THE UNIVERSITY OF CENTRAL OKLAHOMA
Edmond, Oklahoma
Jackson College of Graduate Studies

Health Behaviors Among Indian and Pakistani People Living in the United States

A THESIS

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements

for the degree of

MASTERS OF SCIENCE

by

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Edmond, Oklahoma

2013

Health Behaviors Among Indian and Pakistani People Living in the United States

A THESIS

APPROVED FOR THE DEPARTMENT OF KINESIOLOGY AND HEALTH STUDIES

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Acknowledgements

I want to thank Dr. C. Diane Rudebock, Dr. Karen Barnes, Dr. Gregory Farnell, and Dr. Jill Devenport for their continued guidance, support, and encouragement. Their knowledge and insight made the thesis process a less strenuous and smoother experience.

I also want to thank the Department of Kinesiology and Health Studies at the University of Central Oklahoma. The assistance of the faculty and staff was immeasurable and is greatly appreciated.

I would like to thank the Office of Research and Grants for providing funding for this research study. The opportunity to work on this study and receive funding made this experience challenging as well as gratifying.

Finally, I would like to thank my family and close friend Christopher D. Harris for their continued support through many evenings spent working on this study, I could not have completed this without their support!

Table of Contents

Tables

Figures

Abstract

Cardiovascular disease is the first and third leading cause of death among men and women respectively in the United States (Centers for Disease Control, 2011a). According to the National Heart Lung and Blood Institute, within the next 10 to 15 years, Asian-Indians will account for 40 to 60% of people around the world with cardiovascular disease, of which 12% will be in the U.S. Asian Indians have been identified as one group who has a higher rate of cardiovascular disease compared to other minorities. There has been little research conducted identifying reasons why Asian Indians have higher rates of cardiovascular disease. These rates have severe public health and financial implications. The purpose of this research was to determine what health behaviors may lead to this high prevalence of cardiovascular disease. The hypothesis was that lack of physical activity and length of time living in the U.S. contribute the most to a higher risk of morbidity, mortality, and cardiovascular disease among people from India and Pakistan living in the United States for at least 10 years. A survey comprised of questions about physical activity, cardiovascular health, food and vegetable consumption, and level of acculturation was given to a group of Indian and Pakistani people residing in the U.S. for at least 10 years. This study was a pilot study and had a descriptive design. The significance or alpha level for this study was set at 0.05. Pearson's correlation tests were used to assess relationships between multiple variables; no significance was found in this cohort. Independent samples *t*-tests were used to assess differences in variables among men and women; no significance was found in this cohort; however, a trend towards significance was found when looking for differences between men and women's acculturation scores.

Very little research exits related to cardiovascular risk within this cohort; the findings from this study will help enhance the body of knowledge in this area.

Chapter One: Introduction

Significance

Cardiovascular disease is the first and third leading cause of death among men and women respectively in the United States (CDC, 2011a). Oklahoma has the second highest rate of mortality due to heart disease in the United States and is 27% above the overall national average (Oklahoma State Department of Health, 2011). According to the National Heart Lung and Blood Institute (NHLBI), within the next 10 to 15 years, Asian-Indians will account for 40 to 60% of people around the world with cardiovascular disease, of which 12% will be in the United States (NHLBI, 2011). Asian-Indians are people whose origins are from the continent of Asia, specifically the country of India. Some of the Asian-Indians from India have migrated to the country of Pakistan during the partition of the subcontinent of India and Pakistan in 1947 (Chester, 2002). According to the United States Census Bureau's 2010 Census, 2.8 million Americans are of Asian Indian descent. By the year 2050, the number of Asians or people who classify themselves as Asians living in the United States is estimated to be 40.6 million (U.S. Census Bureau, 2011). One of the Healthy People 2020 goals outlined by the United States Department of Health and Human Services (HHS) is emphasis on the need to identify health disparities through tracking chronic diseases and illness particularly in racial and ethnic groups (U.S Department of Human Services, 2012).

Several ethnic minorities exist in the United States; however, Asian Indians have been identified as one group who has a higher rate of cardiovascular disease in comparison to other ethnic minorities (Pais, Pogue, Gerstein, Zachariah, Jayprakash, & Usuf, 1996). Asian Indians also tend to show evidence of chronic disease at younger ages in comparison to their Caucasian American counterparts (Anand et al., 2000). Research has shown Asian Indians also have a higher rate of insulin resistance which seems to be intensified by living in a more Westernized

society (Koya & Egede, 2007). The prevalence of coronary artery disease in Asian immigrants was twice as high as other immigrant populations in the United States (Bhopal, Fischbacher, & Vartiainen, 2005).

Acculturation has been identified as a possible cause of the difference in health status between Asian Indians and other racial and ethnic groups in the United States (Raj, Ganganna, & Bowering, 1999). Kim, Lee, Ahn, Bowen, and Lee (2007) conducted a study examining blood pressures of Korean Americans and Korean natives living in the United States to determine if dietary acculturation was a contributing risk factor to hypertension. The study followed the dietary patterns of each participant and then compared the blood pressures. While it was found that Korean Americans consumed less sodium than native Koreans, they also consumed fewer fruits and vegetables. Korean Americans with hypertension also consumed less sodium and fewer fruits and vegetables than Korean natives. The results indicated that sodium was not a strong predictor for hypertension, and it could be speculated that lower intake of fruits and vegetables may be related.

There were other health behaviors such as lack of physical activity, smoking, and diet that have been acknowledged as contributing factors to higher rates of cardiovascular disease, morbidity, and mortality (Jonnalagadda & Diwan, 2005). Hayes, White, Unwin, Bhopal, Fischbacher, Harland, and Alberti (2002) conducted a study comparing the physical activity levels of Europeans and Asian Indians living in Great Britain. The purpose of the study was to determine if physical activity levels were a contributing factor to the higher prevalence of cardiovascular disease among the Asian Indian population living in Great Britain. The study found that European men and women were about 20% more physically active than each of the Asian Indian subgroups. The study also found those who reported more physical activity had

lower body mass index, blood pressure, blood sugar, and waist circumference regardless of their ethnic background.

There were many gaps in the current literature regarding why these health behaviors were more prevalent in Asian Indians. It is important to learn what particular health behaviors contributed the most to chronic diseases and mortality within this cohort. The Coronary Artery Disease among Asian Indians Research Foundation (CADI) conducted a study in 1995 that showed Asian Indians have a three to four-fold higher rate of heart disease in comparison to the Framingham Offspring Study which was considered the normal sample of the United States population (Enas et al., 1996; Wilson, Christensen, Anderson, & Kannel, 1989). While the CADI study was dated, it was indicative of a growing problem. There was scant recent research to determine current issues, hence the importance of this study. The public health and financial implications of this are severe. The Centers for Disease Control and Prevention estimated that in 2010 the cost of cardiovascular diseases was around 444 billion dollars (CDC, 2011b). In order for there to be adequate public health efforts to eliminate this epidemic within all racial and ethnic groups in the United States, there must be an understanding of the health behaviors that lead to the problem.

