target population, sampling procedures,

study participation criteria, measurement, data collection and analysis, and the ethical consideration involved in the study. Chapter 4 presents the results of data analyzed in the study. Chapter 5 provides the summary conclusions and recommendations of the study.

Chapter 2: Literature Review

According to the WHO, obesity is one of the 10 most preventable health risks. With diet, exercise, and other lifestyle changes, the obesity epidemic can be lessened. Almost 1.2 billion people in the world are overweight and at least 300 million of them are obese (Wilborn, Beckham, Campbell, Harvey, Galbreath, La Bounty et al., 2005). This health problem is blamed primarily on a global shift in diet towards increased fat, salt, and sugar intake. A secondary factor is the decreasing trend in physical activity, an increase in the sedentary nature of modern work and transportation, and an increase in urbanization (Frank et al., 2004).

Migration is not identified only with mere movement of people from one nation to another but involves change in residence, the break of home ties, and a symbiotic rather than a social relationship (Park 2008). This migration resulted to acculturation of values and behaviors that predominantly affect the health of the immigrants. Sanghavi et al. (2004) reported that one indication of acculturated values is diet—namely, in other parts of the world, obesity is lower than it is in the United States, suggesting that diet is healthier in those regions.

Obesity and its health effects are more prevalent in African Americans than in other immigrant groups (Lutfiyya, Garcia, Dankwa, Young, & Lipsky, 2008), and affects both sexes. The highest prevalence of obesity has typically been in the African American adult population (Wyatt, Winters, & Dubbert, 2006). In the last decade, however, there has been an increase numbers of obese children in this ethnic group (Lutfiyya, Garcia,

Dankwa, Young, & Lipsky, 2008; Terrell, 2002). These findings reflect the need for empirical research on the health status of immigrants.

Kendal (2001) reported that 61% of American adults are now overweight. This figure is alarming since health experts estimated that obese people have a 50% to 100% increased risk of death from all causes, compared with those who are non-obese (Kendall, 2001). Overweight adults are at greater risk of early mortality associated with acute and chronic medical conditions (Kendall, 2001). Overweight and obesity and their associated health problems have a significant economic impact on the U.S. health care system (USDHHS, 2001; Wang et al., 2008). Morbidity and mortality costs cause unproductiveness, restriction of activities, and absenteeism. In the study of national costs attributed to both overweight and obesity, medical expenses accounted for 9.1% of total U.S. medical expenditures in 1998 and may have reached as high as \$78.5 billion (Finkelstein, Fiebelkorn, & Wang, 2003; Finkelstein, Ruhm, & Kosa, 2005). This figure warrants the need to investigate overweight and obesity among African American immigrants in the U.S.

This review contains eight major sections on overweight and obesity—particularly on the obesity rates among Hispanic American immigrants. The review also includes a summary of the socio-ecological model of health as applied to obesity. This review will illustrate the gap in research on the obesity rates among immigrant populations other than African American immigrants.

The articles for this literature review were retrieved from Walden University online University library databases which include CINAHL Plus with Full Text,

Academic Search Premier, Medline, PsycINFO, Health and Medical Complete, Health Sciences, A SAGE Full Text Collection, and Journal of the American Medical Association. Search databases included PubMed, Center for Disease Control and Prevention, and Institute of Medicine. Each database was searched using keywords *obesity* and *BMI*. The BOOLEAN operator “and” was included followed by socio-demographic variables such as age, gender, race/ethnicity, income, immigrant status, acculturation, and socioeconomic status.

Although the socio-ecological model associated with overweight and obesity in immigrant population was used in the study, other factors such as behavioral, psychosocial, and socioeconomic are presented to illustrate their role in weight control attitudes and behaviors of adult African American immigrants.

Social Ecological Model

Most health promotion programs and policies target individual behavior such as increase in physical activity or change in eating habits. Such programs or health policies often fail due to lack of availability of appropriate support (Glasgow et al., 2008: 1999). An alternative approach would be to increase availability of healthy food to low income neighborhoods, increase positive social interaction, increase public transportation, and build recreation areas and facilities to increase physical activity. It is in this context that health promotion programs—particularly in controlling the increasing number of obese—become a public health priority at national and international levels (WHO 2003; WHO 2004). As such, many researchers have attempted to understand the socio-cultural context behind obesity (Kumanyika, 2008). These studies revealed that environment with low

neighborhood supply of healthy foods and high supply of fast food restaurants are great contributors to the dependence on high calorie foods. The environmental context of physical activity is another great contributing factor of individual behaviors and lifestyles which has dramatic effects on health. However, existing research has neglected variables related to acculturation. Figure 1 illustrates the factors involved in investigating obesity and overweight among African American immigrants in the U.S.

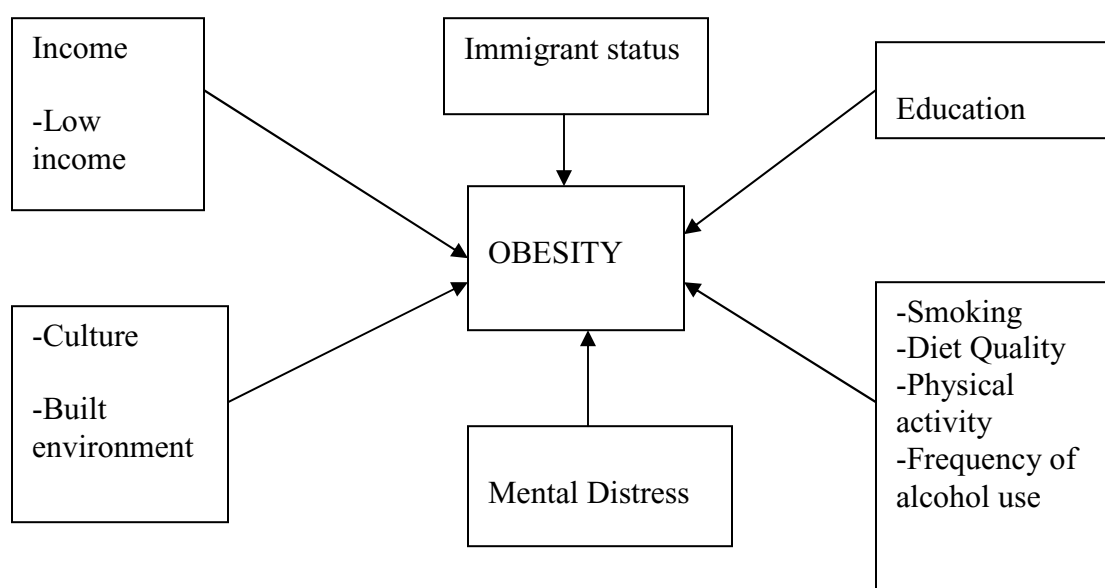


Figure 1. Depicting determinants of population health as related to obesity.

Cochrane and Davey (2008) conducted a quasi-experimental survey research which supports the use of social ecological model to test whether this model can increase the population proportion that is physically active in two deprived inner city electoral ward in Sheffield, U.K. with similar socio-demographic and health profiles. This method provides a broad perspective on the dynamic interactions between people and their respective environments based on the premise that environments influence behavior. The

difference of this approach with respect to other health programs and initiative is that the socio-ecological approach, model, treatment, or intervention program is offered in a local area or community rather than an individual. Cochrane and Davey (2008) concluded that the social ecological approach to the environment change can increase the uptake of physical activity in an urban community of low socioeconomic status.

Addressing inactive lifestyles is a critical public health challenge worldwide, requiring a comprehensive approach. Even the concept of physical activity has evolved over time (Sallis, Cervero, Ascher, Henderson, Kraft and Kerr, 2006). Over the last decade, the term *exercise* had changed to physical activity or active living, symbolizing the evolution of how physical activity is conceived in disciplines engaged and how these meanings are operationalize in the conceptual models used to guide research. Activities of daily living such as neighborhood walking or climbing a flight of stairs in a building are today considered as physical activities. Socio-cultural surroundings of people and their interaction with the environment serves as an ecological model in public health to better understand factors that could have impact on the health of a given community residents. This is supported by the basic principles of socio-ecological model in that multiple levels of interventions is a better approach to prevent health problems in a community. Sallis et al. (2006) identified walking as the most common form of physical activity which could serve for multiple purposes. They separated walking for recreational and for transportation as to traffic concerns and design of neighborhood for easy access to nearby destination. As such, regular activities are determined over social and cultural influences in communities.

Environmental factors have been studied by researchers to better understand their relationship with health programs. Frank et al. (2004) conducted a cross-sectional survey to 10,878 Atlanta, Georgian residents to evaluate the relationship between built environment around each participant's place of residence and self reported travel, BMI, and obesity for specific gender and ethnic classification. Frank et al. concluded that the geographical environment play significantly towards designing appropriate programs for weight loss. Ewing et al. (2003) conducted a similar study using cross-sectional analysis of 448 U.S. counties and 83 metropolitan areas with 206,992 participants from years 1998 to 2000 Behavioral Risk Factor Surveillance System to determine the relationship between urban sprawl, health, and health-related behaviors. This study revealed that urban lifestyle was associated with some physical activity and some health outcomes. According to this study, residents of sprawling counties were likely to walk less during their leisure time and as a results weigh more. Ewing et al. (2003) found a gap in literature on how to refine measures of urban lifestyle, improve measures of physical activity, and control for other individual and environmental influences on physical activity, obesity, and related health outcomes. According to Ewing et al., studies have emerged linking walkability of neighborhoods with physical activity, obesity, and risk for chronic disease (Ewing et al., 2003; Frank et al., 2004).

The Institute of Medicine report on promoting healthy behavior (Fleury & Lee, 2006) found that a multilevel perspective—consistent with social ecological models—may promote health efforts. Fleury and Lee (2006) used the social ecological model and physical activity in African American women in order to recommend future directions for

health and physical activity promotion. Data from the USDHHS indicated that African American women have low levels of physical activity and as a result they are vulnerable to higher level of health risks such as heart and cerebrovascular diseases compared with Caucasians, Latino, Native American, Asian and Pacific Islander ethnic groups. The National Health and Nutrition Examination Survey indicated that 51% of African American women ages 40 to 56 years were considered obese compared to 30% of African American men in the same age range. As a result of such disparities, the possibility of becoming obese and developing obesity related health problems such as hypertension, diabetes, and heart disease affects African American women at higher rates.

To address the literature gap about the contextual factors influencing African American women to engage in regular physical activity, Fleury and Lee (2006) conducted a review on these factors, and found that physical activity research often focuses on individual characteristics (Fleury & Lee, 2006). Moreover, Fleury and Lee found this research to be neglectful of the social and environmental factors influencing African American women's behavior—factors which could be important to incorporate in effective obesity prevention programs. Indeed, social factors such friends, family, work, neighborhood associates, and formal and informal organizations could be incorporated into effective, targeted obesity prevention programs. Other factors, such as self-perceptions of being in poor health, have been found to be associated with low physical activity among African American women (King, Castro, Wilcox, Eyer, Sallis &

Brownson, 2000); these factors, too, must be incorporated into effective prevention programs.

Research has also indicated that fatigue from exercise and the perception of exercise as “hard work” among African American women serve as significant barriers to regular physical activity. The socioeconomic status of African American women has also been found to impact the initiation and maintenance of health promoting behaviors (Fleury & Lee, 2006). Researchers contended that socioeconomic status has a direct relationship between risk reducing behaviors and level of income, education and occupational status (USDHHS 1996; McElroy 2002; Johnson, Friedman et al. 2005). Sanderson et al. (2003) supported this argument by associating higher activity levels with higher annual household income levels, and attributed lower activity levels among African American women to their limited access to structured exercise facilities.

Promising directions for research and practice using social ecological perspectives to promote physical activity among African American women were provided in a study by Fleury and Lee (Fleury & Lee, 2006). They concluded that physical activity interventions must be culturally and contextually relevant and must focus on fostering the development of needed resources to sustain behavioral change across levels including knowledge and motivation, social support and norms, community capacity, and environmental and organizational assets.

The social ecological framework was used by researchers in a trial activity study for adolescent girls (TAAG) to understand how a major multilevel physical activity intervention program might benefit a community (Elder et al., 2006). Six sites with six

schools per site participated in this program of which three were randomized to receive the TAAG intervention and TAAG measurements while three received the TAAG measurements only. Operant conditioning, social cognitive and organizational changes, and diffusion innovation theories were used to support various behavioral aspects of these adolescent girls. Operant conditioning or behavioral modification theory explains that behaviors are strengthened via the process of reinforcement or weakened by punishment or extinction. Elder et al. applied the three key elements in their intervention trial which included increased positive reinforcement for activity, reduced barriers, and adverse consequences that prevents activity and reduced positive reinforcement for sedentary behaviors. On the other hand, the social cognitive learning theory was used to explain how relationships among self-regulatory behavior and supportive functions of social environments for adopting and maintaining health promotion behaviors could be enhanced. High levels of self-efficacy were explained to lead to a greater likelihood of engaging in specific physical activity behaviors. Finally, organizational change and diffusion of innovation theory explained how a blend in school and community programs could increase health promotion behaviors by increase in access of resources and the ability to make better use of existing resources and by using role models for behavioral intervention programs.

Factors Associated with Obesity

Socioeconomic status (SES) has been shown to be an important factor in racial disparities related to chronic illness, morbidity, and mortality. Socioeconomic status (SES) and other indicators of wealth should be considered when investigating racial

disparities associated with obesity and weight related diseases. Researchers have also attempted to evaluate the influence of race and SES on obesity among children and adolescents (Paeratakul, Lovejoy, Ryan, & Bray, 2002). Societies develop and maintain systems of social stratification along multiple dimensions. One of the most important is stratification according to socioeconomic conditions. Others include ethnicity and gender. Such systems of stratification determine in part which resources and goods are distributed to and accumulated over time by different social groups. Unequal distribution of resources and social goods lead to different degrees of economic, political, social and cultural advantage among groups which may then be translated into differences in health.

Body weight depends on the number of calories consumed and the number burnt up. People who eat less than they burn lose weight but those who eat more gain weight. A combination of too much food and lack of exercise or a sedentary lifestyle causes people to gain weight rapidly. African Americans tend to eat a lot of variety of fatty foods which are cheap and unhealthy. The fast food industry has targeted African Americans, the effects of which are clearly visible by the fast food restaurants concentrated in minority neighborhoods (Li, Harmer, Cardinal, Bosworth, & Johnson-Shelton, 2009). The food industry is a powerful force influencing the American way of life especially eating habits. Over 60 percent of food references and advertising on television are of low nutrients foods (Story & Faulker, 1990). An analysis of 2001 advertising spending found that U.S. companies spent \$3.5 billion on fast-food advertisements and \$5.8 billion on the separate food, beverage, and confectionary category including \$785.5 million for the top five soda brands. Consumption of advertised foods is higher than consumption of foods that are not

advertised and advertising expenditures are generally greatest for the most highly processed and package foods (Henderson & Kelly, 2005).

Food production changed drastically in the U.S. during the 20th century and so did physical activity (Bassett, Pucher, Buehler, Thompson & Crouter, 2008). The auto industry lobbied to dismantle public transportation and promote building highways (Sallis & Glanz, 2009). This industry also spends more on marketing than any other business and the result is that there are more cars now in the U.S. and people move less.

Americans are less likely to walk to work, school, church, grocery stores, just to name a few places that used to be in workable distances in the past. Jobs are less physically demanding with the advance in technology and Americans spend more time in front of computers, on telephones and sitting in chairs and benches. To be physically active in this culture requires motivation, time, and money. Physical activity has become a burden instead of a normal part of daily American lives. With obstacles like misleading nutritional education, processed food marketing, auto industry marketing, and poor transportation, it is not surprising that Americans are overfed and some even malnourished (Bassett, Pucher, Buehler, Thompson, & Crouter, 2008; Sallis & Glanz, 2009; Sallis et al., 2009).

Obesity can be linked with population density. Generally there are more obese people in cities than in rural areas. In the southeastern states, the rates are twice as higher than the rest of the country (Davy, Harrell, Harrell, Stewart, & King, 2004). This could be due to socioeconomic status as one of the factors for high prevalence. Overweight and obesity could be attributed to factors as; income, age, gender, education, family and so on

but none of these factors is the complete reason to justify this phenomenon. Obesity can also be partially explained by the stronger reactions to some foods by different ethnic groups living in the same town (Thompson, 2000).

There are also non-biological links between environment and body weight:

1. Cultural standards: African Americans have been exposed for decades to the fat image of some of their celebrities. They tend to be more tolerant and readily accept fat people in their social milieu.
2. Sedentary Lifestyle: An increase in use of cars, public transportation and lack of exercise.
3. Eating Habits: Eating in fast food restaurants and lack or very little consumption of fruits and vegetables. (p.24).

In order to investigate the relationship between obesity and frequency of alcohol use, Rohrer et al. (2005) surveyed a convenience sample of 1471 low-income patients drawn from three clinics. Results from this study indicated that days per month use of alcohol was associated with obesity ($p = 0.001$), as was intensity ($p = 0.01$). Results from this study further indicated that people who consumed alcohol 3 or more days per month had lower odds of being obese (adjusted odds ratio = 0.49, $p < 0.04$). Arif & Rohrer (2005) used data of 8,236 respondents from The National Health and Nutrition Survey III collected between 1988 and 1994 to investigate the relationship between obesity and alcohol consumption in the non-smoking U.S. adult population. An inverse relationship was found between moderate alcohol consumption and obesity in a large representative sample of non-smoking U.S. adults. The odds of obesity were lower in current drinkers

as compared to non drinkers (Adjusted Odds Ratio = 0.73, 95% CI: 0.55, 0.97). They found that the odds of overweight and obesity were significantly greater among binge drinkers and those consuming four or more drinks per day. Those who reported drinking one or two drinks per day had 0.46 (95% CI: 0.34, 0.62) and 0.59 (95% CI: 0.41, 0.86) times the odds of obesity respective according to findings in this study (Arif, & Rohrer, 2005).

Age and Obesity

The growing problem of obesity in America is seen in the entire U.S. population and can be associated with unhealthy life style and consumerism amongst all age groups. The growing rise in obesity among adults is mirrored in a similar climb in obesity among children. No other disease or health condition even comes close to being so widespread across America. This is why epidemiologists consider obesity as a true public health epidemic. Childhood obesity has become a real concern in American societies due to unhealthy diet as junk foods to inactivity related to TV watching, playing video games and a complete reduction of physical activities in children's daily lives.

Ogden et al. (2006) used data from the National Health and Nutrition Survey (NHANES) to study estimates of the prevalence and trends of weight gain by age, gender and race. Analysis of weight and height measurements from 3958 children and adolescents aged 2 to 19 years and 4431 adults aged 20 years or older obtained from NHANES data collected from 1999 to 2004 led to the conclusion that the prevalence of overweight among children and adolescents and obesity among men increased significantly during the 6 year period but among women no overall increases in the

prevalence of obesity were observed. They further concluded in this survey research study that Americans gain weight until middle age then stabilize and begin to lose weight near 60 years of age. Mexican American and non Hispanic African American female children and adolescents were significantly more likely to be overweight compared with non Hispanic white female children and adolescents. Among adult men, no differences were found between racial/ethnic groups. Mexican American and non Hispanic African American women were significantly more likely to be obese compared with non Hispanic white women.

Overeating is glorified in America to the point that it is a spectator sport. It is common to see people eating large amounts in food advertisements, asking for large sizes, or making light of eating too much. Snack food is a huge business in the U.S. today. The industry's main organization, the Snack Food Association (SFA) represents more than 800 companies that manufacture potato chips, tortilla chips, cereal, pretzels, pop-corn, cheese snacks, crackers, meat snacks, pork rinds, snack nuts, party mix, corn snacks, pellets snacks, fruit snacks, granola bars, cakes, cookies and various other snacks. Snacks, sodas, and other prepared foods have liberated the American meal away from domestic confines of the home, and they feed themselves when and where they want. Foods eaten between meals comprise a growing portion of the nation's calorie intake. Availability and convenience of fast foods makes snacking very easy (Bowman, Gortmaker, Ebbeling, Pereira, & Ludwig, 2004; Briefel, Crepinsek, Cabili, Wilson, & Gleason, 2009; Paeratakul et al., 2002).