Purpose

There has been little to no research conducted concerning the reasons why Asian Indians have such a high rate of cardiovascular disease after leaving their homes in the Indian subcontinent. It was important to establish reference point data for this cohort so that the appropriate health promotion efforts can be implemented. The purpose of this research was to determine what health behaviors lead to a higher risk of morbidity, mortality, and cardiovascular

disease- related risk factors among Indian and Pakistani people living in the United States for at least 10 years.

Hypothesis

The hypothesis of this study was that lack of physical activity and length of time living in the United States contributed the most to a higher risk of morbidity, mortality, and cardiovascular disease among people from India and Pakistan living in the United States for at least 10 years. The dependent variable measured was risk of cardiovascular disease. The independent variable was the length of time spent living in the United States and acculturation.

Limitations and Delimitations

Limitations of this study included sample size, and only participants from one mosque were used for the sample. The sample size was small; therefore generalizing the findings to fit for other cohorts was difficult. Another limitation was health behaviors were self-reported, possibly causing some potential inaccuracies in the responses of the participants. Delimitations of this study included the cohort being comprised of only people from an Indo-Pakistani ethnicity, and no other ethnic-immigrants were studied; participants must have also lived in the U.S. for at least 10 years.

Definition of terms

Acculturation: adaptation to a culture, especially a new or different one (Merriam-Webster's, 2003)

Anthropometry: the study of human body measurements especially on a comparative basis (Merriam-Webster's, 2005)

Asian Indian: people with origins in the Far East, Southeast Asia and the Indian Subcontinent (as defined in the literature)

Body Mass Index: the ratio of the weight of the body in kilograms to the square of its height in meters (Merriam-Webster's, 2005)

Cardiovascular disease: disease of, relating to, or involving the heart and blood vessels (Merriam-Webster's, 2005)

Ghee: a semifluid clarified butter made especially in Indian food (Merriam-Webster.com, 2012)

Gujrati: a sub-group of Asian Indians with a common language and cultural heritage originating from the western Indian state of Gujrat (Merriam-Webster.com, 2012)

Fibrinogen: a plasma protein that is produced in the liver and is converted into fibrin during blood clot formation (Merriam-Webster's, 2005)

Health Disparity: a particular type of health difference that is closely linked with social, economic, and/or environmental disadvantage. Health disparities adversely affect groups of people who have systematically experienced greater obstacles to health based on their racial or ethnic group; religion; socioeconomic status; gender; age; mental health; cognitive, sensory, or physical disability; sexual orientation or gender identity; geographic location; or other characteristics historically linked to discrimination or exclusion (U.S. Department of Health and Human Services, 2010).

Homocysteine: an amino acid ($C_4H_9NO_2S$) that is produced in animal metabolism by the dymethylation of methionine and that appears to be associated with an increased risk of cardiovascular disease when occurring at high levels in the blood (Merriam-Websters, 2005)

Hypertension: abnormally high blood pressure that is usually indicated by an adult systolic blood pressure of 140 mm Hg or greater or a diastolic blood pressure of 90 mm Hg or greater; is generally of unknown cause but may be attributable to a preexisting condition (as a renal or endocrine disorder), that typically results in a thickening and inelasticity of arterial walls and

hypertrophy of the left heart ventricle, and that is a risk factor for various pathological conditions or events (Merriam-Webster's, 2005)

Hyperinsulinemia: the presence of excess insulin in the blood (Merriam-Webster's, 2005)

Hyperlipidemia: the presence of excess fat or lipids in the blood (Merriam-Webster's, 2005)

Indo-Pakistani: people with origins from India or Pakistan (as defined in the literature)

Morbidity: a diseased state or symptom (Merriam-Webster's, 2005)

Mortality: the number of deaths in a given time or place (Merriam-Webster's, 2005)

Metabolic Syndrome: a syndrome marked by the presence of usually three or more of a group of conditions including: high blood pressure, abdominal obesity, high triglycerides levels, low HDL levels, and high fasting levels of blood sugar that are linked to an increased risk of cardiovascular disease and type 2 diabetes (Merriam-Webster's, 2005)

Myocardial Infarction: an acute episode of heart disease marked by the death or damage if heart muscle due to insufficient blood supply to the heart muscle usually as a result of coronary thrombosis or a coronary occlusion and that is characterized especially by chest pain- also called heart attack (Merriam-Webster's, 2005)

Normotension: normal blood pressure (Merriam-Webster's, 2005)

Native-Indian: people who originate and live in India (as defined in the literature)

Plasminogen Activator Inhibitor (PAI): any of several regulators of the fibrinolytic system that act by binding to and inhibiting free plasminogen activator; the most important are *PAI-1* and *PAI-2* (Merriam-Webster's, 2005)

Chapter Two: Literature Review

The purpose of this research study was to determine what health behaviors lead to a higher risk of morbidity, mortality, and cardiovascular disease-related risk factors among Indian and Pakistani people living in the United States for at least 10 years. The purpose of this literature review was to examine previous studies investigating cardiovascular disease risk factors in Asian Indians. There has been ample research regarding cardiovascular disease and the risk factors that contribute to the development of it; however, there has been minimal research specifically focusing on the risk factors in Asian Indians. There was also scant research related to the risk factors that most contribute to cardiovascular disease in Asian Indians living in the United States. Due to the lack of literature available regarding cardiovascular risk factors in Asian Indians, this literature review includes studies about risk factors in other Asian populations who had similar dietary and cultural behaviors. Research regarding the assessment and effects of cardiovascular disease were also included in this review.

Cardiovascular risk factors in Asian Indians as well as prevalence of risk factors and research regarding common causes within the native Indian population in Asia was reviewed. Research on specific risk factors that contributed to the prevalence of cardiovascular disease within the Asian Indian population in the United States and around the world follows. Also included was research regarding instruments used to measure risk factors and verifying validity of certain risk factors. Studies on specific risk factors that may contribute to a higher prevalence of heart disease in the United States were also presented.

Prevalence of Risk Factors in Native Asian Indians

Research has shown that Asian Indians tended to have higher rates of glucose intolerance, diabetes, and hyperinsulinemia or high levels of insulin in the blood (McKeigue,

Shah, & Marmot, 1991). There was also evidence that cardiovascular disease and diabetes have similar risk factors and were related diseases; however, new research supported the idea that one was a complication of the other (U.S. Department of Health and Human Services, 2007). Recent research has been published supporting the fact that these two diseases were not necessarily complications of one another but have similar risk factors that caused both diseases, and they both had similar genetic and environmental precursors (U.S. Department of Health and Human Services, 2007; Stern, 1995).

A study completed in Madras, India using 953 men and women 40 years or older was conducted to determine if risk factors for cardiovascular disease existed in a cluster (Ramachandran, Snehalatha, Latha, Satyavani, & Vijay, 1998). Researchers hypothesized particular risk factors seemed to exist in a cluster in certain populations, and because Asian Indians had higher incidence of diabetes and other insulin-related issues, they would also have higher rates of coronary heart disease. The risk factors that existed most often in a cluster were noninsulin dependent diabetes mellitus (NIDDM), previously known as adult onset diabetes, obesity, hypertension, atherosclerotic cardiovascular disease, and dyslipidemia which is an abnormal amount of lipids in the blood. These risk factors often existed in clusters in developed countries but there was no research to show if these clusters existed in native east Indians (Ramachandran et al., 1998).

The researchers used several instruments to measure risk factors: anthropometry, blood pressure, lipid profile, insulin response, glucose tolerance, and electrocardiogram. Measurements were taken from each participant after they had fasted overnight for at least 10 hours. Other clinical measurements taken were family history of hypertension, heart disease, and diabetes, as well as history of heart disease, height, weight, waist, hip measurements, body mass index

(BMI), and waist to hip ratio. Some of the measurements such as the blood pressures and electrocardiograms were read by individuals but the majority of the measurements were computer analyzed. Once all measurements were compiled, several statistical tests were conducted. A chi-squared analysis was used to compare risk factors in men and women. A Pearson's correlation was conducted to look for possible correlations between the variables related to insulin, and *t*-tests were also used for comparing group means. Regression analyses were conducted to determine risk factors related to hypertension and insulin levels related to BMI. Any participants who did not show a presence of risk factors were omitted (Ramachandran et al., 1998).

Results indicated certain risk factors did in fact exist in clusters but not as often as was hypothesized. Risk factors that existed most in order from greatest to least were central adiposity, dyslipidemia, hyperinsulinemia, glucose intolerance, obesity, and hypertension. Coronary heart disease had a higher prevalence in women, 4.5%, with an overall prevalence of 3.9%. Most risk factors existed in clusters of two or three, and almost every risk factor was associated with an elevated BMI. Specifically, hyperinsulinemia, dyslipidemia, and glucose intolerance were all shown to associate with each other. The researchers determined clustering of the risk factors that cause cardiovascular disease and issues with insulin resistance existed in clusters in native Indian people. The researchers suggested preventive interventions be implemented for those with coronary heart disease and any type of metabolic disorder to lower their risk of cardiovascular disease.

This study indicated certain risk factors were common for many Asian Indian people and may be a genetic predisposition; however, the cause of heart disease within this population still seemed vague. What is known was the prevalence of certain risk factors is no different between

migrant Asian Indians and natives. These risk factors included hypertension, smoking, and high blood lipid levels. The risk factors that contributed most to heart disease in this group of people were still unidentifiable.

Another study conducted in 1996 using 400 South Asian Indians focused on risk factors for acute myocardial infarction (MI), sometimes a complication of ischemic heart disease which tended to be very common around the world in many populations (Pais et al., 1996). Four hundred participants were used; 200 had MI, identified as the case group, and 200 who were healthy, identified as the control group, and of the same age and gender (Pais et al., 1996). Those with MIs were admitted after complaining of chest pain that lasted for 20 minutes and an electrocardiogram indicating ST elevation. ST elevation is an indicator (in an ECG) of occlusion of a coronary artery. Researchers took several anthropometric measurements such as weight, height, hip circumference, and waist to hip ratio. Fasting lipid and glucose values were also taken for each participant. Other variables included were age, sex, religion, monthly income, educational level, dietary details, tobacco use, alcohol use, and known history of diabetes mellitus. All variables were recorded, and the means, medians, and prevalence of each were compared with values from the controls that were matched to each case. A multiple logistic regression analysis was conducted to predict what values seemed to be responsible for MI in the case group (Pais et al., 1996).

The results of the study indicated the most important risk factor was smoking with an odds ratio of three to six. The next most important risk factor was a history of hypertension and a presence of diabetes. Another predictor was central adiposity which seemed to be correlated to non-vegetarianism. The researchers found that being a vegetarian served as a protective factor for individuals, and those that had a lower consumption of meat also had a lower waist to hip

ratio. An abnormal finding of this study was that there were no differences in high-density lipoprotein values or triglycerides between the case and control groups.

Researchers concluded that smoking, blood glucose levels, hypertension, and reducing abdominal fat were the most important risk factors in ischemic heart disease, from greatest to least in respect to effect on ischemic heart disease. Suggestions from this study included smoking cessation program implementation, control of blood glucose levels and blood pressure, and dietary education to lower abdominal adiposity (Pais et al., 1996).

The researchers were able to show that preventable risk factors had a higher association with heart disease than those that were usually considered genetic or hereditary (Pais et al., 1996) This finding provided implications for prevention within native Asian Indians. The risk factors that contributed to cardiovascular disease in migrant Indians; however, may be slightly different.

Prevalence of Risk Factors in Migrant Asian Indians

A study conducted in Canada (2000) looked at differences in risk factors for atherosclerosis and cardiovascular disease between ethnic groups (Anand et al., 2000). Researchers wanted to examine the cause in extreme variations of cardiovascular disease rates between ethnic groups within Canada. To determine the cause of the variance, researchers conducted a study using 985 participants, of which 342 were Asian Indians, 326 were Europeans, and 317 were Chinese. Participants were chosen by recruitment from three Canadian cities, Edmonton, Toronto, and Hamilton. All participants had lived in Canada for at least five years and were between the ages of 35 and 75 years. Participants were selected through random selection procedures. Measurements taken from each participant included: fasting lipids, glucose, homocysteine, fibrinogen, and plasminogen activator inhibitor-1 (PAI-1). These measurements were considered to be novel risk factors. The other classes of risk factors were called

conventional; these were age, gender, years lived in Canada, hypertension, smoking status, family history of cardiovascular disease, and family history of myocardial infarction. To determine atherosclerosis, a carotid B-mode ultrasonography was taken. Researchers wanted to assess what the primary risk factor was within each group which may explain the variation between groups.

Statistical analysis was then carried out using ANCOVA to determine the effects of each variable on cardiovascular disease. Post-hoc pairwise comparisons were done with a Tukey's test (Anand et al., 2000). To measure conventional and novel risk factors, atherosclerosis, and ethnicity a multiple logistic regression was used.