In a study by Rohrer et al. (2009) to assess the independent effects of health confidence and uncontrolled eating on obesity risk in primary care patients, a randomized sample of adult patients in a large medical clinic in the mid-western U.S. was surveyed. Obesity was the dependent variable and the primary independent variable was uncontrolled eating even though other secondary independent variables such as age, gender, educational level and marital status were considered. Chi square was used to test these categorical independent variables and their relationship with obesity. Multiple regression analysis was used to assess the independent effects of the independent variable and $p < 0.05$ was determined to be statistically significant. Having some trouble controlling amount of food consumed by an individual exhibited the strongest independent association with obesity (OR 6.67, CI 3.91-11.4). Another interesting finding in this study was that people with high health confidence were less likely to be obese (OR 0.90, CI 0.81-0.99). Weight control motivation was noted to be protective against obesity (OR 0.85, CI 0.78- 0.92). Smoking nearly doubles the odds of obesity (OR 1.99, CI 1.07-3.73); women were less likely to be obese than men (OR 0.63, CI 0.44-0.91); older people were at increased risk of obesity while individuals with a four year college degree were less likely to be obese (OR 0.29-0.88). The study also found that gender and educational level were significantly related to obesity ($p = 0.01$ and $p < 0.01$ respectively). According to this study, being married was unrelated to obesity ($p = 0.62$). It is important to note that these authors found no relationship between exercise and obesity. The dynamics of exercise as it relates to obesity could not really be

determined. The findings in this study justify why a more comprehensive approach is needed to combat obesity in the United States.

Sheehan et al. (2003) used surveyed adult Americans; 5117 men and women age range of 25 to 74 years from the first National Health and Nutrition Examination Survey (NHANES I) for a 20 year time period to estimate the rates of weight change. They found that the rates of weight gain in estimated mixed effects models were highest among young adults and rates of weight loss were greatest among older adults. They also concluded that the overall shape of growth curves in this study were similar for men and women, black and white in terms of both weight gain and weight loss. Americans gain weight until middle age, stabilize and begin to lose weight near age 60 according to these authors. On the other hand, Chilton, Black, Berkowitz, Casey, Cook, Cutts et al. (2009) conducted a survey to investigate household food insecurity and reported fair or poor health among very young children who were U.S. citizens and whose mothers were immigrants compared with those whose mothers had been born in the United States. Data were obtained from the Children's Sentinel Nutrition Assessment Program (C-SNAP) an ongoing multi-state study in 7 U.S. cities investigating the relationship between public assistance participation and the well being of mothers with children aged 0-3 years from 1998 to 2005. The authors obtained data from 19,275 mothers, 7,216 of whom were immigrants and they examined whether food insecurity mediated the association between immigrant status and child health in relation to length of residence in the United States. Results of this study concluded that the risk of fair or poor health was higher among children of recent immigrants than among children of U.S. born mothers (OR = 1.26;

95% CI = 1.02, $p < 0.03$). They also found out that immigrant households were at higher risk of food insecurity than were households with U.S. mothers and that newly arrived immigrants were at higher risk of food insecurity (OR = 2.45; 95% CI = 2.16, 2.77; $p < 0.001$). Overall household food insecurity according to these authors increased the risk of fair or poor child health (OR = 1.74; 95% CI = 1.57, 1.93; $p < 0.001$) and mediated the association between immigrant status and poor child health. In sum, this study is interesting since revealing results showed that low income mothers who had lived in the U.S. for more than 10 years were significantly lower risk of household food insecurity than were newly arrived immigrants. These authors concluded that immigrants who have been in the U.S. for 11 years or more may have more exposure to the U.S. education system and better English language skills as well than the newly arrived immigrants. These factors may have protected such families from the vulnerability associated with food insecurity and poor child health as a result of their potential earnings or awareness of an access to public assistance programs. Elevated rates of food insecurity are an indication that immigrant families and their children face preventable health risks that may reduce their children's ability to achieve in school in developing their full potential.

Gender and Obesity

Rhoades, Altman, and Cornelius (2001), stated that for both adult age (20 to 64) males and females, there was an increase in the percentage of individuals that were obese between 1987 and 2001. For males, the percentage of obese individuals increased from 13.3% to 23.4%, representing a 76% relative increase in obesity between two years. For

females, the percentage of obese individuals increased from 13.8% to 24.5% (a 78% relative increase).

Borders, Rohrer & Cardarelli (2006) used data of the State of Texas 2003 BRFSS of 5078 respondents to examine gender-specific disparities in obesity by rurality of residence, race/ethnicity and socioeconomic status. They found that of the 5078 respondents included in the analysis, 36.48% were normal weight and 25.03% were obese. Post statistical analysis of survey data of respondents revealed that males were found to have increased crude (OR = 1.27, 95% CI = 1.07, 1.50) and adjusted odds (OR = 1.63, CI (1.36, 1.96) of obesity compared to females. Among the males in this study, Hispanic ethnicity and African American race were not significantly associated with obesity. On the other hand, compared to non-Hispanic European American females, Hispanic and African American females had higher crude adjusted odds of obesity. Males living in non-metropolitan areas were found to have higher crude and adjusted odds of moderate obesity than males living in metropolitan central city areas while females residing in non-metropolitan areas had higher adjusted, but not crude, odds of obesity than females residing in metropolitan central city areas. These authors found no significant differences between obesity among males or females residing in metropolitan central city and suburban areas. They found a different association between obesity and income between males and females. Males with household incomes of \$25,000 to \$74,999 had higher crude, but not adjusted, odds of obesity as compared to those incomes of \$25,000 or less while females with household incomes of \$75,000 or more had lower crude and adjusted moderate odds of obesity. Results of educational status indicated that

having a college degree or more education was associated with lower adjusted odds of obesity for males and females (Borders et al., 2006).

Rohrer and Rohland (2004) studied the obesity risk factors in a low income female population in a single community using a convenience sample of 500 low income adult non-pregnant women who attended family planning clinics. The study investigated the relationship between obesity and different sources of personal stress, mental health, exercise and demographic characteristic. These authors measured exercise, social support, mental health and other personal characteristics and held them constant in order to determine the independent effect of different sources of personal stress on obesity. Data revealed that being in the \$10,000 to \$20,000 income category lowered the odds of obesity in comparison to the under \$10,000 category (adjusted odds ratio (AOR) = 0.4864, $p = 0.0267$) and that having a large family and receiving no support from parents were related to obesity. Further, data analysis in this study revealed that support from a parent was marginally related to obesity ($p = 0.0542$) while support from a child was significantly related to obesity ($p = 0.0390$). Women who reported no support from parents had greater odds of being obese (AOR = 2.17, $p = 0.0420$). Obesity differed significantly by the number of persons in the home ($p = 0.0047$), Level of education ($p = 0.0328$) and marital status ($p = 0.0183$). Results from this study also indicated that over 58% of married respondents were obese compared to 42.5% of unmarried persons and women who lived alone were much likely to be obese than women who lived with four or more people at the same home (32.5% vs 64.8%). Over 60% of those lacking high school education were obese, whereas only 40% of those who had more than a high school

education were obese. These authors were unable to demonstrate a significant relationship between self reported stress and obesity in study sample after adjusting for other variables. Personal stress as defined and measured in this study was shown not to be an important factor for obesity in this population group. Rohrer and Rohland (2004) did not find any relationship as well between exercise and obesity. Univariate analysis of data from this study showed an increase in obesity rates with respect to age.

Race/Ethnicity and Obesity

All race/ethnic categories of the adult American population have consistently demonstrated an increase in obesity according to data collected between 1987 and 2001. European American and others showed a relative increase of 79% in obesity, going from 12.6% in 1987 to 22.5% in 2001. Hispanics went from 14.5% in 1987 to 24.9% in 2001, a relative increase of 72%. African Americans were the most likely to be obese in both years 19.7% in 1987 and 32.5 in 2001 (Rhoades, Altman, & Cornelius, 2001).

Akresh and Reanne (2008) used data from the New Immigrant Survey on a 2003 cohort to investigate the degree of which potential immigrants migrate or fail to migrate on the basis of their health status among contemporary U.S. immigrant groups (Akresh 2008). They conducted interviews with 8573 individuals of which 6183 were eligible for analysis. These authors found that immigrants from Western Europe and Africa were the most likely to report having excellent health (87% and 78%, respectively). Mexican immigrants were the least likely to experience positive health selection (61%). Positive health selection ranged from more than twice as high for immigrants from Western Europe ($b = 0.98$; odds ratio OR = 2.66) to 26% higher for immigrants from Asia ($b =$

0.23; OR = 1.26). Refugees had more than twice the odds of negative health selection than did employment migrants ($b = 0.84$; OR = 2.30). The results indicated that women had about 18% lower odds than men of positive health selection ($b = 0.19$; OR = 0.83). Akresh and Reanne also found that measures of time in the U.S. and language use had a stronger association with self-reported current health and that having 12 or more years of education and a higher prestige job increased the odds of reporting excellent health (Akresh, 2008). Akresh and Reanne acknowledged that previous studies indicate immigrant health advantage over U.S. born Americans. These authors were unable to quantify the magnitude of a selection effect on disparities in health between U.S. native born citizens and immigrants using data sets from New Immigrant Survey. Another limitation of this study was differences by region of origin in cultural norms that could have affected the comparability of self-reported health in this cross-sectional study.

Socioeconomic Status and Obesity

Data from the national Medical Survey (NMES) and the Medical Expenditure Panel Survey (MEPS) on the prevalence of obesity in individuals with higher levels of education; (some college) were the least likely to be obese in 1987 (10.9%) and in 2001 (20.8%). However, there was a 91% relative increase in obesity between the two years for such individuals. In 2001, individuals that did not graduate from high school (27.1%) or did graduate from high school (27.2%) were more likely to be obese when compared to those with some college education (20.8%).

Socioeconomic status is partly determined by the annual yearly income and the amount of household members dependent on the gross income. Poverty status is the ratio

of family income to the federal poverty thresholds. Poor refers to persons in families with income less than or equal to the poverty line and includes those who reported negative income. A family of four with a gross annual income of less than \$26,000 is considered poor in the United States. Poverty statistics are based on definition developed by Mollie Orshansky of the Social Security Administration (SSA) in 1964 and revised in 1969 and 1981 by interagency committees. The census bureau uses a set of money income thresholds that vary by family size and composition to detect who is poor. If a family's total income is less than that of the family's threshold, then that family and every individual in it is considered poor. The poverty thresholds do not vary geographically, but they are updated annually for inflation with the Consumer Price Index (CPI-U) (U.S. & Bureau, 2004). Low income includes persons in families with income over 200% through 400% of the poverty line. While high income includes persons in families with income over 400 percent of the poverty line (Jeffrey, Barbara, & Llewellyn, 2001).

There has been growing concern that certain segments of the American population are prone to poor diet because they do not have access to healthy foods. In some neighborhoods in America, it is easy to get an artery clogging piece of fried chicken than it is to get a fresh orange. Access to healthy foods is limited in impoverished areas. The higher the concentration of poverty in a given area, the less likely there will be supermarkets and there are more supermarkets in white than in African American and Latino communities. The inability to travel to a large supermarket is related to the difficulty with feeding the African American poor families and decreases the likelihood of buying perishable items like vegetables and dairy products (Li et al., 2009; Morland &

Evenson, 2009). One can argue that food establishments provide what people want (fast foods, snack foods, and soft drinks) and that poor people want these foods. Studies suggest that when healthy food is made available to poor populations, diet improves significantly. Studies have also shown that the presence of at least one supermarket in an African American neighborhood was linked with a 25 percent increase in those who limit the amount of fat in their diet, while 10 percent in white neighborhoods (Do, Dubowitz, Bird, Lurie, Escarce, & Finch, 2007). Supermarkets are more likely than small stores to have healthy foods at cheaper prices (Brownell, 2004). Additional evidence that the food supply hurts poor people comes from analysis completed by the Economic Research Service of the U.S. Department of Agriculture. This study found that people using food stamps may get enough to eat, but their diets are very high in fat and sugar. People in the Special Nutrition Program for Women, Infants, and Children (WIC) have significantly less added sugar in their diets than did food stamp participants according to this study (USDHHS, 2001). The WIC program basically for low income individuals supplies juices and cereal to participants.

Meantime studies are not conclusive that having more healthy foods in poor areas would eliminate the obesity problem, but limited access is likely contributing to obesity and improved access to healthy foods might help. Further assessing blame to the poor for demanding unhealthy foods is not justified. Federal food programs may promote obesity by providing the opportunity to buy unhealthy foods (Gibson, 2003; Hofferth & Curtin, 2005). Food stamp coupons can be used to buy healthy foods, but because such foods

costs more or are less available in low income neighborhoods, the poor turn to purchase unhealthy foods and eat poorly.

Economic factors are powerful determinants of eating and activity, economic conditions favor obesity, and hence economic changes must be part of an overall obesity strategy for the nation. One cannot understand the obesity epidemic in the U.S. today without considering economic factors such as the per capita price food in comparison to other needs such as housing, transportation, health care, etc., relative prices of healthy and unhealthy foods, and the value to families of obtaining food quickly. Economic factors are powerful determinants of eating and activity which favors obesity thus economic changes must be a part of an overall obesity strategy for the nation. If there is one truth in this war on obesity, it may be that the economics of food and physical activity must change.

Currently the free market does not promote healthier eating. Change might occur if consumer demand increases dramatically for healthier food, which may be driven by food sellers offering good tasting choices at reasonable prices. There may be ways to stimulate this process on both supply and demand sides. Health food stores are a bit more in the mainstream nowadays and the number of restaurants providing healthy menu are on the increase. The food industry will offer healthier foods only if the profit is agreeable. Generating funds to support initiatives on diet, activity, healthier foods and obesity prevention especially in African Americans is a bridge that must be crossed in this century. Taxing high calorie, high fat, or high sugar foods is a means for addressing the obesity epidemic. Taxes, even quite small ones have the potential to generate

considerable revenue that if used wisely, might be a powerful tool for improving the nation's diet and physical activity (Faith, Fontaine, Baskin, & Allison, 2007; Garson & Engelhard, 2007; Kim & Kawachi, 2006; Powell & Chaloupka, 2009). Taxes no matter what their purpose generate strong feelings in the American way of life. There is clear evidence that taxes have driven down smoking rates and encourage smoking prevention in American teenagers. The literature on cigarette and alcohol taxes is vast and is based on studies done in many states in the U.S. and the results have been clear (Baum, 2009). As taxes and hence prices increase, scientists can estimate precisely what will occur with per capita consumption, the number of people engaging in use of the substance and the impact on health and well being. The question then is whether taxes might be effective in the national effort to improve diet, increase activity, and prevent new incidences of obesity.

Increasing physical activity must be a priority if obesity is considered a public health problem. People were once paid to exercise and jobs required physical work (Sallis & Glanz, 2009). Most streets in cities are not safe for walking, biking, or playing (Brownson et al., 2004). Stairs in many buildings are inaccessible, dark, and unattractive. Few children walk or bike to school (Kerr, J., Rosenberg, D., Sallis, J.F., Saelens, B.E., Frank, L.D., & Conway, T.L., 2006). Energy saving devices makes nearly every physical action require less effort. As the American population eats more substantial increases in exercise would be needed just to keep weight stable. But activity has declined in the last two decades (Sallis & Glanz, 2009). Decline in exercise results in negative health effect because exercise can help prevent weight gain and reduces risk for many of the leading

causes of death. A number of experts have called for public health approaches to increasing activity focusing on community interventions, removing barriers to exercise, and changing the environment (Bassett et al., 2008; McElroy, 2002; Sallis et al., 2006; Sallis & Glanz, 2009). Some creative programs have been developed to encourage people to move more. For example; The Kids walk to School Program, a program supported by the U.S. Department of Public Health, the Centers for Disease Control and Prevention, the National Center for Chronic Disease Prevention and Health Promotion, and the Division of Nutrition and Physical Activity, is designed to encourage children to walk or bike to school in groups accompanied by adults. The program has a website that provides information on physical activity in general and on getting to school in particular. These programs represent only local victories thus far but if supported might have an impact nationwide (Staunton, Hubsmith, & Kallins 2009).

Haas, Lee, Kaplan, Sonneborn, Phillips, and Su-Ying (2003) conducted a study from an observational cohort from 1996 Medical Expenditure Panel Survey Household component to examine the effect of race, socioeconomic status, and health insurance on the prevalence of overweight among children and adolescents aged 6 to 11 years. They concluded that both Black (OR = 2.26; 95% CI = 1.62, 3.14) and Latino (OR = 1.99; 95% CI = 1.46, 2.73) children had a greater likelihood of being overweight compared with White children in younger groups. Among adolescent groups, Latino and Asian/Pacific Islanders were more likely to be overweight. A relationship between health insurance status and overweight was not observed for younger children but on the other hand, adolescents lacking health insurance and having public insurance were positively

associated with the prevalence of overweight. After including factors that enabled access to health care services, children from families with lower parental education attainment (OR = 1.38; 95% CI = 1.05, 1.82) and adolescents from households with an income below 125% of the federal poverty level (OR = 1.43; 95% CI = 1.00, 2.04) also had a greater risk of overweight compared with more advantaged children. Overall rate of overweight was twice greater among younger children than among adolescents (26.9% vs 11.2%; $p < 0.001$). These results were also associated to many factors including parental weight, socioeconomic status, early childhood nutrition, level of physical activity, and engagement in sedentary activities such as watching television. According to these authors, the effect of race/ethnicity on the prevalence of childhood overweight requires greater study particularly in relation to socioeconomic factors. Country of birth, single parent household status, health insurance status, and region of the U.S. were all not associated with the prevalence of overweight for children in the multivariate models.

Increasing the nation's activity can improve health and well being. The distance people travel by car has increased dramatically between American cities while traveling by bus, bicycle and foot has declined. Rising pollution and traffic congestion are another consequence of traveling by automobiles. Encouraging transportation by foot and bicycle could be considered a pollution control strategy and a means of conserving fossil fuels but as a return taking physical exercise that prevents weight gain and becoming obese. Rohrer et al. (2008) abstracted medical information from medical records of 673 adult patients utilizing a family medicine and conducted a retrospective study to test the relationship between BMI and pain (Rohrer, Adamson, Barnes, & Herman, 2008).

Specific pain types examined in this study includes abdominal, back, extremity, joint, leg pain when walking, muscle pain, and headaches. Statistical results indicated that only joint pain was significantly related to BMI at $p < 0.05$.

Rohrer and Arif (2006) used a sample of 5530 children, 3 to 18 years of age to evaluate the effects of overweight, hyperglycemia symptoms, Hispanic ethnicity, and language barriers on dependent variable; health related quality of life (HRQoL) (Arif and Rohrer 2006). Overweight, Hyperglycemia symptoms and language barrier were all significantly associated with health related quality of life ($p = 0.008$, $p < 0.05$, $p = 0.001$).

Acculturation and Obesity

The U.S. population has become more racially and ethnically diverse and this change in demographic is accompanied by an increase in health problems in the immigrant population. The length of residence in the U.S. has been explained in studies as supportive evidence or as a risk factor associated with unhealthy outcomes in ethnic diverse groups (Deepika & Egede, 2007; Gordon-Larsen et al., 2003). Acculturation refers to the joining of ethnic groups from different origins into a common culture with outcomes such as similarity in behavioral patterns, same eating habits, same language, or same dress habits. Immigrants to the U.S. give up their original cultures in order to become fully acculturated to the American way of life.