Results indicated no difference between ethnic groups in smoking rates. South Asians had the highest prevalence of established cardiovascular disease of all three groups. South Asians also had the highest rate of what was identified as silent myocardial infarction or acute MI. South Asians had less atherosclerosis than Europeans; however, carotid atherosclerosis was higher in all ethnic groups that had higher disease prevalence. Chinese had the lowest presence of atherosclerosis and disease overall. South Asians also had higher glucose intolerance, triglycerides, total LDL and cholesterol, and lower HDL. South Asians also had higher rates of novel risk factors like fibrinogen, homocysteine, lipoprotein, and plasminogen activator inhibitor (Anand et al., 2000).

The researchers concluded although there were differences in novel and conventional risk factors between the three ethnic groups, these risk factors seem to only be partially responsible for prevalence of cardiovascular disease. There were many contradictions that were found within the results of this research such as the fact that while South Asians had higher rates of cardiovascular disease, Europeans had higher rates of atherosclerosis. This research suggested

that the unique risk factors that were causing the higher prevalence of disease within South Asians have to be further researched. Perhaps the reason why differences that were not easily identifiable existed had to do more with lifestyle factors and health behaviors which were not variables within the study and were often left out of studies of this nature.

Jonnalagadda and Diwan (2005) conducted a study specifically looking at health behaviors and how they affected chronic disease within older Asian Indians living in the United States. The researchers wanted to know how this group of people rated their own health in comparison to their health behaviors. To conduct this study, 226 men and women of Asian Indian descent were used. All participants were at least 50 years old and had lived in the United States on average for 25 years. All participants were found by using several Asian community-based organizations including religions, cultural, and professional organizations. Participants were asked a series of survey questions over the telephone by a trained surveyor. The survey took about 30 to 40 minutes to complete.

Participants were specifically asked questions regarding their health behaviors. Health behaviors were identified as diet, physical activity, smoking habits, and length of residence in the United States. Dietary habits included the daily amount of fat and fiber consumed and were determined by using a dietary questionnaire. The questionnaire included questions regarding information about how many fruits, vegetables, grains, beans, ethnic foods, and traditional American foods were consumed within the last month. Physical activity was determined by measuring the frequency of muscle strengthening, cardiovascular exercise, and stretching on a weekly basis. Smoking habits were measured by simply asking if the participant smoked or not. Participants' body mass index was also measured. The final variable asked participants to

identify the length of residence in the United States and how they identified culturally. Basic demographics of age, gender, and income were also assessed (Jonnalagadda and Diwan, 2005).

To assess how participants felt regarding their personal control over their health, five factors were included (Jonnalagadda & Diwan, 2005). The first factor was perceived quality of social support. Depression was assessed next, and all questions asked used a Likert scale. Next, participants were asked if they had any chronic diseases and what those diseases were. They were also asked to rate their own health; one being excellent and five being poor.

The data were analyzed using a multiple regression analysis. The diseases that were most prevalent were hypertension and diabetes which were considered risk factors for cardiovascular disease. Results indicated that participants who had lived in the United States longer were more likely to be physically active and identified most as American. Conversely, those who had lived in the United States and identified more as Americans had a higher income, higher levels of depression, and a more American identity also had a higher fat intake. Those that rated their health as poor were older, female, with a BMI of >25, had more chronic diseases but also were satisfied with their social support. Specifically, there was a lower rate of fiber intake overall, and although 55% of the sample was practicing some form of aerobic exercise, there were still 30% that did not. There were also 74% who consumed low fiber and 30% who consumed high fat diets. The results also indicated that having a strong social support system was correlated with a better perception of health and with feeling more in-control on personal health (Jonnalagadda & Diwan, 2005). Although those with more chronic conditions reported being satisfied with their social support, they perceived that their health was actually better than it was. This seems to be a contradiction of sorts, but it shows that perception was often based on what others around you

say or do but it also showed that they were more likely to take control of their health as well, possibly because they had that support system in place.

Researchers concluded the study by stating that was important to take into consideration cultural norms and psychosocial factors when creating prevention programs for this cohort. They also advised that specific diseases such as diabetes and hypertension may need to be reviewed in more detail when considering the correct preventive measures for this group (Jonnalagadda and Diwan, 2005).

Diabetes seemed to be a common chronic disease throughout most of the studies reviewed; those using native and migrant Asian Indians all showed a high prevalence of the disease. A 2005 study specifically looked at diabetes prevalence and cardiovascular disease among Asian Indians living in the United States and how the rates compared to non-Hispanic Caucasians (Mohanty, Wollhander, Himmelstein, & Bor, 2005). The researchers wanted to specifically focus on Asian Indians living in the United States and their disease prevalence and risk factors because they were a growing population, yet there was very little data regarding their disease prevalence. The study was conducted using a large sample size of non-Hispanic Caucasians, 87,846 and 555 Asian Indians. This was a cross-sectional study and participant's data was from the National Health Interview Survey (NHIS) from the years 1997 through 2000. The variables included for analysis were age, gender, income, health insurance status, and place of birth. The health outcomes reviewed were hypertension, diabetes, and coronary heart disease. Other variables that were included were BMI and physical activity levels.

A chi-squared test was used to look at categorical variables related to basic characteristics and *t*-tests were used to look at continuous variables. The logistic regression technique was then used to look at associations between disease prevalence and being of Asian Indian descent. The

correlation between health characteristics and the three disease outcomes were also analyzed (Mohanty, Wollhander, Himmelstein, & Bor, 2005).

The study included more Asian Indian men than Asian Indian women. The Asian Indians who participated were foreign born and had a higher income than the non-Hispanic Caucasians that participated. Asian-Indians also had a lower BMI, 6.2%, compared to their Caucasian counterparts at 19.2%. The rates of self-reported diabetes were higher than those reported by the non-Hispanic Caucasian group. The rates of self-reported coronary heart disease were lower but not statistically different between the two groups. The rates of self-reported hypertension however were lower for the Asian Indian group (Mohanty et al., 2005). The study also demonstrated that the Asian Indian group reported regular physical activity, but it was a lower rate than what was reported by the Caucasian group. Tobacco use was also reported to be lower within the Asian Indian group. The Asian Indian group also reported lower rates of having a regular doctor and source for healthcare. The researchers concluded that there were higher rates of diabetes in Asian Indians even though their obesity rates were lower. There was no evidence of an elevated risk of CHD or hypertension. Considering these outcomes, the researchers suggested that it was very important to work on diabetes prevention within this cohort. It was also important to consider that regular vigorous physical activity can contribute to lowering blood glucose levels; therefore, lowering the risk of diabetes and because this group reported lower levels of physical activity, it may be a more important risk factor to review and include in preventive measures (Mohanty et al., 2005).

The Coronary Artery Disease in Indians study (CADI) was conducted to take a more in-depth look at the cause of CAD in first-generation immigrant Asian Indians, living in the United States (Enas et al., 1996). Researchers of this study wanted to know what the prevalence of CHD

was within the first generation population of Asian Indians but they also wanted to know more about risk factors and whether diet, and physical activity played a role in disease risk. The researchers used Asian physicians and their family members. The physicians were all members of the association of Physicians of India and the Association of Kerala Medical Graduates. There were a total of 1688 participants.

During the annual meetings of the two organizations, participants were asked to take a questionnaire that included information regarding the demographics of the participants as well as the history of CHD and any known risk factors. For those that did not attend the conference such as family members, questionnaires were completed over the phone and through mail in procedures (Enas et al., 1996). The attendees of the meeting were asked to provide a fasting blood sample to review their lipid and glucose profiles. Other questions asked related to smoking status and whether or not the participants were hypertensive and taking medications for their condition. Participants were also asked about their dietary practices and because many Asian Indians are vegetarians, a separate category was added for vegetarian diet. Measurements that were provided included height, weight¸ and waist circumferences. Once all measurements were taken, several comparisons were made (Enas et al.,1996).

The first comparison was to the Framingham Offspring Study which was used to compare participants that reported a history of a myocardial infarction or angina (Wilson et al., 1989). The Framingham study was considered to be the national representation for heart disease prevalence in the United States so it provided a good basis for comparison with the group in this study. The Framingham Heart Study predictors for heart disease have been validated by use of the scale in many studies (D'Agostino, Grundy, Sullivan, & Wilson, 2001). Although there has been concern on whether the scale and its predicators can be used with ethnic groups because the

original study consisted of white middle class Americans, a 2001 study conducted using ethnically diverse participants from six other studies used the Framingham Heart Study predictors and scaling to determine if the study predictions would hold true when used with these other groups (D'Agostino, Grundy, Sullivan, & Wilson, 2001). Results indicated the scale was a valid way to measure coronary heart disease in white men and women and for black men and women. The scale did not work as well for Japanese and Hispanic American men and Native American Women. Researchers recalibrated for different prevalence of risk factors and incidence of coronary heart disease rates in these ethnic groups, and after recalibration, the scale was a good estimate for risk of developing coronary heart disease for those groups. The study concluded that the Framingham Heart Study scale predictors were reliable and valid for other groups (D'Agostino et al., 2001).

The male physicians from this study were also compared to their U.S. counterparts. Finally, lipoprotein data was compared to the National Health and Nutrition Examination Survey III (NHANES).

The data for comparison to NHANES and the Framingham Study was done by using the Mantel-Haenszel chi-squared method. Lipoprotein data was compared using a *t*-test. To compare the Indian physicians to the American physicians, a Pearson's chi-square test was used. Coronary heart disease risk factors were compared between those that had CHD and those that did not using the Mantel-Haenszel chi-square test. To assess the relationships between risk factors and the presence of CHD, a multiple logistic regression was used. A Levene's test and Wilk-Shapiro test was used to look at the homogeneity of variance (Enas et al., 1996).

Results indicated a higher rate of myocardial infarction in the Asian Indian group compared to the Framingham study. Asian Indian men in the CADI study were also diagnosed

with CHD at an earlier age (Enas et al.,1996). When reviewing the information about the physicians in each study, it was found that there was a much higher rate of angina in the CADI study compared to the U.S. physicians, and the CADI study physicians were on average five years younger than the U.S. physicians. When reviewing risk factors between the CADI group and the Framingham study, it was found that diabetes was higher in the CADI group, but hypertension, obesity, and smoking were all lower. Another comparison to the Framingham study was that overall, there were lower levels of total and LDL cholesterol in the CADI study male and female participants. Triglycerides and HDL levels were not different between the two groups. The comparison of those with coronary heart disease and those without revealed that those with CHD were about seven years older and had higher rates of hypertension, smoking, noninsulin dependent diabetes mellitus, and use of lipid lowering therapy. The odd result was that there were no differences in dietary habits, waist to hip ratio, and BMI. The main factors that were identified as risk factors for CHD in Asian Indian men were shown to be diabetes, family history of CHD, hypertension, and the use of lipid-lowering medications. Comparison of the dietary habits of the participants within the CADI study showed that those who were vegetarians had a lower overall total and LDL cholesterol in the men of this study but not the women. The vegetarian group also had a lower rate of cigarette use but higher rates of NIDDM. There were no significant differences in HDL or triglycerides between the two groups (Enas et al., 1996).

Researchers concluded by stating several facts regarding their results. The first most important fact was the results indicated a two-to three-fold higher rate of CHD among immigrant Asian Indian men compared to the U.S. physicians and the Framingham study population. The prevalence of CHD in both physicians and non-physicians also had similar findings. The other important fact was that the data found NIDDM to be the most important risk factor in immigrant

Asian Indians regardless of gender. The other factors in order from greatest risk to least were low HDL, cholesterol levels, and elevated triglycerides levels (Enas et al., 1996). Another finding related to this information was that when reviewing studies regarding native Asian Indian populations, the diabetes prevalence rate was the same as the rate of Asian-immigrants. This result could mean that NIDDM is a predisposition and migrating to a more Westernized society and adopting that lifestyle may increase the prevalence of diabetes. This theory was often referred to as acculturation (Kim, Lee, Ahn, Bowen, & Lee, 2007) .

A study conducted in the United States in 2002 had similar findings (Singh & Siahpush, 2002). The purpose of the study was to review the differences in health behaviors between groups of ethnic immigrants living in the United States to determine the cause of morbidity and mortality within each group. This study was used for analysis of various groups of ethnic immigrants' health behaviors. The study used participants from two large national databases, the National Longitudinal Mortality Study (NLMS) from 1979-89 and the National Health Interview Survey (NHIS) from 1993-1994. The purpose of the NLMS was to examine the causes of mortality using several factors: socioeconomic, occupational, and demographics. There were five groups included in this study whose mortality experiences were studied for nine years. The purpose of the NHIS was to examine socioeconomic, demographic, and health behaviors including diet, physical activity, tobacco, and alcohol use. Several immigrant and U.S.-born groups were used for this study. A total of 240,730 U.S.-born non-Hispanic whites, 13,073 foreign-born non-Hispanic whites, 25,655 U.S.-born non-Hispanic blacks, 777 foreign-born non-Hispanic black, 2189 U.S.-born Asian and Pacific Islanders, 3520 foreign-born Asian and Pacific Islanders, 6,686 U.S-born Hispanics, 6,177 foreign-born Hispanics, and 2,095 American Indians were used. A Cox regression analysis was completed to determine how specific variables

affected mortality within each ethnic group. A logistic regression model was used to determine variances within each ethnic group's health risks of smoking, obesity, hypertension, and chronic health conditions. Length of residence of first generation immigrants was also considered as a variable. Controls were set for age, sex, detailed race and ethnicity, marital status, family size, place and region of residence, education, employment status, and family income (Singh & Siahpush, 2002).