Bertera, Bertera, and Shankar (2003) examined via survey questionnaire and measures of acculturation, socioeconomic status and obesity in a convenience sample of 1205 Salvadorian immigrants from the Washington D.C. metro area. Obesity was measured by the percentage overweight based on body mass index and acculturation was

measured by language preference for print and electronic media and years residing in the U.S. Regression models were developed to assess the relationship between obesity and acculturation indicators, socio-demographic factors, and sources of health information variables. The results suggested that the Salvadorian population was not homogeneous with regards to the key issue of language preference. This finding was noted to be an important element in designing cultural appropriate information on education or other population health services. The authors also noted from results in this study that the Salvadorian immigrants in Washington DC were more likely to be obese the longer they are exposed to the American culture. These authors were unable to study the acculturation differences in first, second or third generation Salvadorians because they were not included in the study sample. Fuentes-Afflick and Hessol (2008) conducted a prospective cohort study to understand the relationship between acculturation and body mass among childbearing Latina women. The dependent variable for this study was pre-pregnancy BMI and the independent variables were acculturation metrics, measured by acculturation index score, degree of Americanization, national origin subgroup and the number of years residing in the U.S. These authors also included behavioral, demographic and reproductive factors as potential confounding variables of the relationship between acculturation and body mass. Three hundred and fifty one Latina women ages ranges 22-26 years from prenatal clinic at San Francisco General Hospital, the municipal hospital for the city and County of San Francisco a predominantly Latino community were recruited in this study. They found that women born in the U.S. had higher mean scores on the acculturation index than Mexican born women ($p < 0.0001$)

and women born in central/South America had slightly higher scores than Mexican born women ($p = 0.02$). The scores for an Americanization scale followed a similar pattern. Smoking was noted to be infrequent in this ethnic group and ranged from 5% to 8% across the national origin subgroups. Education was inversely associated with overweight after adjusting for confounding variables; (OR 0.88, 95% CI 0.81 to 0.96). Longer residence in the United States (OR 1.08 for each additional year residing in the U.S., 95% CI 1.02 to 1.15), older age (OR 1.08, 95% CI 1.01 to 1.16), and higher gravidity, the total number of pregnancies (OR 1.41, 95% CI 1.09 to 1.84) were all significantly associated with obesity. In the multivariate model analyzing obesity, these authors found that acculturation as measured by the number of years residing in the United States remained associated with higher odds of obesity (OR 1.08 for additional year, 95% CI 1.02 to 1.15). Finally these authors found no evidence of interaction between number of years in the U.S. and national origin subgroup and the interaction did neither improve the multivariate fit nor the model's predictive ability.

Sanghavi et al. (2004) conducted a cross-sectional study using data from the 2000 National Health and Nutrition Survey of 32374 respondents of which 14% were immigrants. Mexican American and African American populations were over sampled to allow for more precise estimation of these minority groups. According to American Association for Public Opinion Research standards, the combined response rate to components of the survey was 72%. Foreign born respondent were generally older, had lower annual household incomes and education, had lower illness burden, and had limited access to health care. Even though the foreign born respondents were less often obese

than those born in the U.S. (16% vs 22%, $p < 0.001$), they were also more often sedentary than the U.S. respondents. They found out that the prevalence of obesity was 16% among immigrants and 22% among U.S. born individuals. The age and sex adjusted prevalence of obesity was 8% among immigrants living in the U.S. for less than 1 year, but 19% among those living in the U.S. for 10 to 15 years. They also found out after adjusting for age, socio-demographic, and lifestyle factors that living in the U.S. for 10 to 15 years was associated with BMI increases of 0.88 and 1.39 respectively. The association for 15 years of U.S. residence or more was significant for all immigrant subgroups except foreign born blacks. They also noted that immigrants were less likely than U.S. born individuals to report discussing diet and exercise with clinicians (18% vs 24%, $p < 0.001$; 19% vs 23%, $p < 0.001$, respectively). Sanghavi et al. (2004) concluded that among different immigrant subgroups except for foreign born blacks, years of residence in the United States was associated with higher BMI beginning after 10 years. Data for underweight respondents were not reported. $P < 0.001$ for trend in the age and sex adjusted prevalence of obesity with longer duration of U.S. residence among foreign born individuals. 24 % of respondents reported discussing their diet and eating habits with a clinician in the past year and foreign born respondents were less likely to report counseling than were U.S born respondents (18% vs 24%, $p < 0.001$). Sanghavi et al. (2004) failed to explain why there was no association between BMI and years of residence in African American immigrants. Early intervention programs which include diet and physical activity offer an opportunity to prevent weight gain, obesity and obesity related chronic diseases.

In another study of an ethnically diverse group of U.S. immigrants studied the association between length of residence and major CVD risk factors on 5,230 immigrant adults from National Health Interview Survey was examined (Deepika & Egede 2007). Data analysis from this cross sectional study showed that 55.4% were obese, 17.3% had hypertension, 15.9% had hyperlipidemia, 6.6% had diabetes, 79.3% were physically inactive and 14.3% were smokers. Immigrants who had resided in the U.S. for more than 15 years were more likely to be obese (OR 1.31, 95% CI 1.03 to 1.65), have hyperlipidemia (OR 1.59, 95% CI 1.14 to 2.22), and be smokers (OR 1.39, 95% CI 1.04 to 1.85). Length of residence greater than 15 years was associated with decreased odds of sedentary lifestyle (OR 0.63, 95% CI 0.47 to 0.84), Length of residence greater than 15 years was not associated with odds of having diabetes (OR 1.40, 95% CI 0.78-2.51) or hypertension (OR 1.21, 95% CI 0.86 to 1.71). Sanghavi et al. concluded that among immigrants from diverse ethnic backgrounds, longer length of residence in the U.S. was associated with increase odds of obesity, hyperlipidemia, and cigarette smoking even after adjusting for relevant confounding factors.

Linear assimilation models of acculturation continue to dominate public health research despite availability of more complex acculturation theories that propose multidimensional frameworks, reciprocal interactions between the individual and the environment. Linear assessments include, nativity, length of stay in the U.S. and language use which provide constricted measures of acculturation according to Abraido et al. (2006) research performed on Latino population in the U.S. According to these authors, simplifying culture into ethnic assimilated or other risk categories can

inadvertently provide weak explanations of health disparities by focusing attention on culture rather than on structural constraints such as lack of access to resources.

Conventional risk factors for poor health such as less education and low income are understood to be less influential than the protective cultural strengths immigrants bring with them from their respective countries of origin. The role of culture of origin in lowering stress and fostering healthy behaviors via family cohesion and the provision of social support in immigrant population is a better health protective factor. This review indicated that among immigrants from diverse ethnic backgrounds, longer length of residence in the United States was associated with increased odds of obesity.

Conclusions

The review revealed that structural dimensions of places and mobility were predictors of obesity. Frank et al. (2004) cross-sectional survey design study on 10,878 Georgian residents and Ewing et al. (2003) cross-sectional analysis on 448 U.S. counties and 83 metropolitan areas of 206,992 sample size revealed similar findings relative to the predictors that suggests overweighting and obesity. Both studies used cross-sectional survey methods with thousands of participants and controlled covariates such as physical activity, minutes' walk, education, time spent in the car, age, and income that could potentially affect the findings. Education was positively associated with minutes of walking and being physically active as a whole. Environmental influences of health behaviors such as increase in physical activity was found to have a direct relationship with how the environment was built. Physical activity among African American women was noted from a literature review study to be lowest as a result higher levels of health

risks such as cerebrovascular diseases compared with Caucasians, Mexican American, Indian American, Asian American and Pacific Islander ethnic group (Fleury & Lee 2006).

Henderson and Ainsworth (2003) study revealed that the majority of African American women who undertook physical activity found empowerment via engagement in social networks. Similarly, Elder et al. (2006) case control study on adolescent girls attempted to understand how a major multilevel physical activity program benefits a community. Data revealed that higher levels of self efficacy were found to be related to a greater likelihood of engaging in specific physical activity behaviors. Finally, the Borders et al. (2006) study of BRFSS surveillance data from Texas examined gender-specific disparities in obesity by rurality of residence, race/ethnicity and socioeconomic status. This study found that males living in non-metropolitan areas had higher crude and adjusted odds of moderate obesity than males living in metropolitan city areas. Females residing in non-metropolitan areas had higher adjusted, but not crude odds of obesity than females residing in metropolitan central city areas (Borders et al., 2006).

It is also noted that socioeconomic status consistently revealed an inverse relationship with obesity (Bertera et al., 2003; Borders et al., 2006; Haas et al., 2003; Henderson & Ainsworth, 2003; Rohrer et al., 2008; Sanderson et al., 2003; Sanghavi et al., 2004; McElroy 2002; USDHHS 1996). A similar inverse relationship was also noted in survey studies done on relationship between alcohol and obesity (Arif & Rohrer, 2005; Rohrer et al., 2005). Finally eating habits was found to also have an inverse relationship

with obesity (Chilton et al., 2009; Henderson & Kelly, 2005; Rohrer & Vickers-Douglas, 2009).

Results of survey studies in this literature review on the relationship between age and obesity by age, gender and race showed that rates of weight gain often were estimated using mixed effects models (Ogden, Flegal, Carroll, & Johnson, 2002; Sheehan et al., 2003). Obesity and gender showed some disparities similar to obesity and race in findings according to survey studies in this literature review. Mexican American and African American females were noted to have higher crude adjusted odds of obesity (Akresh, 2008; Borders et al., 2006; Rhoades et al., 2001; Rohrer & Rohland, 2004).

Survey, prospective cohort and cross-sectional studies were done mainly on Mexican American and immigrant subgroups on the effects of culture and obesity in the U.S. and results indicated that length of residence had a positive relationship with obesity (Abraido et al., 2006; Bertera et al., 2003; Deepika & Egede, 2007; Fuentes-Afflick Hessol, 2008; Sanghavi et al., 2004). Variables that were typically included in these study models include age, educational attainment, years residing in the U.S., and gender.

Summary

Obesity research on immigrant populations continues to provide evidence that immigrants are vulnerable to becoming as obese as their native-born counterparts. The risk of obesity increases when they live in the U.S. for longer periods of time. Varying opinions have been offered to explain the prevalence of obesity in the U.S. and how to address this health problem. However, researchers contended that socio-ecological model best explains a better approach for obesity health prevention program design. Higher

obesity rates could be associated with many factors. The causes of obesity in the American culture are complex and no single factor could explain this health outcome. The Mexican American population and other minority ethnic groups resident in the U.S. have been extensively studied to understand the relationship between obesity and some variables including socioeconomic factors. This chapter revealed a gap in studies that test the relationship between obesity and socioeconomic factors in adult African American immigrants to the U.S. Various studies highlighted the need to develop effective behavior change strategies to address obesity and its health related issues in the American population.

Chapter 3 describes the methodology that was used in the study designed to test the relationship between obesity/morbid obesity and immigrant status while controlling for co-variables including income, cost of medical care, mental distress, physical activity, diet quality, education, smoking, gender, race/ethnicity, and age. Chapter 3 describes the data sources, data collection methods and sampling strategies, power analysis, data handling strategies, definitions of variables used for the study and statistical methods utilized.

Chapter 3: Research Methods

This cross-sectional survey study examined the relationship between obesity and income in adult African American immigrants living in the United States compared to African Americans who are not immigrants via a questionnaire comprised of BRFSS questions modified for self-administration. Each state in the U.S. conducts the BRFSS annually via standardized telephone surveys in collaboration with the Centers for Disease Control and Prevention (CDC). The primary purpose of these surveys is to provide state-specific estimates of the prevalence of behaviors that are associated with the leading causes of death in the U.S. (Yun, Zhu, Black, & Brownson, 2006).

Obesity and its health effects are more prevalent in the African American community than in other ethnic minority communities (Baskin, M.L., Ard, J., Franklin, F., & Allison, D.B. 2005). . Obesity affects both sexes, particularly the adult population (Lutfiyya et al., 2008; Terrell, 2002). The socio-ecological model used in public health posits that the social environment as well as personal characteristics determine health behavior, general health status, and, often, specific illnesses in any given group of community residents. This approach was used in this cross-sectional survey study to assess the relationship of immigrant status and income to obesity in the African American adult population while adjusting for age, gender, physical activity, healthy eating, and other risk factors.

Research Design and Approach

A cross-sectional survey research design was used for this study. A survey design provides a quantitative description of trends, attitudes, and opinions of a sampled

population (Creswell, 2003). According to Trochim (2001), surveys can be divided into two broad categories: the questionnaire and the interview. Questionnaires are usually paper and pencil instruments that the respondents completes in a given setting, whereas interviews are completed by an interviewer based on the answer given by respondents.

Automated telephone surveys use random dialing methods. Monthly telephone interviews are employed by BRFSS in collecting surveillance data on risk behaviors nationwide. A modified BRFSS self administered web-based survey was used in collecting primary data. A self administered web survey is a better approach to support the study hypothesis, which is to evaluate whether the risk of obesity in African American adults is associated with immigration after adjusting for other factors, due to the fact that a large number of cases is needed in order to achieve an adequate level of statistical power.

Using the socio-ecological model, I surveyed a sample of African American immigrants and non-immigrants in the U.S. in this study. This design was employed to identify risk factors associated with the dependent variable (obesity) and independent variables such as immigrant status, income, diet, physical activity, and socio-demographic variables in the study. Study results serve as a basis for program development and implementation to address obesity and health related problems associated with immigrant population as well as the native born African American population.

Setting and Sampling

Target Population

The population investigated in this cross sectional survey research study consisted of adult African Americans residing in the U.S. Data concerning adult African American immigrants and non-immigrants residing in the U.S. were obtained with a non-probability sample. Participation was entirely voluntary via flyers placed in public areas in several States and survey's invitation letters. All participants viewed the abstract of the study on a web link that also included my contact information.

Sampling Method

A cross-sectional survey was used in selecting adult African American immigrants and non-immigrants to test the hypothesis that the risk of obesity in African American adult immigrants is associated with immigration after adjusting for other factors. The exclusion criteria include non-African American and mixed racial/ethnic groups and non-adults in the U.S. Flyers containing web link were placed in public areas announcing the study and inviting anonymous participation.

Sample Size

Power Analysis: When calculating the sample size for the study, several factors were taken into consideration. These factors include the intended power of the study, the effect size of the phenomena under study, and the level of significance to be used in rejecting the null hypothesis (alpha). The power of the study was set at 80% and the alpha level was set at 0.05. The effect size was set at 0.5 or 50% higher risk of obesity in the adult African American immigrant population. Effect size is an estimate

measurement of strength of the relationship between the independent and dependent variables in the study (Cohen 1988). The effect size of the study can be characterized as small, medium and large. Several models were examined to test whether the independent variables (immigrant status, income, age, gender, race/ethnicity) predict the two two-level dependent variables (obesity and morbid obesity).

The study set the sample size necessary to likely determine a statistical significance to 385 participants. This means that there is an 80% probability that 385 participants was sufficient to find a statistical effect (effect size of .25) between variables where $\alpha = 0.05$ (Faul, Erdfelder, Lang, & Buchner, 2007).

However, 1,500 participants were targeted to capture information to compensate for uncompleted questionnaires, missing information, or sample bias such as more women or men in the study. This study used convenience sampling of participants with internet access, a form of non-probability sampling. Participation in this study was voluntary and participants were informed that they could refuse to participate in this survey research. No consent form was needed because the form was anonymous and participation was voluntary. Survey questions that could potentially help identify participants were not included in the form (see Appendix D). By clicking the next button on the web survey after study summary, consent information and responding to survey questions constitute consent by participant. Participants were asked to complete web survey and click the done with survey button at the end of survey for submission.

Study Participants Eligibility Criteria

Participant who expressed voluntary participation were included if they were adult African American immigrants and non-immigrants. They also needed to be 18 years of age and must have resided in the U.S for at least 10 years. Immigrants of mixed racial/ethnic groups were excluded from the study and all other racial/ethnic groups. African American immigrants with less than 18 years old were also excluded.

Instrumentation and Materials

The BRFSS is a cross-sectional surveillance survey currently involving 54 reporting areas with a complex sample design (Mokdad, Bales, Greenlund, & Mensah, 2003). A modified BRFSS web survey questionnaire was used to collect data on adult African American immigrant and non-immigrant population. A recent review found that most questions on the core BRFSS instrument were at least moderately reliable and valid and many were highly reliable and valid (Nelson, Holtzman, Bolen, Stanwyck, & Mack, 2001). BMI was calculated according to self-reports of height and weight. Obesity was measured using the BMI or weight in kilograms divided by height (in meters) squared. BMI was categorized as underweight ($BMI \leq 18.5$), normal weight ($18.5 \leq BMI \leq 25$), overweight ($25 \leq BMI < 30$), obese ($BMI \geq 30$) and morbid obese ($BMI \geq 35$) and BMI missing. Modified BRFSS core modules questions were used for this study.

Measurements of Variables

The conceptual model was converted into a measurement model that drives the analysis of data as shown in Figure 3. Behavioral risk factor variables are used to adjust

for potential confounders that could arise due to their effects on weight in both native born African American and Adult African America immigrant population.

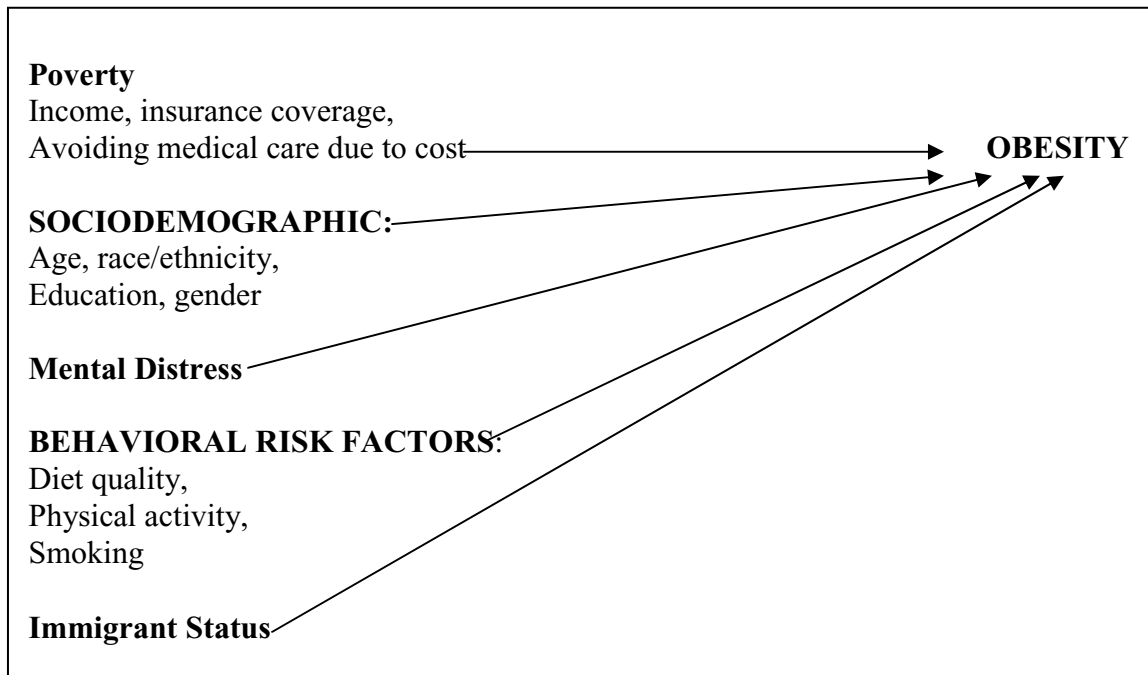


Figure 2. Measurement model for the study.

Data Recoding

The strategy for recoding each variable included in the analysis is highlighted in Tables 1 through 7.