Results indicated that the lowest mortality rate was among foreign-born blacks, followed by Hispanics, Asian and Pacific Islanders, U.S.-born Asian and Pacific Islanders, U.S.-born Hispanics, and foreign-born whites. These rates were compared with U.S.-born whites who overall had the lowest mortality rate. U.S.-born blacks had an 8% higher mortality risk than their white counterparts. Native Americans did not differ in mortality risk from U.S.-born whites. The lowest risk for cardiovascular disease, cancer, injuries, infectious diseases, respiratory issues, and overall morbidity was in Asian and Pacific Islanders and Hispanic immigrants. When comparing black immigrants to their U.S. counterparts, the immigrant group had a 52% lower mortality risk. Hispanic immigrants had a similar outcome; their mortality risk was 26% lower than their U.S. counterparts (Singh & Siahpush, 2002).

The researchers concluded that most immigrant groups had lower overall mortality risks than their U.S. counterparts. Their rates for smoking, hypertension, obesity, and other chronic conditions were also lower. Another fact found to be true within this study was that as length of residency increased so did the rates of these risk factors. Researchers also noted that cultural identity was not specifically studied, and in order to accurately measure acculturation, researchers would have needed to include some sort of way to measure how each participant identifies with their native culture versus a more U.S. or westernized culture. Researchers also

noted the need to take into account several factors that could affect mortality and differences in health status between ethnic groups. Suggested factors considered were smoking, diet, social support, health care access, acculturation, health care access, immigration status, discrimination, length of residence, ethnic origin, country of origin, and immigrant selectivity (Singh & Siahpush, 2002). The researchers also advised that because the immigrant population was increasing significantly, it was especially important to consider the aforementioned risk factors to ensure that the proper health promotion and prevention programs be implemented for these groups. The researchers noted that more research regarding these health risks was also important because of the financial, overall health, and mortality affect that immigrant populations will have on the United States (Singh & Siahpush, 2002).

Acculturation as a Risk Factor

One of the factors that has not been thoroughly researched was acculturation. Acculturation encompasses many traits that were often adopted by immigrants from another country after they moved to a new land. There were many behaviors that were included within the acculturation process. Dietary and identity acculturation were two of those behaviors that were often changed (Misra, 2009). This study hypothesized that both of these aspects contributed to a higher risk of cardiovascular disease within the Asian Indian population living in the United States.

Koreans have some similar dietary patters to Asian Indians; rice is the staple food in both groups, and very little red meat was consumed. A study conducted from 2003 to 2004 used native Koreans and Korean Americans that were either hypertensive or normotensive to determine what affect dietary acculturation had on their blood pressure category (Kim, Lee, Ahn, Bowen, & Lee, 2007). The study used 398 participants all from the Chicago metroplex. One

hundred were normotensive Korean Americans that were recruited from two Korean churches, and 100 were hypertensive and recruited from two clinics. The hypertensive group all had Korean physicians as their general practitioner. There were also 100 hypertensive and normotensive native Koreans used as a control group, and they were found in eight community health posts in South Korea (Kim et al., 2007).

Each participant was asked to recall the foods they had eaten within the last 24 hours (Kim et al., 2007). Dietary quality and patterns were both assessed. Dietary patterns were determined by consumption of certain foods. Foods were categorized as Korean, American, and common foods. Korean foods are foods that are traditionally Korean, American foods were those that were mostly consumed in America, and common foods were foods that were found in either Korea or America (Kim et al, 2007). Diet quality was measured based on the Diet Quality Index (DQI) which was an instrument used to measure overall diet quality but was adjusted for a study for the Korean population (Oh et al., 2003; Patterson et al., 2003). The DQI had eight components: energy from fat, energy from saturated fat, cholesterol, energy from carbohydrates, intake of vegetables and fruits, protein, calcium, and sodium. Potassium which was not included in the DQI was added by the researchers because of the effect it had on blood pressure control. All of these components were measured in percentages or per day increments (Kim et al., 2007).

Nurse research assistants used the 24- hour dietary recall method to assess the variables of diet quality and pattern. All results were calculated by the Korean Nutrition Societies' computer aided nutritional analysis program to determine energy intake from each component. Prior to conducting statistical analysis, a propensity score was used to match participants from each group. This method was used because there were differences in factors that could affect diet such as income, education, and employment status. Once all participants were matched, an

independent *t*-test was conducted for dietary pattern analysis. A chi-squared test was used to measure diet quality. ANOVA with post hoc tests were used to compare the DQI score, potassium intake, and frequency of foods consumed among each group (Kim et al., 2007).

Results indicated no statistical difference between the DQI scores between the groups (Kim et al., 2007). There was also no statistical difference between normotensive and hypertensive Korean Americans. Native Koreans consumed more sodium, potassium, fruits, and vegetables, and carbohydrate energy. Korean Americans ate more non-traditional or American food and more common food as well. Hypertensive Korean Americans also ate less fruits and vegetables, sodium, and potassium than native hypertensive Koreans (Kim et al., 2007).

The conclusion of this research was that dietary acculturation had both negative and positive effects on diet quality and pattern. The Korean American group definitely consumed more American food, specifically junk food, but they also consumed less of the Korean dishes that have been identified as contributors to hypertension such as kimchi, a spicy pickled cabbage dish. The traditional Korean diet also consisted of many fruits and vegetables, of which Korean Americans seemed to eat less. The researchers suggest that a specific health promotion program for diet be created to assist Korean Americans with their transition to the United States so that they will continue to follow the healthy aspects of their traditional diet, yet not adopt the unhealthy aspects of the American diet. This research provided a foundation for further research on acculturation, specifically dietary acculturation (Kim et al., 2007).

Jonnalagadda and Diwan (2002) reviewed how the dietary intake of first generation Gujrati Asian Indians was affected by their length of residence in the United States and their socioeconomic status. There were a total of 90 male and 99 female study participants recruited from Atlanta and Detroit. The median age of the participants was 57 with a range of 45 to 84.

All participants originated from Gujrat, India. Participants were classified according to their length of residence being either less than 10 years or greater. They were also classified by their education and income levels. Education level was assessed to help determine socioeconomic status. Those that had advanced education such as a bachelor's or master's degree were also within the higher socioeconomic status category. All participants were called on the telephone by a trained interviewer who asked them a series of questions regarding their diet for the previous 24 hour period. The questions related to the nutrient intake of macronutrients, fats, carbohydrates, proteins, cholesterol, and fiber and of micronutrients, vitamins and minerals (Jonnalagadda & Diwan, 2002).

The dietary recall information was analyzed using a software program called Food Processor. This database includes USDA guidelines and allows ethnic foods to be added as well. The participants' reported nutrient intake was compared to their dietary requirements. Caloric requirements were calculated using the Harris-Benedict equation for estimating basal energy requirements and a light physical activity factor. It was then compared to the age and gender requirements for the Recommended Dietary Allowances guidelines set by the United States Department of Agriculture. To compare the participant group to their U.S.-born counterparts, the NHANES III survey was used (Jonnalagadda & Diwan, 2002).

There were several statistical tests used to determine the results. The chi-squared test was used to determine differences between education levels and income between the men and women in the group. An independent *t*-test was conducted to determine differences in age, weight, height, BMI, length of residence in the U.S. between the men and women. An ANOVA and a Tukey's post hoc test were used to determine differences in macronutrient intake between genders based on levels of education. Multiple regression analyses were completed to determine

the effect of each of the independent variables on each of the macronutrients. Independent variables were defined as age, total energy intake, length of residence in the U.S., and level of education (Jonnalagadda & Diwan, 2002).

Results indicated that the women of the group were overweight based on BMI, but the men were considered to a normal weight. Men were within their recommended energy intake, but women were below what was suggested. The macronutrients of protein and carbohydrates were within the recommended intake guidelines; however, fat intakes were above 30% of total energy intake which is considered excessive. Fiber, trans fat, saturated fat, polyunsaturated fat, and cholesterol were all within the recommended guidelines. Monounsaturated fat was the only fat that fell below the recommended guidelines. When reviewing micronutrient intake, results indicated that men met all of the guidelines except for vitamins A, D, B6, and pantothenic acid. Women had similar outcomes; they met most guidelines except for vitamins D, B12, A, D, and pantothenic acid. Mineral intakes were met by both men and women except for phosphorus, iron, and sodium recommendations. Compared to NHANES III survey, the Gujrati Asian Indian group in this study had significantly lower nutrient density intakes. Gujrati Asian Indians that had lived in the U.S. for 10 years or more showed significantly lower intakes of macronutrients compared to those that had lived her for less than 10 years. For men who had lived in the U.S. for greater than 10 years, there was a 59% energy intake from carbohydrates, and 32% fat intake, and 9% for protein intake. For women, there was a 58% carbohydrate intake, 32% fat intake, and 13% protein intake. The carbohydrate intake for men and women who had been living in the U.S. for less than 10 years were less for both genders, and 53% for both. Fat intake was greater for those who were more recent immigrants, 38% for women, and 39% for men. Although the fat intake was lower, it was still more than the recommended amount. The diets were also too low in

vitamin D, calcium and potassium for women, as well as copper and zinc. Gujrati Indians also had diets overall for both genders that were low in cholesterol and high in fiber (Jonnalagadda & Diwan, 2002). Education levels also affected macronutrient intake. Men who had higher education ate more protein and dietary fiber. Women who were more educated ate more carbohydrates, proteins, and fiber but less fat. Overall the most significant predictor on carbohydrate intake for men was length of residence. Length of residence for men was also a significant predictor on protein and fat intake. Women were most affected by their level of education as it was the largest predictor on energy from carbohydrates and fat (Jonnalagadda & Diwan, 2002).

Researchers concluded that overall, the carbohydrate intake for this group met the recommended dietary guidelines of 55% to 60% but the fat intake was above the recommended amount of 30%, and the protein intake was below the recommended dietary guidelines of 15%. Researchers noted that 61% of the participants in this study were vegetarian, and although they had lived in the U.S. for at least 10 years, they had maintained their vegetarian diet. It was also important to note that most people from this study were Hindu, and people from the Hindu religion do not eat meat of any kind, whereas Muslims and Christians from Gujrat and other parts of India tended to eat meat. The researchers suggested that the religious and cultural influences affecting this group may also be the reason why the protein intake was so low in this group and that in further studies, there should be a larger more diverse group of people from this region used to determine how these influences affect diet and disease risks (Jonnalagadda & Diwan, 2002).

A study conducted using Asian immigrants living in California also reviewed the effects of acculturation, including dietary, identity, and social acculturation on risk factors for disease

and overall health (Gomez, Kelsey, Glaser, Lee, & Sidney, 2004). Immigrants from several parts of Asia were used for this study, including Chinese, Filipino, Japanese, Southeast Asian, and Indians. Some participants were classified as multiple-race Asians which means they were mixed with more than one ethnicity or more than one race such as Black, White, or Hispanic. Participants were selected from the Kaiser Permanente Medical Care Program case control study on bone fractures which was conducted in Northern California. Identification procedures for case and control groups were carried out for five years between 1996 and 2001. Interviews of the case group were completed from May through October 2001. All case group participants were at least 45 years or older and had visited the Kaiser Permanente Medical Care Group for some form of bone fracture. A total of 3168 participants were included in the case group. The control groups were ascertained from the same database during the same time period and were Caucasian. There were 2413 control participants. Data collection was carried out by telephone by trained interviewers or at participants' homes. The questions asked related to acculturation, immigration, and sociodemographic characteristics. These variables were used as the primary independent variables. Disease risk factors included constitutional and lifestyle characteristics such as self-reported height and weight which were combined to determine BMI. Other included characteristics that participants were asked about included those regarding smoking status, consumption of soy products, alcohol consumption, and exercise frequency, duration, and type. The final set of questions asked related to self-reported health and disease conditions. Participants were asked what diseases they already had and how they rated their health (Gomez et al., 2004).

Results were analyzed using a frequency distribution of the characteristics for whites, all Asians, and each Asian subgroup. Adjustments were made for the distributions for Asians for

gender and length of time in the U.S. A logistic regression analysis was used to determine odds ratios and 95% confidence intervals for the associations between the variables (Gomez et al., 2004).

Results indicated that Chinese and Japanese participants had a lower BMI than other Asians. An association was found for those participants from all subgroups having a greater BMI than 25kg/m^2 and being born in the U.S. Smoking rates were found to be higher in Japanese and mixed-race Asians. Filipinos and mixed-race Asians reported smoking at the age of 18 years or younger. Filipino and mixed-race Asians also reported more incidence of diabetes. Results also indicated that those who had recently migrated showed indicators of better health than their U.S.-born counterparts. The researchers concluded that not only should Asians not be classed in one group, without subgroups, because their health behaviors and risks are different, but that those who immigrate to the U.S. tend to be healthier when they first arrive in the U.S. They also concluded that other cultures, specifically Asian cultures practice a healthy lifestyle, and that the culture of American mainstream was not as healthy regarding health behaviors (Gomez et al., 2004).