Table 1

Data Recoding of BMI Variable

Variable	Variable Type	Measure(s)	Initial Coding	Recoding
DV ^a : BMI	Categorical (Tables)	Q 15. How tall are you in feet and inches? Q 16. How much do you weigh in pounds?	HEIGHT IN FEET& INCHES WEIGHT	BMIcat 0.000-17.999 = “a. Underweight” 18.000-24.999 = “b. Normal weight” 25.000-29.999 = “c. Overweight” 30.000-34.999 = “d. Moderately Obese” 35.000-99.999 = “e. Morbidly Obese”

Note: ^a D.V. = Dependent Variable

Table 2

Data Recoding of Income Variable

Variable	Variable Type	Measures(s)	Initial Coding	Recoding
IV ^b : INCOME	Categorical (Tables)	Q 19. Is your annual household income from all sources;-	– \$20,000 to less than \$25,000	Incomecat
			– \$15,000 to less than \$20,000	“a. \$10,000 to less than \$24,999”
			– \$10,000 to less than \$15,000	"a. \$10,000 to less than \$24,999"
			– \$25,000 to less than \$35,000)	"a. \$10,000 to less than \$24,999"
			– \$35,000 to less than \$50,000)	"b. \$25,000 to less than \$34,999"
			– \$50,000 to less than \$75,000)	"c. \$35,000 to less than \$49,999"
			– \$75,000 or more	"d. \$50,000 to less than \$74,999"

Note: ^bI.V.=Independent Variable

Table 3

Data Recoding of Immigrant Status and Avoiding Medical Cost Variables

Variable	Variable Type	Measure(s)	Initial Coding	Recoding
IV: IMMIGRANT STATUS	Categorical (Tables)	Q2. Are you and an immigrant?	Yes No	Are you am immigrant
IV: Avoiding medical cost	Categorical (Tables)	Q 13. Was there a time during the last 12 months when you needed to see a doctor, but could not because of the cost?	Yes No	AVOID MD

Note: I.V.= Independent Variables

Table 4

Data Recoding of Physical Activity

Variable	Variable Type	Measure(s)	Initial Coding	Recoding
IV: Physical activity	Categorical (Tables)	Q 6. In the past week, how many times did you exercise at least 20 minutes hard enough to breathe fast, speed up heart rate, or work up a sweat?	EXERCISE DAYS	Exercisedayscat
IV: Physical activity	Categorical (Tables)	Q 7. In the last week, how many times did you spend in moderate exercise (for example, brisk walking, weight lifting, heavy gardening, heavy housework or playing basket ball)?	EXERCISE MINUTES	Exerciseminutescat

Note I.V.= Independent Variables

Table 5

Data Recoding of Education and Diet Quality

Variable	Variable Type	Measure(s)	Initial Coding	Recoding
IV:EDUCATION	Categorical (Tables)	Q 20. What is the highest grade or level of school that you have completed?	8 th grade or less not Some high school, but did not graduate High school graduate or GED Some college or 2 year degree 4-year college graduate More than 4-year college degree	Educationcat "a. High school graduate or less" "a. High school graduate or less" "b. Some college or 2 year degree" "c. 4-year college graduate" "d. More than 4-year college degree"
IV: DIET QUALITY	Continuous (Means)	Q 5. How many servings of fruits or vegetables did you eat yesterday?		VEGGIES

Note: I.V.= Independent Variables

Table 6

Data Recoding of Mental Distress, Smoking and Age

Variable	Variable Type	Measure(s)	Initial Coding	Recoding
IV: MENTAL DISTRESS	Continuous (Means)	Q 11. During the past month, how many days did you felt worried, tense, or anxious?	None Days the past Month	FMD
IV: SMOKING	Continuous (Means)	Q 8. How many cigarettes do you smoke on a typical day?		CIGS
IV: AGE	Continuous (Means)	Q 17. What was your age on your last birthday?	YEARS	AGE

Note: I.V.= Independent Variables

Table 7

Data Recoding of Gender, Alcohol and Length of Stay in the U.S.

Variable	Variable Type	Measure(s)	Initial Coding	Recoding
IV: GENDER	Categorical (Tables)	Q 18. Are you male or female?	MALE FEMALE	GENDER
IV: ALCOHOL	Categorical (Tables)	Q. 9 During the past month, how many days did you drink any alcoholic beverages?	DRINK DAYS	Drinkdayscat
IV: ALCOHOL	Categorical (Tables)	Considering all types of alcoholic beverages, how many days during the past month did you have 5 or more drinks?	DRINK 5	Drink5cat
IV: LENGTH OF STAY IN THE US	Continuous (Means)	Q 4. How long have you lived in the United States?	MONTHS YEARS	YEARS IN US

Note: I.V.= Independent Variables

Dependent Variables: Two dichotomous dependent variables were investigated for this study namely, obesity and morbid obesity. In this study, obesity is defined as BMI > 30 and morbid obesity is defined as BMI > 35. Body Mass Index (BMI) is computed using the weight in kilograms divided by height (in meters) squared.

Independent Variables: The primary independent variables were immigration status and income.

Demographic variables: In addition, the following independent variables were investigated and controlled for: age, education, gender, smoking, diet quality, physical activity, avoiding medical cost, race/ethnicity and mental distress.

Reliability and Validity of BRFSS Questions

Nelson et al. (2001) found that most questions on the core BRFSS instrument were at least moderately reliable and valid and many were highly reliable and valid. BRFSS results were concluded to be valid and results generalized to the adults U.S. non-institutionalized population. The focus of the present study is on obesity and its relationship with immigration status and other independent variables identified in the literature review. A modified version of BRFSS core questionnaires was to be used in collecting data via internet survey on African American adult immigrants and non-immigrants. This instrument has been previously used in published articles and successfully predicted the expected dependent variable. Pierce, Denison, Arif, and Rohrer, (2006) used a modified BRFSS survey to test the hypothesis whether living near a walking or cycling trail was associated with greater odds of walking in patients attending community clinics and other independent variables. They found that perceived

proximity to a trail was correlated with walking. Rohrer et al. (2004) used a similar modified BRFSS survey in a cross-sectional study in a convenience sample in three community clinics to investigate the relationship between perceived walkability and overall self-related health among clinic users. Perceiving availability of places to walk was related to better self related health according to study results. Rohrer et al. (2007) used a modified BRFSS survey in a cross-sectional study in community medicine patients to investigate the feasibility of using a measure normally employed in community health surveys as a quality indicator in primary care patients.

Sources of Error

Several potential sources of errors can occur during administration of a survey. Recall bias is when the respondent does not accurately recall the reported event. A second source of error is non-response error by which respondent refuses to answer the question or does not truthfully answer the question. This study used a sample drawn from adult African American immigrants and non-immigrants residing in the U.S. As a result findings cannot be generalized to the entire U.S. population. Study was limited to participants with internet access only.

Data Collection and Analysis

Statistical Analysis. Data were obtained from Survey Moneky in Excel spreadsheets and imported into EpiInfo version 3.5.1. The data were cleaned, independent variables reassigned simpler names, and any outliers were identified and removed. Data were recoded as necessary, especially in cases of skewness. Missing data were replaced with median of data set. Descriptive statistics (e.g., mean, standard

deviation for continuous variables, frequency, and percentages for categorical variables) were computed for each variable.

Multiple linear regression analysis was used to examine the research questions and corresponding hypotheses. The first regression model examined the ability of the independent variables (age, education, avoid medical care due to cost, smoking, alcohol consumption, physical activity, frequent mental distress, gender, diet quality and length of time lived in the U.S.) to predict obesity. The second regression model examined the ability of the independent variables to predict morbid obesity.

Data collection took place via flyers containing web's survey link placed in public areas in several States. E-mail letters containing survey's web link was sent to thousands of friends, family and associates. Data were collected from eligible participants who were 18 years of age and beyond. Flyers and e-mail invitation letters advertised study and encouraged eligible participants to respond to the web survey and forward invitation letter to other potential participants. An introductory page was included in internet survey link briefly explaining study and informing participants that participation was entirely voluntary and that they could withdraw from the study at any time. Completing survey questionnaire after reading introductory page on survey link constituted consent for the study. There was no question that could potentially help identify participants. Participation was completely anonymous.

Web completed surveys were exported into EpiInfo statistical software for analysis. The data were saved in Survey Monkey's web site and on separate data storage

device and placed in a filing cabinet. The data will be kept for a period of 10 years, after which all digital data will be deleted.

Descriptive statistics was used to analyze data generated by this cross-sectional survey research study. Frequency, standard measures of central tendency (mean, median, and mode), standard deviation and variance were calculated for each variable.

Chi-square tests were performed to test association between each categorical independent variable and obesity. Multiple logistic regression analysis were used to test the independent effects of the immigration status while controlling for confounding effects of income, age, gender, education, physical activities, mental distress, and smoking. A reverse step elimination process was employed using a critical p value of 0.05 ($p < 0.05$) for variable retention in the final model selection.

The first multiple logistic regression model tested whether immigrant status and income were independently associated with elevated risk for obesity. The second regression model tested whether immigrant is independently associated with elevated risk for morbid obesity. Additional regression model tested for the interaction between immigrant status and other risk factors.

Protection of Human Subjects

This cross-sectional survey study used a modified BRFSS survey questionnaire via internet as a primary instrument in data collection. To protect the rights of human subjects during the data collection process and afterwards, Walden University institutional review board (IRB) approval was requested prior to collection of data.

Walden's University's approval number for this study was 12-03-09-0302481 which expires on December 2, 2010.

Data collected in this cross-sectional survey research study excluded information that could make it possible to identify study subject and findings did not report information that could identify individuals. Data collected for this study were stored in my personal lap top portable computer and on back-up removable discs—all of which were password-protected for a period up to a decade.

Summary

Chapter 3 discussed the research methodology for this quantitative study on obesity and morbid obesity on adult African American immigrants. This study employed a cross-sectional research design with a target sample size of 385 participants chosen via a random sampling. Modified BRFSS questions were used in the survey instrument. This instrument has been validated and reliably used in published studies that predicted expected dependent variable. Data were analyzed using descriptive statistics, chi-square tests to test association between each categorical variable, univariate, and multivariate logistic regressions and a reverse step elimination process was employed for variable retention in the final model selection. This chapter also described measures taken for the protection of rights of the participants.

Chapter 4: Results

The purpose of this quantitative cross-sectional study was to discover the relationship between immigrant status and obesity in African American adults residing in the U.S. The study relied on primary data collected using survey monkey and an internet web-based survey instrument. A structured e-mail invitation letter with an active survey link was sent out to a convenient sample of African Americans and adult African American immigrants. Respondents were asked after completion of survey to forward invitation e-mail letter to family, friends, and associates and the snowball effect helped in the completion of data collection for the study. Data collected using survey monkey for up to six weeks were exported into EpiInfo version 3.5.1 via an excel spreadsheet for analysis. A total of 303 (N = 303) completed responses were used at the completion of this study. This study provided information related to overweight and obesity in African American communities in the U.S.

Two dichotomous dependent variables, obese and morbidly obese, were investigated in this study. Immigration status and income were two primary independent variables that were adjusted for with respect to obesity and morbid obesity while controlling fourteen independent variables that included age, avoiding medical care due to cost, smoking, alcohol consumption, physical activity, frequent mental distress, gender, diet, and length of time lived in the U.S. The variables were coded on nominal and ordinal scales. Demographic variables were race/ethnicity (European American, African American, Asian, Native Hawaiian or other Pacific Islander and American Indian or Alaska Native), gender, age (18-34, 35-64 and 64-100), and education (high

school graduate or less, some college or 2 year degree, 4-year college graduate and more than 4-year college degree). Behavioral and social variables were moderate physical activity (none, 1-30 minutes and more than 30 minutes), vigorous physical activity (none, 1-30 minutes and more than 30 minutes), smoking, income (\$10,000 to less than \$24,999, \$25,000 to less than \$34,999, \$35,000 to less than \$49,999, \$50,000 to less than \$74,999 and \$75,000 or more) diet quality, binge drinking or five or more drinks/day (0, 1-7, 8-14, 9-21, 21-29 and 29-41), and moderate alcohol consumption days in a month (0, 1-7, 8-14, 9-21, 21-29 and 29-41). Demographic characteristics related to weight in the participant sample were based on BMI level. BMI was calculated using CDC standards of $BMI = (\text{weight in pounds}) \div (\text{ht in inches squared}) \times (703)$. BMI was computed from self-reported height and weight. Normal weight was classified as a person having a BMI between 18 and 24. Overweight was classified as a person having a BMI between 25 and 29, while moderately obese was having a BMI between 30 and 35. A person having a BMI of 35 and above was classified as morbidly obese

This chapter provides tables of results of the data analyses including summary statistics (frequency, standard measures of central tendency, standard deviation and variance) for each variable. Results of tables of chi-square tests of association between each categorical independent variable and obesity and morbid obesity will be presented. Finally, the chapter presents findings of reduced model of multiple regression analysis of immigration status and income as they relate to obesity and morbid obesity while controlling confounding effects of age, gender, education, physical activities, mental distress, smoking, alcohol consumption, frequent mental distress, diet and years of

residence in the United States. A reverse step elimination process was performed using a p value of 0.05 ($p < 0.05$) for variable retention in the final model selection. Detail elimination steps can be seen in the appendix section.

Replacement of Missing Values

Missing values for independent variables that were measured on either a nominal or ordinal scale were replaced with median value in data set. The total responses to the survey was 303 ($N = 303$) of which 297 (98%) of survey with no missing cases. There were eight cases with missing data for independent variables age, frequent mental distress and eat when hungry. No comparisons were made between this subset and the entire sample in the data set. Replacement of missing values was implemented to be consistent with other studies found in the literature (Pierce et al., 2006; Rohrer et al., 2004; Rohrer et al., 2007; Rohrer et al., 2007; Rohrer et al., 2008; Rohrer et al., 2009; Rohrer et al., 2010).

Demographic, Behavior and Social Characteristics of Study Sample

The final study sample included 303 participants who responded to 98% of survey questions. Among the 192 immigrant responders, 41 were from Caribbean islands and 151 from west, central or east Africa, with the largest group being from Cameroon in central Africa. Immigrant responders had been in the United States from 1 to 42 years with 12 years being the median.

Table 8 shows the characteristics of the sample in regard to age and immigration status. More than half of the survey participants 70% ($n = 212$) were in the 35-64 age category, 29% ($n = 88$) in the 18-34 age category and 1% ($n = 3$) in the 65-100 age

category. Of those in the study, 64% ($n = 193$) were immigrants and 36% ($n = 110$) were not immigrants. Of total participants in the study, 29% ($n = 87$) responded that there was a time in a year that they could not see a doctor as a result of cost. On the other hand, 71% ($n = 216$) of survey participants had some kind of medical coverage or could see the doctor for medical check up or when sick.

Table 8

Age, Immigration Status and Avoiding Doctor Due to Cost (n = 303)

Age Category	Frequency	Percent
18-34.99	88	29%
35-64.99	212	70%
65-100	3	1%
Total	303	100%
Are you an immigrant?	Frequency	Percent
No	110	36%
Yes	193	64%
Total	303	100%
Avoiding doctor due to cost	Frequency	Percent
No	216	71%
Yes	87	29%
Total	303	100%

The results show 18% ($n = 54$) of survey participants as normal weight, 36% ($n = 109$) overweight, 25% ($n = 76$) moderately obese and 21% ($n = 64$) morbidly obese (Table 9).

Table 9

BMI Category (n = 303)

BMI Category	Frequency	Percent
Normal Weight	54	18%
Overweight	109	36%
Moderately Obese	76	25%
Morbidly Obese	64	21%
Total	303	100%

Participants were asked the number of days in a month that they consumed 5 or more alcoholic beverages (Table 10). Half of survey participants 50% ($n = 151$) reported that they had not engaged in drinking 5 or more alcoholic beverages in a month but 44% ($n = 133$) stated that they drank between 1-7 alcoholic beverages in a month. A total of 4% ($n = 12$) stated that they drank 8-14 alcoholic beverages in a month, 0.7% ($n = 2$) drank 8-21 alcoholic beverages in a month, 0.3% ($n = 1$) drank 21-29 and 1% drank 29-41.

Another question was asked about number of days participants drank alcoholic beverages in a month. More than half 56% ($n = 170$) drank 1-7 days in a month and 25% ($n = 77$) of survey participants reported not drinking any alcoholic beverage in a month. It is important to note that 6% ($n = 19$) of participants reported to drink 29 or more days in

a month. A total of 6% ($n = 19$) of participants reported drinking alcoholic beverages 8-14 days per month. A total of 5% ($n = 14$) reported drinking 9-21 days. Finally 1% ($n = 4$) of participants reported to drink 21-29 days of alcoholic beverages in a month.

Table 10

Alcohol Consumption (n = 303)

Days per month consumed more than 5 alcoholic beverages	Frequency	Percent
0	151	50%
1-7	133	44%
8-14	12	4%
9-21	2	.7%
21-29	1	.3%
29-41	4	1%
Total	303	100%
Days per month consumed alcoholic beverage	Frequency	Percent
0	77	25%
1-7	170	56%
8-14	19	6%
9-21	14	5%
21-29	4	1%
29-41	19	6%
Total	303	100%

Participants were asked about the highest grade or level of school that they have completed. Results showed 49% (n = 150) had more than 4-year college degree, 22% (n = 68) had some college or 2 year degree, 18 (n = 57) were 4-year college graduate and 11% (n = 28) were high school graduate or less (Table 10). Results of how many times participants exercised moderately in a week also appear in Table 11. Sixty-five percent (n = 197) of study participants engaged in such activity between 1-30 minutes and 23% (n = 69) did not exercise at all while 12% (n = 37) exercised for more than 30 minutes. Sixty percent of participants (n = 182) exercised at least 20 minutes hard enough to breathe fast, speed up heart rate, or work up a sweat of study participants engaged in such activity between 1-30 minutes and 40% (n = 121) did not exercise at all.

Table 11

Education and Physical Activity (n = 303)

Education Category	Frequency	Percent
High school graduate or less	28	11%
Some college or 2 year degree	68	22%
4-year college graduate	57	18%
More than 4-year college degree	150	49%
Total	303	100%
Moderate Exercise		
Frequency (minutes/week)	Frequency	Percent
None	69	23%
1-30 minutes	197	65%
More than 30 minutes	37	12%
Total	303	100%
Vigorous Exercise		
Frequency (minutes/week)	Frequency	Percent
None	121	40%
1-30 minutes	182	60%
Total	303	100%

Over half (51%, $n = 153$) of survey participants were male and 49 % ($n = 150$) were female (table 12). Finally participants were asked their household income from all sources and 42% ($n = 126$) of survey respondents made \$75,000 or more, 23% ($n = 71$) made \$50,000 to less than \$74,000, 17% ($n = 51$) made \$35,000 to less than \$49,000, 11% ($n = 34$) made \$10,000 to less than \$24,000 and 7% ($n = 21$) made \$25,000 to less than 34,000.

Table 12

Gender and Income (n = 303)

Gender	Frequency	Percent
Female	150	49%
Male	153	51%
Total	303	100%
Income Category	Frequency	Percent
\$10,000 to less than \$24,999	34	11%
\$25,000 to less than \$34,999	21	7%
\$35,000 to less than \$49,999	51	17%
\$50,000 to less than \$74,999	71	23%
\$75,000 or more	126	42%
Total	303	100%

Age ranged from 18-100 with most being between 18-64 years of age. In the age group 18-34 over 27% of respondents were of normal weight, over 38% were overweight, over 18% moderately obese and over 15% morbidly obese (Table 13). In the age category 35-65, over 13% of respondents were normal weight, over 34% overweight, over 27%

moderately obese and over 23% morbidly obese. Finally in the age category 65-100, over 33% of respondents were normal weight, overweight and moderately obese and no respondent in this age category was morbidly obese. The relationship between age category and BMI category was not statistically significant ($p = 0.065$).

Over 20% of non-immigrant respondents were of normal weight, over 28% were overweight, over 29% moderately obese and over 22% morbidly obese. Among immigrants, over 16% of respondents were normal weight, over 40% overweight, over 22% moderately obese and over 20% morbidly obese. The association between immigration status and BMI category was not statistically significant ($p = 0.1959$).

Among respondents who were not to be able to see a doctor due to cost, over 14% were normal weight, over 29% overweight, over 21% moderately obese and over 33% were moderately obese. Among respondents who could see a doctor as needed, 19% were normal weight, over 38% were overweight, over 26% were moderately obese and over 16% were morbidly obese.

Table 13

BMI by Age, Immigration Status, and Avoiding Medical Care Due to Cost (n = 303)

Age Category (p = 0.065)	Normal Weight		Overweight		Moderately Obese		Morbidly Obese		TOTAL	
	N	%	N	%	N	%	N	%	N	%
18-34.99	24	8	34	11	16	5	14	5	88	29
35-64.99	29	10	74	24	59	19	50	17	212	70
65-100	1	.3	1	.3	1	.3	0	.3	3	1
TOTAL	54	21	109	38	76	27	64	25	303	100
Are you an immigrant? (p = 0.1959)	Normal Weight		Overweight		Moderately Obese		Morbidly Obese		TOTAL	
	N	%	N	%	N	%	N	%	N	%
No	22	7	31	10	32	11	25	8	110	36
Yes	32	11	78	26	44	15	39	13	193	64
TOTAL	54	18	109	36	76	26	64	21	303	100
Avoid to see a doctor due to cost (p = 0.012)	Normal Weight		Overweight		Moderately Obese		Morbidly Obese		TOTAL	
	N	%	N	%	N	%	N	%	N	%
No	41	14	83	27	57	19	35	12	216	71
Yes	13	4	26	9	19	6	29	10	87	29
TOTAL	54	18	109	36	76	25	64	22	303	100

The association between days in a month a respondent consumed five or more alcoholic beverages and BMI category is shown in Table 14. Over 29% of respondents who did not drink alcoholic beverages were of normal weight, over 39% of respondent in that same category were overweight, over 25% were moderately obese and over 5% were morbidly obese. Among respondents who drank 1-7 alcoholic beverages in a month, over 6.8% were normal weight, over 32% overweight, over 27% moderately obese and over 33% morbidly obese. Results of respondents who answered that they drank 8-14 alcoholic beverages in a month, none were normal weight, 25% were overweight, over

8% moderately obese and over 66% were morbidly obese. Finally, all respondents who drank 9-41 alcoholic beverages in a month were morbidly obese.

Over 36% of those who responded that they did not consume any alcoholic beverage in a month were normal weight, 39% overweight, over 16% moderately obese and over 7% morbidly obese. Respondents who consumed 1-7 alcoholic beverages in a month; over 11% were normal weight, over 34% overweight, over 28% moderately obese and over 25% morbidly obese. Respondents who consumed 8-14 alcoholic beverages in a month, over 5% were normal weight, over 36% overweight and moderately obese and over 21% were morbidly obese. In the 9-21 alcoholic beverages consumed in a month category, over 28% of respondents were normal weight and overweight, over 35% moderately obese and 7% moderately obese. Respondents who reported to drink 21-29 alcoholic beverages in a month; none or respondents were normal weight or moderately obese, over 75% were obese, and 25% were morbidly obese. Finally in the 29-42 alcoholic beverages consumed in a month category, over 5% of respondents were normal weight, over 31% overweight, over 25% moderately obese and over 21% were morbidly obese.

Table 14

BMI by Social Behavior towards Days Per Month Consumption more than 5 Alcoholic Beverages (n = 303)

Days per month consumed more than 5 alcoholic beverages (p = 0.000)	Normal Weight		Overweight		Moderately Obese		Morbidly Obese		Total	
	N	%	N	%	N	%	N	%	N	%
0	45	15	60	20	38	13	8	3	151	50
1-7	9	3	43	14	37	12	44	15	133	44
8-14	0	0	3	1	1	.3	8	3	12	4
9-12	0	0	0	0	0	0	2	.6	2	.6
21-29	0	0	3	1	0	0	2	.3	1	.3
TOTAL	54	18	109	36	76	25.3	64	30	303	100
Days per month consumed alcoholic beverage (0.0001)	Normal Weight		Overweight		Moderately Obese		Morbidly Obese		Total	
	N	%	N	%	N	%	N	%	N	%
0	28	9	30	10	13	4	6	2	77	25
1-7								1		56
8-14	20	7	59	19	48	16	43	4	170	6
9-21	1	.3	7	2	7	2	4	1	19	6
21-29	4	1	4	1	5	2	1	3	14	5
29-41	0	0	3	1	0	0	1	3	4	1
TOTAL	1	.3	6	2	3	1	9	3	19	6
								2		100
	54	18	109	35	76	25	64	1	303	

Among respondents who had high school degrees or less education, over 7% were normal weight, 25% overweight, over 17% moderately obese and 50% morbidly obese (Table 15). Among respondents who had some college or a 2 year degree, over 11% were normal weight, over 41% overweight, over 23% moderately obese and morbidly obese. Among respondents who in the 4-year college graduate category, over 28% had normal

weight, over 22% overweight, over 29% moderately obese and over 19% morbidly obese. Finally among respondents in the more than 4-year college degree category, over 18% had normal weight, over 40% overweight, over 25% moderately obese and over 15% morbidly obese.

Examining the association between moderate exercise category and BMI category showed that respondents who did not exercise in a week; over 15% had normal weight, over 30% overweight, over 28% moderately obese and over 25% morbidly obese. On the other hand, among respondents who exercised for 1-30 minutes in a week, over 19% had normal weight, over 39% overweight, over 23% moderately obese and over 18% morbidly obese.

Among respondents who did not exercise vigorously in a week, over 17% had normal weight, over 26% overweight, over 31% moderately obese and over 26% morbidly obese. Among, respondents who engaged in vigorous exercise for 1-30 minutes in a week, over 15% had normal weight, over 39% overweight, over 23% moderately obese and over 22% morbidly obese. Finally, respondents who vigorously exercise for more than 30 minutes in a week; over 32% had normal weight, over 37% overweight, over 21% moderately obese and over 8% morbidly obese. Vigorous exercise was not associated with BMI ($p = 0.1872$).

Table 15

BMI by Education and Exercise (n = 303)

Education Category (0.0016)	Normal Weight		Over-weight		Moderately Obese		Morbidly Obese		TOTAL	
	N	%	N	%	N	%	N	%	N	%
High school graduate or less	2	.6	7	2	5	2	14	5	28	9
Some college or 2 year degree	8	3	28	9	16	5	16	5	68	22
4-year college graduate	16	5	13	4	17	6	11	4	57	19
More than 4-year college degree	28	9	61	20	38	13	23	8	150	50
TOTAL	54	18	109	26	76	25	64	21	303	100
Moderate Exercise (minutes/week) (p = 0.046)	Normal Weight		Over-weight		Moderately Obese		Morbidly Obese		TOTAL	
	N	%	N	%	N	%	N	%	N	%
None	19	6	37	12	34	11	31	10	121	40
1-30 minutes	35	12	72	24	42	14	33	11	182	60
TOTAL	54	18	109	36	76	25	64	21	303	100
Vigorous Exercise (minutes/week) (p = 0.1872)	Normal Weight		Over-weight		Moderately Obese		Morbidly Obese		TOTAL	
	N	%	N	%	N	%	N	%	N	%
None	12	4	18	6	22	7	17	6	69	23
1-30 minutes	30	10	77	25	46	15	44	15	197	65
More than 30 minutes	12	4	14	5	8	3	3	1	37	12
TOTAL	54	18	109	36	76	25	64	21	303	100

Over 20% of females and 15% of male respondents were normal weight, 36 % of female and over 35% of male respondents were overweight, over 26% female and over 25% male respondents moderately obese and over 16% female and over 25% male

respondents were morbidly obese (Table 16). Gender was not statistically significant with respect to BMI category ($p = 0.2179$).

Income category was the last independent variable that was compared to BMI category. Results showed that among respondents in \$10,000 to less than \$24,000 income bracket, over 23% had normal weight, over 41% overweight, over 26% moderately obese and over 8% morbidly obese. For respondents in the \$25,000 to less than \$34,000 income bracket, over 14% had normal weight, over 42% overweight, 19% moderately obese and over 23% morbidly obese. Among respondents in the \$35,000 to less than \$50,000 income brackets with respect to BMI category showed, over 19% were normal weight, over 29% overweight, over 25% moderately and morbidly obese. Among respondents in the \$50,000 to less than \$75,000 income category, over 19% had normal weight, over 29% were overweight, over 28% moderately obese and over 22% morbidly obese. Finally among respondents who earned from \$75,000 and above category, over 17% had normal weight, over 36% were overweight, over 25% were moderately obese and over 21% morbidly obese. Income category was not statistically significant with respect to BMI category ($p = 0.8087$).

Table 16

BMI by Gender and Income Category (n = 303)

Gender (p = 0.2179)	Normal Weight		Overweight		Moderately Obese		Morbidly Obese		Total
	N	%	N	%	N	%	N	%	N
Female	31	10	54	18	40	13	25	8	150
Male	23	8	55	18	36	12	39	13	153
TOTAL	54	18	109	36	76	25	64	21	303
Income Category (p = 0.8087)	Normal Weight		Overweight		Moderately Obese		Morbidly Obese		Total
	N	%	N	%	N	%	N	%	N
\$10,000 to less than \$24,999	8	3	14	5	9	3	3	1	34
\$25,000 to less than \$34,999	3	1	9	3	4	1	5	2	21
\$35,000 to less than \$49,999	10	3	15	5	13	4	13	4	51
\$50,000 to less than \$74,999	14	5	21	7	20	7	16	5	71
\$75,000 or more	19	6	50	17	30	10	27	9	126
TOTAL	54	18	109	36	76	25	64	21	303

Means tests of the association between continuous variables and BMI category are shown in Table 17. The relationship between each continuous variable (number of cigarettes smoke on a typical day, frequent mental distress, years of residence in the U.S., and number of vegetable servings in a day) and BMI category was assessed using a t-test, or, when variances were unequal, the Kruskal-Willis test. The relationship between

number of cigarettes smoked on a typical day, frequent mental distress, years of residence in the U.S., and number of vegetable servings in a day and BMI category were not statistically significant at $p < 0.05$.

Table 17

BMI by Cigarettes Smoked, Days of Frequent Mental Distress, Years of Residence in the U.S., and Number of Vegetable Servings in a Day

	Normal Weight	Overweight	Moderately Obese	Morbidly Obese	p-value
Smoking (number of cigarettes smoke on a typical day), Mean (SD)	0.94 (4.86)	1.69 (5.88)	2.43 (7.28)	0.97 (3.96)	P = 0.49 Kruskal-Wallis
Frequent Mental Distress, Mean (SD)	6.02 (8.51)	5.95 (8.27)	5.95 (8.27)	4.48 (4.58)	p = 0.74 Kruskal-Wallis
Years of residence in the United States, Mean (SD)	23.46 (17.14)	20.85 (16.96)	25.96 (15.60)	26.50 (15.08)	p = .6537 t test
Number of vegetable servings in a day	1.61 (1.77)	1.68 (1.36)	1.37 (1.24)	1.22 (1.09)	P = 0.14 Kruskal-Wallis

Results of multiple logistic regression modeling to determine if the association between obesity (BMI > 30) and immigrant status remained significant after adjusting for fourteen independent variables (Table 18). Adjusted odds ratios and 95% confidence intervals were calculated for each independent variable. A reverse step multivariate logistic regression analysis was conducted using a p value of 0.05 ($p < 0.05$) eliminating first variable with highest p values as shown in Appendix E. Immigrant status was retained in every model of analysis as variables with higher p values were eliminated. There was no significant relationship between obesity and 11 of the 14 independent

variables (avoid medical care due to cost, smoking, number of days consumed alcoholic beverages in a month, education category, moderate exercise, vigorous exercise, frequent mental distress, gender, income category, diet, years of residence in the U.S.).

Significance at the $p < 0.05$ level was demonstrated for obesity and two other independent variables: age (Adjusted OR = 1.0332, 95%CI: 1.0032-1.0641, $p = 0.0298$) and days per month consumed more than 5 alcoholic beverages (Adjusted OR = 1.7735, 95%CI: 1.3294-2.366, $p = 0.0001$). Immigrant status was found not to be related to obesity (Adjusted OR = 1.1095, 95%CI: 0.5871-2.0967, $p = 0.7489$) and does not support the hypothesis of this study that the risk of obesity in African American adults is associated with immigration after adjusting for other factors.

Table 18

Multiple Logistic Regression Analysis of Obesity (N = 303)

Variables	Odds Ratio	Lower CL	Upper CL	P-Value
Age	1.0332	1.0032	1.0641	0.0298
Are you an immigrant (Yes/No)	1.1095	0.5871	2.0967	0.7489
Days per month consumed more than 5 alcoholic beverages	1.7735	1.3294	2.366	0.0001

Table 19 shows the results of multiple logistic regression modeling to determine if association between morbid obesity (BMI > 35) and immigrant status remained significant after adjusting for fourteen independent variables. Adjusted odds ratios and 95% confidence intervals were calculated for each independent variable. A reverse step multivariate logistic regression analysis was conducted using a p value of 0.05 ($p < 0.05$) eliminating first variable with highest p values as shown in Appendix F. Immigrant status was retained in every model of analysis as variables with higher p values were

eliminated. There was no significant relationship between morbid obesity and seven of the fourteen independent variables (age, avoid medical care due to cost, smoking, number of days consumed alcoholic beverages in a month, education category, moderate exercise, vigorous exercise, frequent mental distress, gender, income category, diet, years of residence in the U.S.). Significance at the $p < 0.05$ level was demonstrated for morbidly obese and six independent variables: avoid medical care due to cost (Adjusted OR = 4.4628, 95%CI: 2.1038-9.4668, $p = 0.0001$), smoking (Adjusted OR = 0.9078, 95% CI: 0.8348-0.9871, $p = 0.0235$), days per month consumed more than 5 alcoholic beverages (Adjusted OR = 1.2105, 95% CI: 1.105-1.326, $p = 0.0000$), education (Adjusted OR = 0.0569, 95% CI: 0.0166-0.1948, $p = 0.0000$), frequent mental distress (Adjusted OR = 0.9329, 95% CI: 0.8769-0.9924, $p = 0.0276$), and income (Adjusted OR = 11.857, 95% CI: 2.4713-56.8896, $p = 0.0002$). Immigrant status was found not to be related to morbidly obese (Adjusted OR = 0.7897, 95%CI: 0.388-1.6074, $p = 0.5151$) and does not support the hypothesis of this study that the risk of morbid obesity in African American adults is associated with immigration after adjusting for other factors.

Some of the findings involving covariates were unexpected. Higher education, smoking and frequent mental distress had odds ratios below 1.0, indicating protective effects. Higher income appeared to increase the risk of obesity. However, these effects though significant were small so they will not be discussed further.

Table 19

Multiple Logistic Regression Analysis of Morbid Obesity (N = 303)

Variables	Odds Ratio	Lower CL	Upper CL	P-Value
Are you an immigrant (Yes/No)	0.7897	0.388	1.6074	0.5151
Avoid to see a doctor due to cost (Yes/No)	4.4628	2.1038	9.4668	0.0001
Smoking	0.9078	0.8348	0.9871	0.0235
Days per month consumed more than 5 alcoholic beverages	1.2105	1.105	1.326	0
Education Category (b. Some college or 2 year degree/a. High school graduate or less)	0.1358	0.0403	0.4576	0.0013
Education Category (c. 4-year college graduate/a. High school graduate or less)	0.1211	0.0337	0.4356	0.0012
Education Category (d. More than 4-year college degree/a. High school graduate or less)	0.0569	0.0166	0.1948	0
Frequent mental distress	0.9329	0.8769	0.9924	0.0276
Income Category (b. \$25,000 to less than \$34,999/a. \$10,000 to less than \$24,999)	3.2118	0.5254	19.634	0.2065
Income Category (c. \$35,000 to less than \$49,999/a. \$10,000 to less than \$24,999)	5.1553	1.1083	23.9798	0.0365
Income Category (d. \$50,000 to less than \$74,999/a. \$10,000 to less than \$24,999)	7.6781	1.6209	36.3699	0.0102
Income Category (e. \$75,000 or more/a. \$10,000 to less than \$24,999)	11.857	2.4713	56.8896	0.002

Interactions between immigrant status and both age and gender were tested using stratified two-way tables. The interaction was not significant with either age or gender for either obesity or morbid obesity.

Summary of Findings

This study aimed to verify whether immigrant status is directly related to obesity or morbid obesity. Of the fourteen independent variables that were tested in multivariate binary logistic regression models, two (age and days per month consumed more than 5 alcoholic beverages) were statistically significant with respect to obesity and six (avoid medical care due to cost, smoking, days per month consumed more than 5 alcoholic beverages, education, frequent mental distress, and income) with respect to morbid obesity. Immigrant status was found not to have a statistically significant effect on either obesity or morbid obesity supporting the null hypothesis for this research study which states that the risk of obesity in African American adults is not associated with immigration after adjusting for other factors.

Overall, this study indicated that binge drinking was the only independent variable that was directly associated with both obesity and morbid obesity. It was interesting to find that age was associated with obesity but not associated with morbid obesity. Morbid obesity on the other hand was associated with several more independent variables than obesity.

Chapter 5 discusses the interpretation of research findings and implications for social change. Conclusions and recommendations for future research are explained at the end of this chapter.

Chapter 5: Discussions, Conclusions and Recommendations

The continued attention to weight-related issues and health disparities among minorities and the immigrant population was the major driving force behind conducting this research. The literature clearly defines obesity as an escalating epidemic of alarming proportions in the United States and a serious public health crisis in every race even though this health problem is more prevalent in African American communities (Baskin et al., 2005). Researchers have looked at obesity in many racial and ethnic groups (Abraido-Lanza et al., 2006; Gordon-Larsen et al., 2003; Goel et al., 2004; Haas et al., 2003), especially the African American communities (Baskin et al., 2005), but little research has examined African American adult immigrants residing in the U.S.. This research sought to uncover via primary data collection whether obesity in African American Adult immigrant population was due to immigration while controlling other factors. This study used survey research to investigate whether the risk of obesity was higher among immigrant African American adults than among non-immigrant African American adults after adjusting for other risk factors. A modified BRFSS survey questionnaire previously used in published articles was used in developing internet survey using Survey Monkey. A structured e-mail invitation letter containing the survey's active link was sent out to friends, family, and associates. An invitation letter encouraged participants to forward the letter to family, friends, and as well as associates after completing the survey. A \$50.00 incentive in the form of a lottery prize was offered to encourage participants to participate in this study and participants were asked to respond via e-mail if interested in participating in lottery. The snowball effect coupled with lottery

incentive facilitated data collection for this study for a six-week period of time. In total, only nine participants responded to participate in lottery. Lottery participants e-mail addresses were folded placed in a box and two winners were selected. Winners were both sent e-mail letters containing reference numbers of \$50.00 payment from Western Union. No form of identification was required for lottery payout at Western Union as condition of payment was based on a test question: “Winner of Walden Doctoral Student” and the answer of this statement was “Obesity.” Information of payout was e-mailed to both winners selected in the lottery process.

A total of 303 participants responded to survey questions. Data were imported to EpiInfo via excel spreadsheet for analysis. A reverse step-wise elimination multiple logistic regression analysis was conducted dropping independent variables with highest p value first. The model reduction process ended when all p values were significant at 0.05 and below. Immigrant status was retained in all models of analysis. The first series of models analyzed the relationship between immigration status and obesity adjusting for in total of fourteen independent variables as seen in appendix B. The next series of models examined the relationship between immigration status and morbid obesity adjusting for the same fourteen independent variables as in previous models.

Results showed binge drinking as the only independent variable that was statistically significant with respect to both obesity and morbid obesity. Additionally, the study results also showed that age was statistically significant with respect to obesity but not with morbid obesity. Six independent variables (avoid medical care due to cost, number of cigarettes smoke in a day, education category, frequent mental distress, and

income category) were all significant with respect to morbid obesity. These results provide evidence that risk factors that affect weight and its related health problems in the African American and African American immigrant communities are not limited to alcohol consumption. Instead, additional risk factors must be addressed in order to reduce the prevalence of obesity in the U.S. minority population.

Interpretation of Findings

The primary purpose of this study was to investigate the relationship between obesity and immigration status and income in African American adults residing in the U.S. A hypothesis and a research question were developed to guide the research and all stem from previous research issues that have not been addressed in this particular population. The following discussions reviews findings in this survey research study on Blacks in the U.S. and makes comparisons to similar previous research findings based on results described in Chapter 4 of this research.

Obesity in African American immigrants residing in the U.S. has not been widely studied even though the literature identifies a high prevalence in African Americans as compared to other racial/ethnic groups (Lutfiyya et al., 2008). The relationship between obesity/morbid obesity and immigrant status were not statistically significant ($p = 0.7489$, $p = 0.5151$) according to findings in this dissertation research. These results support the null hypothesis of this research study which stated that the risk of obesity in African American adults was not associated with immigration after adjusting for other factors. A similar study on immigration and obesity among lower income African American men and women to examine the associations of nativity, immigrant generation,

and language acculturation with obesity showed a protective effect of foreign born status and low-moderate language acculturation on obesity risk among (Bennett, et al. 2007). These findings highlight the importance of more frequently examining nativity in obesity-related research conducted among African Americans in the U.S.

The relation between years of residence in the U.S. and obesity/morbid obesity was not statistically significant according to findings in this dissertation. This finding contradicts some previous studies on acculturation as measured by years of residence in the U.S. which concluded that living in the U.S. for 10 to 15 years or more was associated with an increase in BMI (Bertera, et al. 2003; Deepika & Egede 2007; Gordon-Larsen, et al. 2003). It is important to note that most of these studies were conducted on the Latino population in the U.S. Other studies showed no relationship between immigration status and BMI in foreign born African Americans, which is consistent with the findings in this dissertation research (Abraido-Lanza, et al., 2006; Goel, et al., 2004). Focusing on years of residence in the U.S. may direct attention away from socioeconomic and structural constraints such as lack of access to resources.

The association between obesity and age (18-64) in this dissertation was statistically ($p = 0.0298$). Participants in 18-64 age categories were of higher risk of becoming obese compared to participants of 65-100 age category which is supported by previous research on how Americans gain weight (Ogden et al. 2006; Rohrer et al. 2009). Sheehan et al. (2003) estimated weight change in American adults over a 20 year time period and found out that the overall shape of growth curves were similar for men and women, African Americans and European Americans in terms of both weight gain and

weight loss (Sheehan et al., 2003). These authors concluded that Americans gain weight until middle age, stabilize, and begin to lose weight near age 60. A similar finding was also found in a research study by Ogden et al. (2006). Interestingly, in this study, age was not statistically significant with respect to morbid obesity. Nevertheless, the significance of age as a risk factor for obesity is important in age appropriate community program intervention design.

How alcohol consumption affected the risk of becoming obese was evaluated using two independent variables in the questionnaire. Respondents were asked how many days they consumed alcoholic beverages in a month in the first alcohol related question. The next alcohol related question was to know how many days' respondents drank 5 or more alcoholic drinks in a month, which is the definition of binge drinking. Drink days in a month was not significant in both obese and morbidly obese. Binge drinking or having five or more drinks in a day was statistically significant with respect to both obesity and morbid obesity ($p = 0.0001$, $p = 0.0000$). These findings indicate the importance for public health practitioners and primary care physicians to screen obese patients about alcohol consumption. Such methods can lead to secondary prevention which could help reduce morbid obesity rates in the U.S. especially in the black population.

The socio-ecological model was the conceptual framework for this research which offered a better basis for developing intervention. This model acknowledged multiple levels of influence or fostering behavior change. Social support, social norms or influence has shown to positively influence health behavior change. The potential of behavior change within a population groups according to the literature on socio-ecological model

was considered within the social context which included family, friends, work, neighborhood associates, and community organization. In order to improve health behavior based on the socio-ecological model, positive social interaction, improvement in public transportation, building of recreation areas and facilities in order to increase physical activity and diet quality are needed according to researchers (Fleury & Lee 2006). The influence of food advertising is another important factor that impact food consumed by individuals. A socio-ecological model integrated with health literacy education so that respondents could evaluate food advertisements will be a more comprehensive approach to improve healthier food choices by respondents.

The relationship between avoiding medical care due to cost and morbid obesity was significant ($p = 0.0001$). Thus the use of community health clinics could be a potential source of application of health prevention or intervention programming for morbidly obese patients.

The relationships between gender and both obesity and morbidly obese were not significant according to findings in this research study. These results contradict findings in the literature which showed a strong relationship between gender and obesity (Borders et al., 2006).

The relationship between number of fruits or vegetable servings participants ate the previous day was not significantly related to either obesity or morbid obesity. The same results were found in a study by Rohrer et al. (2009) to investigate the independent effects of health confidence and uncontrolled eating on obesity risk in primary care patients. These authors found the number of fruits or vegetables servings ate the previous

day not to be significant with respect to obesity in a multiple logistic regression analysis. Even though fruits and vegetable consumption were not significant in this research study, the literature clearly shows poor diet based on unhealthy foods such as fried chicken as being more available in the African American communities (Campbell et al., 2009; Morland & Evenson 2009).

A surprising finding of this study was that both moderate and vigorous exercise was not related to both obesity and morbid obesity. A similar study on the relationship between uncontrolled eating and obesity in adult primary care patients adjusting for other variables including exercise found exercise not to be related to obesity (Rohrer et al., 2009). According to these authors, there were several potential explanations for these findings. Some people exercise as a social activity and may not be committed to control their calories intake. Others exercise as an alternative to eating less, thinking that they can remove enough body calories to avoid dietary control. Meanwhile others exercise because they were interested in building bulk rather than avoiding obesity. These authors concluded that uncontrolled eating was a more important determinant of obesity in their subjects than lack of exercise as a result of uncertainties about the dynamics of exercise as it relates to obesity. Studies such as this support the fact that in developing a community health program to address the obesity epidemic in Black community, a focus on exercise alone will lead to failure and the continue rise in obesity rates in this racial/ethnic group. The socio-ecological model in developing multiple levels of intervention will certainly be the best approach in implementing an effective community program to fight overweight and obesity.

Finally the following independent variables were not statistically significant with respect to obesity; avoid medical care due to cost, number of cigarettes smoked in a day, level of education, frequent mental distress and income level. These results were interesting because the aforementioned independent variables were all statistically significant with respect to morbid obesity. Therefore, a community program to prevent obesity/morbid obesity must not overlook these variables because they have the potential of having a long term health effect.

Implications for Social Change

Findings in this research are of significance to minority public health community. As a result of disparities and high prevalence rates of obesity in minority ethnic communities, this research study is relevant to the interests of the black population. Past research has concluded that African Americans are more obese than the rest of the U.S. population that leads to severe health and economic consequences (Lutfiyya, et al., 2008; Lutfiyya, et al., 2008; Ogden et al., 2006; Ogden, 2009; Terrell 2002). Published research up to this date has provided the public health community with comparative evidence of obesity in the U.S. in African Americans and other racial ethnic communities. The findings of this dissertation research have not fully supported previous information on obesity in African Americans. Nevertheless, the findings raise questions about the completeness and clarity of previous reports. In order to bring change in a given community public health professionals must research to find what changes are needed in that community. The findings within this research provide the public health community with potential research targets in a population which has been overlooked even though

they might be exposed to factors related to obesity and health related problems. Binge drinking alone can predispose participants to a future of becoming obese. This research brings to light a subject (binge drinking) that has been looked upon mostly on college students.

Avoiding medical care due to cost increased the risk of morbid obesity in this sample. This indicates that impaired access to medical care due to low income may pose an independent risk factor. Expansion of obesity programs through federally qualified health centers and other public clinics is worthy of consideration. The network of such clinics is being expanded, posing an opportunity for reaching more persons who are at risk for obesity with weight management programs.

The results of this dissertation indicated that programs intended to help reduce obesity rates in minority communities must incorporate a socio-ecological model which includes screening for alcohol consumption, intervention and counseling integrated with advisories on other behavioral factors that were significant according to findings of this study.

Limitations of the Study

The primary factor limiting this study was the use of an internet survey method to obtain primary data. Interpretation and application of study's findings are bounded by the context by which this survey method was conducted. The use of modified BRFSS survey questionnaires to obtain data via self-reported behavioral responses presents difficulties in the accuracy of response and recall, which could limit data analysis and interpretation. Being a cross-sectional quantitative research study, it demonstrates associations and not

does prove cause-and-effect. Participants self reported social and behavioral history are personal life factors that they may have been uncomfortable to truly share by responding to survey questions. Finally the use of a convenience sample which was mostly people of Cameroon descent (n = 141), 46% of total participants surveyed may have limited the generalizability of the study results. The use of a convenience sample increases the probability of bias within the study population of African Americans and African American immigrants. This study was limited to adult African Americans and African American immigrants residing in the U.S. so may not apply to minorities of other racial/ethnic groups. Amount of time residing in the U.S. could have affected obesity risk. However, since the time in the United States only applied to the immigrants in the sample, it could not be included in the multivariate model. Despite these limitations, this study is useful because it demonstrates that obesity and morbid obesity are positively related to binge drinking suggesting that health promotion programs targeting this behavior will optimize net health impact in the African American immigrant and African American communities.

Recommendations

The results of this research provide a useful roadmap for public health and health care professionals to begin to view the issues of overweight and obesity in African American and African American immigrant populations. The data presented here indicate that binge drinking was one of the most significant risk factors of obesity and morbid obesity. Binge drinking is defined as drinking 5 or more drinks during a single occasion for men or 4 or more drinks during a single occasion for women (Flowers,

Naimi et al., 2008). According to recent national surveys, more than half of the adult U.S. population drank alcohol in the past 30 days and approximately 15% of the population binge drank. In fact this report stated that excessive alcohol use was the third leading lifestyle related cause of death for people in the United States each year (Serdula et al., 2004). Preventing excessive alcohol use by the Task Force on Community Prevention Services directed towards the general US population, a non federal independent group of public health and prevention experts appointed by the CDC Director has been on four major targets areas; regulating the number of places in a given area where alcohol may be legally sold also known as outlet density. This is as a result of previous research that indicated that there is a positive association between outlet density and excessive alcohol consumption and related harms; privatization of retail sales; maintaining limits on days of sale; increase in alcohol taxes and maintaining limits of hours of alcohol sale in establishments that serve alcohol (Naimi et al., 2009).

Other programs to prevent alcohol use and abuse include controlling alcohol advertising and promotion, strategies aimed at curbing social availability, public support for alcohol policy change and restriction of public drinking. Research from primary care studies on patients who presented for some other problem has shown that brief alcohol screening followed by brief intervention via motivational interviewing or similar counseling can be effective to reduce alcohol consumption (Campbell et al., 2009).

Most work in the prevention field has emphasized changing the individual behavior by education about the dangers of drinking. However, education alone is not enough because social marketing of alcoholic beverages is more a powerful and effective

tool than educative tools such as health advisories about dangers of binge drinking. A comprehensive community approach via change in community norms, policies, media advocacy strategies and finally alcohol screening/counseling in community organizations that provide services to immigrant. Data and results from this dissertation will help gain support and empower community stakeholders to participate in the program design and implementation.

Dissertation results will be disseminated via publications in peer reviewed journal articles, oral and poster presentations at health conferences, state and local health departments and in community organizations. The results will be shared in the Cameroonian and other African American immigrant networks in the United States. This will be an important information especially for the African American immigrant population who had little access to direct information related to their health.

Recommendations for Further Study

The present quantitative survey study has added targeted research to a very limited pool of study on the relationship between immigration status and obesity in African American immigrant population in the U.S. Public health researchers have only focused their efforts on understanding this health burden on African Americans and other racial/ethnic groups other than African American immigrants. The need is to develop sound, evidence-based interventions that promote healthy body weight in the African American immigrant population and also in the African American population in general. Continued research can only help to improve interventions and practice of healthcare

professionals in obesity prevention and treatment programs for this vulnerable population.

More studies are needed to test intervention programs in the African American community. Future research is needed to support this study using a true randomized sample nationwide. Implications for future research are based on findings from this study as well as the bounds in study generalizability noted above. Even though immigration status was not related to obesity or morbid obesity according to findings in this dissertation research, future research should seek to understand obesity rates in participants' country of origin. Numbers of years of residence in the United States also should be considered in future research study.

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Appendix A: Invitation Letter

Bella Survey Invitation by Julius Ade

Title: “Doctoral student research study on Blacks in the United States”.

I am conducting a survey on Adult African Americans and Black immigrants. Your response would be appreciated. Your participation is entirely voluntary and you can win up to \$50.00 by participating in this study. There is no survey question that can identify your personal information. Here is a link to the survey:

<https://www.surveymonkey.com/s/5Q2KVVK> This link is uniquely tied to this survey.

Please forward this e-mail to family, friends and associates.

Thanks for your participation!

Julius N. Ade MD, MPH

Walden University Doctoral Candidate

E-mail: Julius.ade@waldenu.edu

Appendix B: Flyer

DOCTORAL STUDENT**SURVEY**

*Date: 12-03-09***RESEARCH
STUDY**

*Are you 18 years or older, African American or Black immigrant and reside **in the United States?***

You might be interested in participating in this research study by responding to survey at:

<https://www.surveymonkey.com/s/5Q2KVVK>

Your participation is entirely voluntary and you can win up to \$50.00 by participating in this study.

Two winners will be randomly selected from 385 printed e-mail addresses of participants placed in a box to receive a \$50 thank you gift.

A winner will receive an e-mail from researcher containing reference number of gift claim from Western Union.

There is no survey question that can identify your personal information.

Questions call Julius Ade at (703) 863-3356

Appendix C: Consent Form

Welcome!

I am a Walden Doctoral student in Public Health, specializing in Epidemiology conducting an independent research on immigration status, income and obesity amongst adult black immigrants and non-immigrants residing in the United States.

The purpose of this letter is to request your participation in my research study by responding to questions about your health. This survey will last for not more than ten minutes and your participation is entirely voluntary.

This research poses no risk to you and you responding to questions remain anonymous. This research may create awareness about the causes of obesity in African American adults and can help design community health programs on overweight and obesity.

You can win up to \$50.00 by participating in this study. Please reply to invitation e-mail or send e-mail to Julius.Ade@waldenu.edu after survey completion if interested in lottery participation. 385 people will participate in the survey. Participants e-mail printed addresses will be folded and placed in a box and randomly select two winners to receive the \$50 thank-you gift. Winners will receive an e-mail titled "Walden Doctoral Student Survey" with a collection identity number from Western Union. If you choose not to participate or to withdraw from the study at any time, you can do so without penalty or loss of benefit to yourself.

To protect your privacy, signatures are not being collected. Your completing this questionnaire indicates that you are 18 years of age and older, black immigrant or non-immigrant and that you indicate your consent to anonymously voluntarily participate in the study describe.

If you have any questions concerning the research study, please call me at (703)863-3356 or e-mail at, julius.ade@waldenu.edu. If you want to talk privately about your rights as a participant, you can call Dr. Leilani Endicott. She is the Walden University representative who can discuss this with you. Her phone number is 1-800-925-3368, extension 1210. Walden University's approval number for this study is 12-03-09-0302481 and it expires on December 2, 2010.

Appendix D: Modified BRFSS Survey Questions

BLACK ADULT IMMIGRANT AND NON-IMMIGRANT HEALTH SURVEY

1. In general, how would you rate your overall health now?

Excellent Very Good Good Fair Poor

2. Are you an immigrant? _ Yes _ No

3. What is your country of origin?

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

___ Months

___ Years

5. How many servings of fruits or vegetables did you eat yesterday?

_____ servings yesterday

6. In the last week, how many times did you exercise at least 20 minutes hard enough to breathe fast, speed up your heart rate, or work up a sweat?

_____ times in the last week

7. In the last week, how many minutes did you spend in moderate exercise (for example, brisk walking, weight lifting, heavy gardening, heavy housework or playing basketball)?

_____ minutes in the last week

8. How many cigarettes do you smoke on a typical day?

_____ cigarettes per day

9. During the past month, how many days did you drink any alcoholic beverages?

_____ days in the past month

10. Considering all types of alcoholic beverages, how many days during the past month did you have 5 or more drinks?

_____ days in the past month

11. During the past month, how many days have you felt worried, tense, or anxious?

None *or* _____ days the past month

12. How often do you eat when you are not hungry?

Never		Sometimes							
Very Often									
0	1	2	3	4	5	6	7	8	9
10									

13. Was there a time during the last 12 months when you needed to see a doctor, but could not because of the cost?

Yes No

14. What type of health insurance coverage pays for **most** of your medical care?

- Private insurance **including managed care**
- Medicaid Medicare Other
- I don't have health insurance

15. How tall are you in feet and inches? _____ feet _____ inches

16. How much do you weigh in pounds? _____ pounds

17. What was your age on your last birthday? _____ years

18. Are you male or female? Male Female

19. Is your annual household income from all sources—

_ \$20,000 to less than \$25,000

_ \$15,000 to less than \$20,000

- _ \$10,000 to less than \$15,000
- _ \$25,000 to less than \$35,000)
- _ \$35,000 to less than \$50,000)
- _ \$50,000 to less than \$75,000)
- _ \$75,000 or more

20. What is the highest grade or level of school that you have completed?

- | | |
|--|---|
| <input type="checkbox"/> 8th grade or less graduate | <input type="checkbox"/> Some high school, but did not graduate |
| <input type="checkbox"/> High school graduate or GED | <input type="checkbox"/> Some college or 2-year degree |
| <input type="checkbox"/> 4-year college graduate | <input type="checkbox"/> More than 4-year college degree |

21. What is your race? *Please mark one or more.*

- | | |
|---|--|
| <input type="checkbox"/> White | <input type="checkbox"/> Black or African-American |
| <input type="checkbox"/> Asian | <input type="checkbox"/> Native Hawaiian or other Pacific Islander |
| <input type="checkbox"/> American Indian or Alaska Native | |

THANK YOU FOR SHARING YOUR INFORMATION AND OPINIONS!

Contact your primary care provider with any questions about your health.

Contact Julius N. Ade (Ph.D Candidate) at (703) 863-3356 with questions about this survey.

Appendix E: Multivariate Logistic Regression Models

For obesity adjusting for Independent Variables

Unconditional Logistic Regression

Variable	Odds Ratio	Lower CL	Upper CL	P-Value
AGE	1.05	1.00	1.11	0.06
Are_you_an_immigrant_ (Yes/No)	0.60	0.15	2.50	0.49
AVOID_MD (Yes/No)	1.48	0.64	3.42	0.36
CIGS	0.99	0.92	1.07	0.86
DRINK_5	1.69	1.22	2.34	0.00
DRINK_DAYS	0.99	0.93	1.06	0.81
educationcat (b. Some college or 2 year degree/a. High school graduate or less)	0.51	0.09	3.03	0.46
educationcat (c. 4-year college graduate/a. High school graduate or less)	0.20	0.03	1.25	0.09
educationcat (d. More than 4-year college degree/a. High school graduate or less)	0.25	0.04	1.50	0.13
EXERCISE_DAYS	0.98	0.79	1.20	0.82
EXERCISE_MINUTES	0.99	0.99	1.00	0.10
FMD	1.00	0.95	1.05	0.96
GENDER (Male/Female)	1.04	0.52	2.07	0.92
Incomecat (b. \$25,000 to less than \$34,999/a. \$10,000 to less than \$24,999)	1.24	0.24	6.33	0.80
Incomecat (c. \$35,000 to less than \$49,999/a. \$10,000 to less than \$24,999)	1.11	0.32	3.89	0.87
Incomecat (d. \$50,000 to less than \$74,999/a. \$10,000 to less than \$24,999)	1.60	0.47	5.44	0.45
Incomecat (e. \$75,000 or more/a. \$10,000 to less than \$24,999)	2.61	0.73	9.35	0.14
VEGGIES	1.08	0.85	1.37	0.54
YEARS_IN_US	0.97	0.92	1.02	0.22
CONSTANT	*	*	*	0.57
Convergence:	Converged			
Iterations:	7.00			
Final -2*Log-Likelihood:	235.50			
Cases included:	303.00			
Test	Statistic	D.F.	P-Value	

Score	34.09	19.00	0.02
Likelihood Ratio	48.52	19.00	0.00

Unconditional Logistic Regression

Variable	Odds Ratio	Lower CL	Upper CL	P-Value
AGE	1.05	1.00	1.11	0.06
Are_you_an_immigrant_ (Yes/No)	0.60	0.15	2.48	0.48
AVOID_MD (Yes/No)	1.48	0.64	3.42	0.36
CIGS	0.99	0.92	1.07	0.86
DRINK_5	1.69	1.23	2.33	0.00
DRINK_DAYS	0.99	0.93	1.06	0.78
educationcat (b. Some college or 2 year degree/a. High school graduate or less)	0.51	0.09	3.01	0.46
educationcat (c. 4-year college graduate/a. High school graduate or less)	0.20	0.03	1.20	0.08
educationcat (d. More than 4-year college degree/a. High school graduate or less)	0.24	0.04	1.46	0.12
EXERCISE_DAYS	0.98	0.79	1.20	0.82
EXERCISE_MINUTES	0.99	0.99	1.00	0.10
GENDER (Male/Female)	1.04	0.52	2.07	0.92
Incomecat (b. \$25,000 to less than \$34,999/a. \$10,000 to less than \$24,999)	1.24	0.24	6.34	0.80
Incomecat (c. \$35,000 to less than \$49,999/a. \$10,000 to less than \$24,999)	1.12	0.32	3.88	0.86
Incomecat (d. \$50,000 to less than \$74,999/a. \$10,000 to less than \$24,999)	1.61	0.48	5.37	0.44
Incomecat (e. \$75,000 or more/a. \$10,000 to less than \$24,999)	2.63	0.75	9.17	0.13
VEGGIES	1.08	0.85	1.37	0.54
YEARS_IN_US	0.97	0.92	1.02	0.20
CONSTANT	*	*	*	0.56

Convergence:
 Iterations: 7.00
 Final -2*Log-Likelihood: 235.50
 Cases included: 303.00

Test	Statistic	D.F.	P-
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	Value		
Score	33.69	18.00	0.01
Likelihood Ratio	48.52	18.00	0.00

Unconditional Logistic Regression

Variable	Odds Ratio	Lower CL	Upper CL	P-Value
AGE	1.06	1.00	1.11	0.05
Are_you_an_immigrant_ (Yes/No)	0.60	0.15	2.46	0.48
AVOID_MD (Yes/No)	1.48	0.64	3.40	0.36
CIGS	0.99	0.92	1.07	0.85
DRINK_5	1.70	1.23	2.33	0.00
DRINK_DAYS	0.99	0.93	1.06	0.79
educationcat (b. Some college or 2 year degree/a. High school graduate or less)	0.51	0.09	2.99	0.45
educationcat (c. 4-year college graduate/a. High school graduate or less)	0.20	0.03	1.20	0.08
educationcat (d. More than 4-year college degree/a. High school graduate or less)	0.24	0.04	1.45	0.12
EXERCISE_DAYS	0.98	0.80	1.20	0.83
EXERCISE_MINUTES	0.99	0.99	1.00	0.10
Incomecat (b. \$25,000 to less than \$34,999/a. \$10,000 to less than \$24,999)	1.22	0.24	6.11	0.81
Incomecat (c. \$35,000 to less than \$49,999/a. \$10,000 to less than \$24,999)	1.10	0.32	3.76	0.88
Incomecat (d. \$50,000 to less than \$74,999/a. \$10,000 to less than \$24,999)	1.60	0.48	5.30	0.45
Incomecat (e. \$75,000 or more/a. \$10,000 to less than \$24,999)	2.60	0.76	8.91	0.13
VEGGIES	1.08	0.85	1.37	0.54
YEARS_IN_US	0.97	0.92	1.02	0.19
CONSTANT	*	*	*	0.55

Convergence: Converged
Iterations: 7.00
Final -2*Log-Likelihood: 235.51
Cases included: 303.00

Test	Statistic	D.F.	P-Value
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Score	33.51	17.00	0.01
Likelihood Ratio	48.51	17.00	0.00

Unconditional Logistic Regression

Variable	Odds Ratio	Lower CL	Upper CL	P-Value
AGE	1.06	1.00	1.11	0.05
Are_you_an_immigrant_ (Yes/No)	0.61	0.15	2.47	0.49
AVOID_MD (Yes/No)	1.48	0.64	3.40	0.36
DRINK_5	1.69	1.23	2.33	0.00
DRINK_DAYS	0.99	0.93	1.06	0.79
educationcat (b. Some college or 2 year degree/a. High school graduate or less)	0.51	0.09	3.00	0.46
educationcat (c. 4-year college graduate/a. High school graduate or less)	0.20	0.03	1.20	0.08
educationcat (d. More than 4-year college degree/a. High school graduate or less)	0.25	0.04	1.46	0.12
EXERCISE_DAYS	0.98	0.79	1.20	0.81
EXERCISE_MINUTES	0.99	0.99	1.00	0.10
Incomecat (b. \$25,000 to less than \$34,999/a. \$10,000 to less than \$24,999)	1.22	0.24	6.08	0.81
Incomecat (c. \$35,000 to less than \$49,999/a. \$10,000 to less than \$24,999)	1.11	0.32	3.77	0.87
Incomecat (d. \$50,000 to less than \$74,999/a. \$10,000 to less than \$24,999)	1.61	0.48	5.32	0.44
Incomecat (e. \$75,000 or more/a. \$10,000 to less than \$24,999)	2.60	0.76	8.93	0.13
VEGGIES	1.08	0.85	1.37	0.52
YEARS_IN_US	0.97	0.92	1.02	0.20
CONSTANT	*	*	*	0.57

Convergence:
 Iterations: 7.00
 Final -2*Log-Likelihood: 235.54
 Cases included: 303.00

Test	Statistic	D.F.	P-Value
Score	33.46	16.00	0.01
Likelihood Ratio	48.48	16.00	0.00

Unconditional Logistic Regression

Variable	Odds Ratio	Lower CL	Upper CL	P-Value
AGE	1.06	1.00	1.11	0.05
Are_you_an_immigrant_ (Yes/No)	0.61	0.15	2.47	0.49
AVOID_MD (Yes/No)	1.48	0.64	3.39	0.36
DRINK_5	1.70	1.24	2.33	0.00
DRINK_DAYS	0.99	0.93	1.06	0.81
educationcat (b. Some college or 2 year degree/a. High school graduate or less)	0.52	0.09	3.03	0.47
educationcat (c. 4-year college graduate/a. High school graduate or less)	0.20	0.03	1.21	0.08
educationcat (d. More than 4-year college degree/a. High school graduate or less)	0.25	0.04	1.47	0.13
EXERCISE_MINUTES	0.99	0.99	1.00	0.09
Incomecat (b. \$25,000 to less than \$34,999/a. \$10,000 to less than \$24,999)	1.17	0.24	5.69	0.84
Incomecat (c. \$35,000 to less than \$49,999/a. \$10,000 to less than \$24,999)	1.09	0.32	3.70	0.89
Incomecat (d. \$50,000 to less than \$74,999/a. \$10,000 to less than \$24,999)	1.57	0.48	5.13	0.46
Incomecat (e. \$75,000 or more/a. \$10,000 to less than \$24,999)	2.54	0.75	8.56	0.13
VEGGIES	1.08	0.85	1.36	0.53
YEARS_IN_US	0.97	0.92	1.02	0.20
CONSTANT	*	*	*	0.60
Convergence:	Converged			
Iterations:	7.00			
Final -2*Log-Likelihood:	235.60			
Cases included:	303.00			

Test	Statistic	D.F.	P-Value
Score	33.14	15.00	0.00
Likelihood Ratio	48.42	15.00	0.00

Unconditional Logistic Regression

Variable	Odds Ratio	Lower CL	Upper CL	P-Value
AGE	1.06	1.00	1.11	0.05
Are_you_an_immigrant_ (Yes/No)	0.60	0.15	2.43	0.47
AVOID_MD (Yes/No)	1.49	0.65	3.41	0.35
DRINK_5	1.68	1.24	2.27	0.00
educationcat (b. Some college or 2 year degree/a. High school graduate or less)	0.52	0.09	3.01	0.46
educationcat (c. 4-year college graduate/a. High school graduate or less)	0.20	0.03	1.19	0.08
educationcat (d. More than 4-year college degree/a. High school graduate or less)	0.25	0.04	1.45	0.12
EXERCISE_MINUTES	0.99	0.99	1.00	0.09
Incomecat (b. \$25,000 to less than \$34,999/a. \$10,000 to less than \$24,999)	1.18	0.24	5.73	0.83
Incomecat (c. \$35,000 to less than \$49,999/a. \$10,000 to less than \$24,999)	1.09	0.32	3.70	0.89
Incomecat (d. \$50,000 to less than \$74,999/a. \$10,000 to less than \$24,999)	1.58	0.48	5.16	0.45
Incomecat (e. \$75,000 or more/a. \$10,000 to less than \$24,999)	2.54	0.75	8.54	0.13
VEGGIES	1.08	0.85	1.36	0.54
YEARS_IN_US	0.97	0.92	1.02	0.20
CONSTANT	*	*	*	0.59
Convergence:	Converged			
Iterations:	7.00			
Final -2*Log-Likelihood:	235.66			
Cases included:	303.00			

Test	Statistic	D.F.	P-Value
Score	33.13	14.00	0.00
Likelihood Ratio	48.36	14.00	0.00

Unconditional Logistic Regression

Variable	Odds Ratio	Lower CL	Upper CL	P-Value
AGE	1.06	1.00	1.11	0.04

Are_you_an_immigrant_ (Yes/No)	0.58	0.14	2.35	0.45
AVOID_MD (Yes/No)	1.49	0.65	3.41	0.35
DRINK_5	1.66	1.23	2.23	0.00
educationcat (b. Some college or 2 year degree/a. High school graduate or less)	0.51	0.09	2.96	0.45
educationcat (c. 4-year college graduate/a. High school graduate or less)	0.20	0.03	1.18	0.08
educationcat (d. More than 4-year college degree/a. High school graduate or less)	0.26	0.05	1.50	0.13
EXERCISE_MINUTES	0.99	0.99	1.00	0.10
Incomecat (b. \$25,000 to less than \$34,999/a. \$10,000 to less than \$24,999)	1.18	0.24	5.71	0.84
Incomecat (c. \$35,000 to less than \$49,999/a. \$10,000 to less than \$24,999)	1.09	0.32	3.70	0.89
Incomecat (d. \$50,000 to less than \$74,999/a. \$10,000 to less than \$24,999)	1.52	0.47	4.94	0.48
Incomecat (e. \$75,000 or more/a. \$10,000 to less than \$24,999)	2.53	0.75	8.49	0.13
YEARS_IN_US	0.97	0.92	1.02	0.19
CONSTANT	*	*	*	0.51

Convergence:	Converged
Iterations:	7.00
Final -2*Log-Likelihood:	236.05
Cases included:	303.00

Test	Statistic	D.F.	P-Value
Score	33.12	13.00	0.00
Likelihood Ratio	47.97	13.00	0.00

Unconditional Logistic Regression

Variable	Odds Ratio	Lower CL	Upper CL	P-Value
AGE	1.03	0.99	1.06	0.11
Are_you_an_immigrant_ (Yes/No)	1.34	0.68	2.63	0.40
AVOID_MD (Yes/No)	1.46	0.64	3.32	0.37
DRINK_5	1.65	1.22	2.21	0.00
educationcat (b. Some college or 2 year degree/a. High school graduate or less)	0.58	0.10	3.33	0.54
educationcat (c. 4-year college graduate/a. High school graduate or less)	0.24	0.04	1.38	0.11

educationcat (d. More than 4-year college degree/a. High school graduate or less)	0.32	0.06	1.79	0.19
EXERCISE_MINUTES	0.99	0.99	1.00	0.07
Incomecat (b. \$25,000 to less than \$34,999/a. \$10,000 to less than \$24,999)	1.32	0.28	6.29	0.73
Incomecat (c. \$35,000 to less than \$49,999/a. \$10,000 to less than \$24,999)	1.05	0.31	3.54	0.93
Incomecat (d. \$50,000 to less than \$74,999/a. \$10,000 to less than \$24,999)	1.41	0.44	4.52	0.57
Incomecat (e. \$75,000 or more/a. \$10,000 to less than \$24,999)	2.15	0.66	7.00	0.20
CONSTANT	*	*	*	0.69

Convergence:	Converged
Iterations:	7.00
Final -2*Log-Likelihood:	237.84
Cases included:	303.00

Test	Statistic	D.F.	P-Value
Score	31.95	12.00	0.00
Likelihood Ratio	46.18	12.00	0.00

Unconditional Logistic Regression

Variable	Odds Ratio	Lower CL	Upper CL	P-Value
AGE	1.03	0.99	1.06	0.10
Are_you_an_immigrant_ (Yes/No)	1.31	0.66	2.57	0.44
DRINK_5	1.67	1.24	2.23	0.00
educationcat (b. Some college or 2 year degree/a. High school graduate or less)	0.61	0.11	3.43	0.57
educationcat (c. 4-year college graduate/a. High school graduate or less)	0.27	0.05	1.50	0.13
educationcat (d. More than 4-year college degree/a. High school graduate or less)	0.35	0.06	1.91	0.23
EXERCISE_MINUTES	0.99	0.99	1.00	0.09
Incomecat (b. \$25,000 to less than \$34,999/a. \$10,000 to less than \$24,999)	1.29	0.27	6.14	0.75
Incomecat (c. \$35,000 to less than \$49,999/a. \$10,000 to less than \$24,999)	1.02	0.31	3.38	0.98
Incomecat (d. \$50,000 to less than \$74,999/a. \$10,000 to less than \$24,999)	1.23	0.40	3.76	0.72
Incomecat (e. \$75,000 or more/a. \$10,000 to less than \$24,999)	1.81	0.59	5.54	0.30

CONSTANT * * * 0.62

Convergence: Converged
 Iterations: 7.00
 Final -2*Log-Likelihood: 238.65
 Cases included: 303.00

Test	Statistic	D.F.	P-Value
Score	30.74	11.00	0.00
Likelihood Ratio	45.37	11.00	0.00

Unconditional Logistic Regression

Variable	Odds Ratio	Lower CL	Upper CL	P-Value
AGE	1.03	1.00	1.07	0.04
Are_you_an_immigrant_ (Yes/No)	1.27	0.65	2.45	0.48
DRINK_5	1.64	1.24	2.19	0.00
educationcat (b. Some college or 2 year degree/a. High school graduate or less)	0.63	0.12	3.40	0.59
educationcat (c. 4-year college graduate/a. High school graduate or less)	0.29	0.06	1.52	0.14
educationcat (d. More than 4-year college degree/a. High school graduate or less)	0.43	0.09	2.13	0.30
EXERCISE_MINUTES	0.99	0.99	1.00	0.10
CONSTANT	*	*	*	0.66

Convergence: Converged
 Iterations: 7.00
 Final -2*Log-Likelihood: 240.48
 Cases included: 303.00

Test	Statistic	D.F.	P-Value
Score	29.31	7.00	0.00
Likelihood Ratio	43.54	7.00	0.00

Unconditional Logistic Regression

Variable	Odds Ratio	Lower CL	Upper CL	P-Value
AGE	1.03	1.00	1.06	0.03
Are_you_an_immigrant_ (Yes/No)	1.14	0.60	2.16	0.70
DRINK_5	1.71	1.29	2.28	0.00
EXERCISE_MINUTES	0.99	0.99	1.00	0.06
CONSTANT	*	*	*	0.66

Converged

Convergence:
Iterations: 7.00
Final -2*Log-Likelihood: 244.14
Cases included: 303.00

Test	Statistic	D.F.	P-Value
Score	23.33	4.00	0.00
Likelihood Ratio	39.88	4.00	0.00

Unconditional Logistic Regression

Variable	Odds Ratio	Lower CL	Upper CL	P-Value
AGE	1.03	1.00	1.06	0.03
Are_you_an_immigrant_ (Yes/No)	1.11	0.59	2.10	0.75
DRINK_5	1.77	1.33	2.37	0.00
CONSTANT	*	*	*	0.50

Converged

Convergence:
Iterations: 7.00
Final -2*Log-Likelihood: 247.61

Cases included: 303.00

Test	Statistic	D.F.	P-Value
Score	15.88	3.00	0.00
Likelihood Ratio	36.41	3.00	0.00

For Morbidly Obese adjusting for Independent Variables

Results of Morbidly Obese Regression Analysis

Variable	Odds Ratio	Lower CL	Upper CL	P-Value
AGE	0.999	0.947	1.0534	0.971
Are_you_an_immigrant_ (Yes/No)	0.7116	0.173	2.9273	0.637
AVOID_MD (Yes/No)	4.6706	2.104	10.368	0.000
CIGS	0.9014	0.826	1	0.019
DRINK_5	1.179	1.068	0.9834	0.5
DRINK_DAYS	1.0042	0.955	1.3011	0.001
educationcat (b. Some college or 2 year degree/a. High school graduate or less)	0.1619	0.044	0.868	0.005
educationcat (c. 4-year college graduate/a. High school graduate or less)	0.1489	0.038	0.5844	0.005
educationcat (d. More than 4-year college degree/a. High school graduate or less)	0.0625	0.016	0.5766	0.000
EXERCISE_DAYS	0.8325	0.638	0.2408	0.174
EXERCISE_MINUTES	0.99	0.974	1.085	0.221
FMD	0.9211	0.860	1.0061	0.017
GENDER (Male/Female)	1.566	0.765	0.9859	0.219
Incomecat (b. \$25,000 to less than \$34,999/a. \$10,000 to less than \$24,999)	3.7071	0.556	3.2031	0.175
Incomecat (c. \$35,000 to less than \$49,999/a. \$10,000 to less than \$24,999)	5.2741	1.053	24.688	0.043
Incomecat (d. \$50,000 to less than \$74,999/a. \$10,000 to less than \$24,999)	7.1533	1.335	26.398	0.021
Incomecat (e. \$75,000 or more/a. \$10,000 to less than \$24,999)	12.116	2.085	38.325	0.005

		5	4	5
		0.730		
VEGGIES	0.9815	8	1.3181	0.901
				0.970
YEARS_IN_US	1.0009	0.952	1.0525	5
				0.217
CONSTANT	*	*	*	2

Convergence:	Converged
Iterations:	6
Final -2*Log-Likelihood:	227.9941
Cases included:	303

Test	Statistic	D.F.	P-Value
Score	80.5648	19	0
Likelihood Ratio	84.4413	19	0

Unconditional Logistic Regression

Variable	Odds Ratio	Lower CL	Upper CL	P-Value
		0.222		0.543
Are_you_an_immigrant_ (Yes/No)	0.7009	5	2.2075	7
		2.107	10.364	0.000
AVOID_MD (Yes/No)	4.6741	9	8	1
		0.826		
CIGS	0.9013	3	0.983	0.019
		1.068		
DRINK_5	1.1792	8	1.3009	0.001
		0.955		0.869
DRINK_DAYS	1.0042	5	1.0553	7
educationcat (b. Some college or 2 year degree/a. High school graduate or less)		0.044		0.005
	0.162	9	0.5846	4
educationcat (c. 4-year college graduate/a. High school graduate or less)		0.038		0.005
	0.1487	5	0.5745	7
educationcat (d. More than 4-year college degree/a. High school graduate or less)		0.016		0.000
	0.0624	2	0.2398	1
		0.639		
EXERCISE_DAYS	0.8329	8	1.0841	0.174
		0.974		0.221
EXERCISE_MINUTES	0.99	2	1.0061	8
		0.860		0.017
FMD	0.921	7	0.9855	1
		0.768		0.217
GENDER (Male/Female)	1.5634	9	3.1788	2

Incomecat (b. \$25,000 to less than \$34,999/a. \$10,000 to less than \$24,999)	3.6808	0.575	23.534	0.168
		7	6	6
Incomecat (c. \$35,000 to less than \$49,999/a. \$10,000 to less than \$24,999)	5.2497	1.070	25.738	0.040
		8	9	9
Incomecat (d. \$50,000 to less than \$74,999/a. \$10,000 to less than \$24,999)	7.1248	1.350	37.599	0.020
		1	3	7
		2.134	68.004	0.004
Incomecat (e. \$75,000 or more/a. \$10,000 to less than \$24,999)	12.0471	0.731	6	8
		5	1.3153	0.897
VEGGIES	0.9809			5
				0.986
YEARS_IN_US	1.0003	0.964	1.038	4
				0.203
CONSTANT	*	*	*	6

Convergence:	Converged
Iterations:	6
Final -2*Log-Likelihood:	227.9954
Cases included:	303

Test	Statistic	D.F.	P-Value
Score	80.5637	18	0
Likelihood Ratio	84.44	18	0

Unconditional Logistic Regression

Variable	Odds Ratio	Lower CL	Upper CL	P-Value
Are_you_an_immigrant_ (Yes/No)	0.6956	0.325	1.4859	0.348
AVOID_MD (Yes/No)	4.6767	2.114	10.344	0.000
CIGS	0.9012	0.826	0.9828	0.018
DRINK_5	1.1792	1.068	1.3009	0.001
DRINK_DAYS	1.0041	0.955	1.0552	0.870
educationcat (b. Some college or 2 year degree/a. High school graduate or less)	0.1616	0.046	0.5653	0.004
educationcat (c. 4-year college graduate/a. High school graduate or less)	0.1482	0.040	0.5444	0.004
educationcat (d. More than 4-year college degree/a. High school graduate or less)	0.0621	0.017	0.221	0
EXERCISE_DAYS	0.8324	0.644	1.0751	0.159

		5		9
		0.974		0.221
EXERCISE_MINUTES	0.99	2	1.0061	7
		0.861		0.015
FMD	0.9211	7	0.9846	6
		0.768		0.217
GENDER (Male/Female)	1.5634	9	3.1788	1
Incomecat (b. \$25,000 to less than \$34,999/a. \$10,000 to less than \$24,999)	3.6856	1	1	8
Incomecat (c. \$35,000 to less than \$49,999/a. \$10,000 to less than \$24,999)	5.2656	9	24.847	0.035
Incomecat (d. \$50,000 to less than \$74,999/a. \$10,000 to less than \$24,999)	7.1591	9	34.376	0.013
		2.471	59.417	0.002
Incomecat (e. \$75,000 or more/a. \$10,000 to less than \$24,999)	12.119	9	3	1
		0.731		0.897
VEGGIES	0.9808	5	1.3152	2
				0.106
CONSTANT	*	*	*	6

Convergence:	Converged
Iterations:	6
Final -2*Log-Likelihood:	227.9957
Cases included:	303

Test	Statistic	D.F.	P-Value
Score	80.1638	17	0
Likelihood Ratio	84.4397	17	0

Unconditional Logistic Regression

Variable	Odds Ratio	Lower CL	Upper CL	P-Value
Are_you_an_immigrant_ (Yes/No)	0.6967	0.326	1.4866	0.35
		5	10.354	0.000
AVOID_MD (Yes/No)	4.704	2.137	5	1
				0.018
CIGS	0.9016	0.827	0.9829	8
		1.070		0.000
DRINK_5	1.1801	4	1.3011	9
		0.955		0.863
DRINK_DAYS	1.0043	9	1.0553	8
educationcat (b. Some college or 2 year degree/a. High school graduate or less)	0.1619	0.046		0.004
		3	0.5668	4

educationcat (c. 4-year college graduate/a. High school graduate or less)	0.1487	0.040	0.5459	0.004
educationcat (d. More than 4-year college degree/a. High school graduate or less)	0.0618	0.017	0.2193	0
EXERCISE_DAYS	0.8291	0.646	1.0636	0.140
EXERCISE_MINUTES	0.9899	0.974	1.0059	0.215
FMD	0.9203	0.861	0.9829	0.013
GENDER (Male/Female)	1.5597	0.767	0.218	0.218
Incomecat (b. \$25,000 to less than \$34,999/a. \$10,000 to less than \$24,999)	3.6914	1.501	3.1678	9
Incomecat (c. \$35,000 to less than \$49,999/a. \$10,000 to less than \$24,999)	5.268	0.582	23.405	0.165
Incomecat (d. \$50,000 to less than \$74,999/a. \$10,000 to less than \$24,999)	7.1872	1.118	24.804	0.035
Incomecat (e. \$75,000 or more/a. \$10,000 to less than \$24,999)	12.0474	2.471	58.724	0.002
CONSTANT	*	*	*	0.095

Convergence: Converged
Iterations: 6
Final -2*Log-Likelihood: 228.0125
Cases included: 303

Test	Statistic	D.F.	P-Value
Score	79.9361	16	0
Likelihood Ratio	84.4229	16	0

Unconditional Logistic Regression

Variable	Odds Ratio	Lower CL	Upper CL	P-Value
Are_you_an_immigrant_ (Yes/No)	0.7072	0.338	1.4791	0.357
AVOID_MD (Yes/No)	4.6673	2.131	10.218	0.000
CIGS	0.901	0.826	0.9821	0.017

		5		7
		1.091		0.000
DRINK_5	1.1856	6	1.2877	1
educationcat (b. Some college or 2 year degree/a. High school graduate or less)		0.046		0.004
	0.1624	5	0.5677	4
educationcat (c. 4-year college graduate/a. High school graduate or less)		0.040		0.004
	0.1489	6	0.5459	1
educationcat (d. More than 4-year college degree/a. High school graduate or less)		0.017		
	0.062	5	0.2195	0
		0.645		0.136
EXERCISE_DAYS	0.8278	6	1.0615	3
				0.214
EXERCISE_MINUTES	0.9898	0.974	1.0059	2
		0.863		0.013
FMD	0.9212	1	0.9831	4
				0.202
GENDER (Male/Female)	1.5752	0.783	3.1689	6
Incomecat (b. \$25,000 to less than \$34,999/a. \$10,000 to less than \$24,999)		0.579	23.288	0.167
	3.6748	9	2	1
Incomecat (c. \$35,000 to less than \$49,999/a. \$10,000 to less than \$24,999)		1.112	24.585	0.036
	5.2299	5	7	2
Incomecat (d. \$50,000 to less than \$74,999/a. \$10,000 to less than \$24,999)		1.500	34.410	0.013
	7.1861	7	1	6
		2.480		
Incomecat (e. \$75,000 or more/a. \$10,000 to less than \$24,999)	12.0866	6	58.89	0.002
				0.094
CONSTANT	*	*	*	8

Convergence: Converged
Iterations: 6
Final -2*Log-Likelihood: 228.0418
Cases included: 303

Test	Statistic	D.F.	P-Value
Score	79.9223	15	0
Likelihood Ratio	84.3937	15	0

Unconditional Logistic Regression

Variable	Odds Ratio	Lower CL	Upper CL	P-Value
Are_you_an_immigrant_ (Yes/No)	0.722	0.347	1.4993	0.382
AVOID_MD (Yes/No)	4.5325	2.095	9.8043	0.000

		0.829		
CIGS	0.9037	3	0.9849	0.021
		1.092		0.000
DRINK_5	1.1882	2	1.2927	1
educationcat (b. Some college or 2 year degree/a. High school graduate or less)		0.046		
	0.1614	5	0.5597	0.004
educationcat (c. 4-year college graduate/a. High school graduate or less)		0.036		0.002
	0.1332	4	0.4865	3
educationcat (d. More than 4-year college degree/a. High school graduate or less)		0.016	0.1978	0
	0.0563	0.628		
EXERCISE_DAYS	0.8009	3	1.0209	0.073
		0.861		0.011
FMD	0.9196	8	0.9812	3
		0.796		0.187
GENDER (Male/Female)	1.5958	8	3.1961	2
Incomecat (b. \$25,000 to less than \$34,999/a. \$10,000 to less than \$24,999)		0.634	25.556	0.139
	4.0257	1	5	7
Incomecat (c. \$35,000 to less than \$49,999/a. \$10,000 to less than \$24,999)		1.171		0.030
	5.4833	7	25.662	7
Incomecat (d. \$50,000 to less than \$74,999/a. \$10,000 to less than \$24,999)		1.633	36.570	0.009
	7.7297	8	8	9
		2.630	61.559	0.001
Incomecat (e. \$75,000 or more/a. \$10,000 to less than \$24,999)	12.7245	2	1	6
				0.079
CONSTANT	*	*	*	7

Convergence: Converged
Iterations: 6
Final -2*Log-Likelihood: 230.3717
Cases included: 303

Test	Statistic	D.F.	P-Value
Score	78.8484	14	0
Likelihood Ratio	82.0638	14	0

Unconditional Logistic Regression

Variable	Odds Ratio	Lower CL	Upper CL	P-Value
Are_you_an_immigrant_ (Yes/No)	0.7459	0.362	1.5338	0.425
		2.112		0.000
AVOID_MD (Yes/No)	4.5428	6	9.7685	1
CIGS	0.9095	0.835	0.9905	0.029

		2		3
		1.098		
DRINK_5	1.1967	8	1.3034	0
educationcat (b. Some college or 2 year degree/a. High school graduate or less)	0.1435	9	0.4911	0.002
educationcat (c. 4-year college graduate/a. High school graduate or less)	0.1289	5	0.468	0.001
educationcat (d. More than 4-year college degree/a. High school graduate or less)	0.0569	4	0.1975	0
		0.623		0.067
EXERCISE_DAYS	0.7963	9	1.0162	2
		0.863		0.012
FMD	0.9208	1	0.9824	5
Incomecat (b. \$25,000 to less than \$34,999/a. \$10,000 to less than \$24,999)	3.6412	5	23.199	0.171
Incomecat (c. \$35,000 to less than \$49,999/a. \$10,000 to less than \$24,999)	5.377	9	25.142	0.032
Incomecat (d. \$50,000 to less than \$74,999/a. \$10,000 to less than \$24,999)	7.8588	6	37.259	0.009
Incomecat (e. \$75,000 or more/a. \$10,000 to less than \$24,999)	12.4435	4	60.122	0.001
			9	7
				0.133
CONSTANT	*	*	*	5

Converged

Convergence:

Iterations: 6

Final -2*Log-Likelihood: 232.1246

Cases included: 303

Test	Statistic	D.F.	P-Value
Score	77.3504	13	0
Likelihood Ratio	80.3109	13	0

Unconditional Logistic Regression

Variable	Odds Ratio	Lower CL	Upper CL	P-Value
Are_you_an_immigrant_ (Yes/No)	0.7897	0.388	1.6074	0.515
AVOID_MD (Yes/No)	4.4628	2.103	9.4668	0.000
CIGS	0.9078	0.834	0.9871	0.023
DRINK_5	1.2105	1.105	1.326	0
educationcat (b. Some college or 2 year degree/a. High school graduate or less)	0.1358	0.040	0.4576	0.001
		3		3

educationcat (c. 4-year college graduate/a. High school graduate or less)	0.1211	0.033	0.4356	0.001
educationcat (d. More than 4-year college degree/a. High school graduate or less)	0.0569	0.016	0.1948	0
FMD	0.9329	0.876	0.9924	0.027
Incomecat (b. \$25,000 to less than \$34,999/a. \$10,000 to less than \$24,999)	3.2118	0.525	19.634	0.206
Incomecat (c. \$35,000 to less than \$49,999/a. \$10,000 to less than \$24,999)	5.1553	1.108	23.979	0.036
Incomecat (d. \$50,000 to less than \$74,999/a. \$10,000 to less than \$24,999)	7.6781	1.620	36.369	0.010
Incomecat (e. \$75,000 or more/a. \$10,000 to less than \$24,999)	11.857	2.471	56.889	0.002
CONSTANT	*	*	*	0.044

Convergence:	Converged
Iterations:	6
Final -2*Log-Likelihood:	235.7457
Cases included:	303

Test	Statistic	D.F.	P-Value
Score	74.8565	12	0
Likelihood Ratio	76.6898	12	0

Curriculum Vitae

Julius Nchangtachi Ade, MD, MPH

Email: Juliusnade@yahoo.com

Education:

Doctorate of Philosophy in Public Health (PhD)

Walden University, Minneapolis, MN

Concentration: Epidemiology

Expected Date of Graduation-July 2010

MPH, International Health

New York Medical College, Valhalla, New York

2006

MD, Special concentration and interest in infectious diseases

Universita di Padova, Italy.

1997

Career History & Accomplishments**Public Health Sanitarian**

Suffolk County Department of Health Services

Yaphank, New York

January, 2008 to Present

Conduct food borne illness investigations, restaurants inspections and confers, corporate with representatives of other local, state and federal health agencies. Assists and supervises the field work of a small number of Sanitarian Trainees; Prepares reports and recommendations concerning health surveys, studies, inspections and investigation of business concerns, industrial plants and other large establishments governed by the public health laws and sanitary code, including those related to enforcement actions. Collect water, food and other samples for laboratory examination.

MD Consultant

Totowa, New Jersey

March, 2007 to December, 2008

Primarily responsible for fostering consultative relationships on behalf of a pharmaceutical company client with thousands of target physicians of various medical specialties via telephone on how a specific pharmaceutical product could be effectively

utilized in their patient population based on clinical data. Placed by Tek Systems. Key achievements:

- ◆ Functioned as a team leader via the keen ability to initiate and maintain pharmaceutical marketing discussions with target physicians. Positioning and promoting resulted in an increase in target product prescribing and the increased financing by the pharmaceutical company to create additional marketing projects.
- ◆ Proficient in the processing of pharmaceutical efficacy and safety data in comparison to fellow team members due to strong ability to manage and analyze large amounts of data. Competence resulted in higher outgoing call volume to target physicians and lower need for call backs to physicians with clarification or additional product information.
- ◆ Expertise and demonstrated skills in pharmaceutical research and development facilitated the translation of efficacy and safety features into medically practical benefits to the target physicians in marketing discussions. Advanced communication and analysis skills resulted in the fostering of high quality consultative relationships with the target physicians.
- ◆ Reliably demonstrated strong competences of effective communication and perseverance to penetrate traditionally challenging medical office staff barriers in order to engage the target physicians in quality marketing discussions focused on particular drugs over and above fellow team members as evidenced by “successful call” statistics.
- ◆ Successful at consistently meeting the Project Managers drug marketing discussion quotas of 100 calls per day. Advanced the Team’s goal achievement and satisfied the pharmaceutical company client.
- ◆ Educated target physicians on how particular patient types could greatly increase their quality of life by offering a unique perspective grounded in public health and welfare training and expertise.
- ◆ Led resolution of target physicians’ prescribing concerns through needs analysis and active listening techniques.

Clinical Research Coordinator

Stony Brook University Medical Center

Department of Pediatrics

StonyBrook, New York

June, 2006 to October, 2006

Extensive proficiency and direct operations accountability involving in patient recruitment/retention; biological sample collection; Pediatric AIDS Clinical Trial Group (PACTG) and Adult AIDS Clinical Trial Group (AACTG) (A prospective cohort study to assess maternal and infant safety of interventions [antiretroviral therapy and mode of delivery] prescribed for women’s health and/or for prevention of vertical transmission of HIV) protocol management; quantitative and qualitative data compilation; documentation

organization; and data analysis in the research/lab setting that focused on pregnant women, infants, and children with the HIV virus. Key achievements:

- ◆ Selected by the veteran Principal Investigator, who possessed over twenty-five years of research experience, to administer the daily research operational responsibilities for eight investigative protocols that focused on the effectiveness of antiretroviral therapy in women, infants, and children with the HIV virus due to demonstrated research execution mastery.
- ◆ Robust analytical and problem solving skills demonstrated by the successful launch and maintenance of the strict PACTG/AACTG protocols. Consistently anticipated data reporting deadlines and created a patient report summary template. Analysis adeptness resulted in more advanced research responsibilities within the department.
- ◆ Provision of excellent patient management care resulted in remarkable patient recruitment and retention rates for the study, thereby strengthening the validity and durability of the data. Successes resulted in increased funding for other research studies.
- ◆ Fostered teamwork climate by fortifying the network between research physicians, nurses, laboratory personnel, technicians, and research sponsors. Instituted a previously non-existent structured meeting schedule with all members of the investigative team to relay up-to-date findings compilation, developing issues, and recommended solutions to minimize protocol noncompliance. Designed and disseminated follow-up documents to the investigative team to create communication continuity.
- ◆ Instrumental in the timely administration of the PACTG/AACTG data collection and reporting protocols. Precise assembly and reporting of patient data resulted in a significant decrease in the number of problem queries made by the study sponsors in comparison to previous Research Coordinators. Improvement enabled the more efficient and effective utilization of research time by the entire research team.
- ◆ Exceptional grasp of leadership, initiative, problem solving, and organizational skills resulted enhanced work results by subordinate clinical research assistant and LPN. Instituted the regular provision of feedback, protocol progress, and hands on management of issues.

Research Associate

Westchester Medical Center
 Valhalla, New York
 Masters of Public Health Practicum
 Department of Infectious Diseases
 June, 2005 to January, 2006

Primarily responsible for the successful overseeing of patient management and recruitment/retention; biological sample collection; patient examinations; Adult HIV/AIDS, SMART (A randomized trial comparing long-term effects of two strategies for the use of antiretroviral therapy; drug conversation strategy; and virological

suppression strategy) protocol management; quantitative and qualitative data compilation; grading of adverse events; documentation organization; and data analysis in the research/lab setting that focused on individuals infected with the HIV virus. Research project was one of the most renowned and funded within the Department of Infectious Diseases due to the potential impact on the treatment of HIV and the large national (NIH/NIAID) and international (33 nations) sponsorship. Key achievements:

- ◆ Instituted operational procedures with a special emphasis on being proactive and exceeding timeline expectations by anticipating imminent deadlines and potential new problems. Directed team members on how to complete assigned tasks more rapidly without compromising quality. Instructed team members on the key elements of project management forecasting. Innovation resulted in increased subject enrollment, increased funding, and the team applying new techniques on maximizing resources and time allotments in their daily work activities.
- ◆ Launched structured team meetings to communicate updates, challenges, and progress on the daily operations with special emphasis on problem solving. Eliminated individual clustering and instituted teamwork and collaboration ideology within the team. Enhancement resulted in other research team incorporating this team meeting model into their standard operating procedures.
- ◆ Overcame challenges of a research team burdened by perpetual management turnover. Employed management techniques of supplying consistent and accurate feedback, goal setting, and problem-solving using multimedia to solidify action items and techniques. Served as a professional resource to the research assistant, laboratory assistant, administrative assistant, and two nurses by practicing delegation to advance individual skill development. Resulted in an improvement in team's work performance as deemed by the principal investigator.
- ◆ Delivered high quality patient management derived from distinct medical, clinical, and public health practical experience. Established the ability to successfully discuss and probe the patients about the research process to gather required data while effectively allaying stress and anxiety. Resulted in an increase in patient enrollment and continuation in the research projects.
- ◆ Streamlined the query response procedure by instituting a timeline accountability system. Resulted in efficiently delivered responses to study sponsors and clarified team role responsibilities in the query answer process.

Physician

University of Padova, Italy
 Department of Allergy and Infectious Diseases
 March, 1997 to March 2001

Two thousand bed general hospital treating 91,000 patients. Internationally recognize educational institution with a deep historical presence. Well-known within Italy for its contributions to scientific and scholarly research.

Competently administered healthcare management for adult and pediatric patients with acute and chronic medical conditions comorbid with infectious diseases. Oversaw four clinical trials that involved highly active antiretroviral treatment (HAART) regimens (Randomized trials to verify the effectiveness of azidodeoxythymidine (AZT) in pregnant women; anal dysplasia due to antiretroviral therapy (ARV) drugs; ARV side effects specifically on lipid profile on various HIV/AIDS patients; and psychosocial impacts of the disease) in patients diagnosed with HIV/AIDS and other sexually transmitted diseases. Managed patient recruitment/retention; biological sample collection; and quantitative and qualitative data compilation. Special concentration in the assessment, treatment, and monitoring of patients with comorbid diagnoses of AIDS, tuberculosis and various types of cancers. Supervised a staff of five medical personnel in daily operations and patient care management. Key achievements:

- ◆ Identified the need to restructure departmental research operations, assessed current operations, and created new systems to ensure higher levels of quality control. Identified the operational deficiencies within the department and coordinated the hiring of research support staff to resolve these issues. Created a standardized training program and operational protocol for each research staff member. Incorporated previously absent procedures of intense multi-level documentation checks and balances and more regular calibration of research equipment. Innovation resulted in the delivery of more valid and reliable data, thereby providing precise information for interpretation on the most effective means to treat patients diagnosed with AIDS.
- ◆ Surmounted patient recruitment, retention, and compliance issues by designing and implementing a patient incentives program. Outcomes included a significant decrease in the number of subject drop-out rates due to non-compliance or lost interest.
- ◆ Revised research procedures specific to the assembly of data, management of biological specimens, query response systems, and reporting of adverse event data. Revisions bolstered the University's position as being one of the top three Italian institutions to employ excellence in research standards as evidenced by feedback from the Italian Institute of National Research.
- ◆ Devised and launched a local HIV/AIDS public awareness campaign focused on destigmatization grounded in qualitative data derived from research. Created and disseminated study questionnaires that focused on the socio-psychological aspects of HIV/AIDS to research participants. Widened the public focus from treatment to prevention and increased the number of individuals with HIV/AIDS willing to be prospective research participants.

PROFESSIONAL AFFILIATIONS

Member; American Public Health Association; December, 2005 to present.

Member; Global Health Council; April, 2007 to present.

Member; Federal Emergency Management Agency (FEMA); Medical Reserve Corps;

October, 2006 to present

RESEARCH

MPH Thesis

May, 2006

The relationship between obesity and socioeconomic status in Adult African American men and women in Southeastern United States.

Advisor: Padmini Murthy, MD, MPH, MS Assistant Professor of Practice in Public Health,

International and General Public Health.

MD Research Thesis

May, 1996

The importance of vasoactive factors of endothelial origin in the pathogenesis of essential hypertension.

Advisor: Angela D'Angelo, MD, Director and Professor of Internal Medicine Department

Site: Internal Medicine Department; Division of Nephrology.

SPECIALIZED SKILLS

Fluent in English, French, and Italian.