Chapter Three: Methods

Subjects

The purpose of this research study was to determine what health behaviors lead to a higher risk of morbidity, mortality, and cardiovascular disease- related risk factors among Indian and Pakistani people living in the United States for at least 10 years. The participants for this study were men and women between the ages of 43 and 75 (SD = ± 8.71) years originating from India or Pakistan who had resided in the United States for at least 10 years. There were 14 male and 16 female participants who were all first-generation immigrants. The participants were recruited from a mosque in Oklahoma City, Oklahoma. This was the only mosque in Oklahoma City that consisted of this unique group of people from India and Pakistan. Levels of physical activity, nutrition, use of tobacco and acculturation were measured. The inclusion criteria for participation were age, ethnicity, and length of residence in the U.S. The mosque consisted only of people who originated from India, Pakistan, or East Africa but were of Indian descent and permanently resided in the United States. A relationship was previously established between the principle investigator and the mosque leader, and access to the mosque and members was previously approved by the health portfolio advisor who is in charge of any health-related matters for the mosque. The health portfolio advisor also signed a consent form for use of the mosque for research; the consent is located in Appendix D. The mosque consisted of 220 members, of which approximately 150 were between the ages of 43 and 75 years of age.

Announcements regarding the research and need for participants were made during health education sessions provided by the mosque's health portfolio advisor. Congregation members were given the opportunity for participation at that time but were able to participate any time thereafter as well. The principal investigator was on site for a two-month period after each prayer

service on every Friday of the month for the months of December 2012 through January 2013 to administer and collect surveys from participants who did not take the survey at the health education sessions. Participants were able to take the survey on any given Friday during December and January. The principal investigator was present at each session as well as Friday prayer services to administer and collect the surveys. A study of this nature had yet to be conducted in this cohort so there was no basis for determining the necessary number of participants (α=.05, 1-β=.80). Each participant was provided and asked to sign an informed consent regarding the nature of the study. Participation in the study was voluntary, and any participants who met the criteria were eligible to participate. This study was approved by the University of Central Oklahoma Institutional Review Board.

Instrument

A survey was provided to each participant upon enrolling in the study. A copy of the survey can be found in Appendix C. The survey, developed by the principle investigator, was a combination of several other questionnaires already being widely used to test for specific factors including physical activity, nutrition, and tobacco use (CDC, 2011c; Framingham Risk Score Profile, 2012; Suinn, Rickard-Figueroa, Lew, & Vigil, 1987; USDA, 2011). The survey consisted of multiple choice and open-ended questions; the survey was divided into three sections. The sections were nutrition and physical activity, acculturation, and cardiovascular health. The scoring systems already established for the individual questionnaires were used. Each segment of the survey was scored separately using the scoring systems established for each. Acculturation was measured as well to determine if identifying with a Western culture influenced behavior in food choices, and identity. The survey did not require participants to give their name or any identifiable information.

Framingham Risk Score Assessment

The survey used questions from the Framingham Heart Study to assess risk for cardiovascular disease (Framingham Heart Study, 2012). The Framingham Heart Study had specific scales that were offered on their website to determine the risk for general cardiovascular disease and coronary heart disease. The questions were derived specifically from the predictors for general cardiovascular disease risk. These predictors included: age, use of tobacco, treated or untreated systolic blood pressure, total cholesterol, HDL (good cholesterol), and diagnosis of diabetes. This type of assessment was suggested to be used with people who were 30 to 74 years old and who did not have known cardiovascular disease at the start of the study. There were participants who have had cardiovascular disease or a cardiovascular incident, and they were permitted to participate; however, their surveys were scored according to the Framingham predictors for reoccurring coronary artery disease. Predictors for this scale were age, systolic blood pressure, use of tobacco, most recent fasting total and HDL cholesterol, and physician diagnosis of diabetes (Framingham Heart Study, 2012). The predictors were entered into the tool on the Framingham Risk Assessment site to determine a total score for cardiovascular disease risk. The mosque regularly conducted health screenings in which members could get their blood pressure, HDL, LDL, and glucose values checked. Participants were asked to provide their most recent values either from the most recent health screening or from their most recent doctor visit. The purpose of using these questions was to determine what health behaviors lead to a higher risk of cardiovascular disease.

Nutrition

The second section of the survey consisted of questions which related specifically to nutrition and physical activity. These nutrition questions asked participants to identify how often they ate certain foods that were not typically considered to be Indian foods. This section also asked how often each participant consumed fruits and vegetables, fats, oils, sweets, dairy products, and whole grain products. The questions were based on the Dietary Guidelines for Americans (United States Department of Agriculture, 2010). The questions asked participants to identify the frequency of food consumed from each food group. An example was given with each question to help participants identify their daily portion equivalents. There was an extra space provided after each question for the participant to place their answer.

Physical Activity

Questions regarding physical activity asked participants to identify frequency, duration, and type of physical activity they completed within the past week. Each participant was given an example of physical activity levels with each question. Categories were established for levels of physical activity: no activity, low, moderate, or high. Guidelines for physical activity and measurement of physical activity levels were based on the Centers for Disease Control and Prevention Guidelines for all adults ages 18 to 64 and older adults age 65 and older (Centers for Disease Control and Prevention, 2011c). There was no known criterion or test-retest reliability information for the nutrition and physical activity guidelines. The guidelines; however, were considered standard for all Americans as stated by the Department of Health and Human Services (2012).

Acculturation

The third part of the survey used questions from the Suinn-Lew Asian Self-Identity Acculturation Scale (SL-ASIA) (Suinn, Rickard-Figueroa, Lew, & Vigil, 1987). The SL-ASIA is a 21-item multiple choice questionnaire that assessed cultural background and behaviors that indicated with what culture a person most closely identifies themselves. The purpose of using this scale was to determine each participant's level of acculturation. Acculturation has been shown to be a possible cause of health disparities in health status between Asian Indians and other ethnic groups in the United States (Raj, Ganganna, & Bowering, 1999). There were five components used to determine acculturation: reading and language preference, identity and pride, interaction and friendships, health behaviors and food preferences, geographic and generational history. Participants selected the answer that best suited them. After all of the questions were answered, each rating for each question was added together, and the sum was then divided by the total number of items (i.e. 21). The final result was be a number between one and five, with one being low acculturation and five being high acculturation.

Procedures

Upon approval from the University of Central Oklahoma's Institutional Review Board (IRB), coordination for using the mosque began. The mosque had a health portfolio advisor who conducted monthly health education sessions on various topics. The Principle Investigator (P.I.) coordinated with the health portfolio advisor to attend the monthly health education sessions. After the health education sessions, an announcement was made explaining the study and the benefits and risks. Those who were interested completed the surveys after the health education sessions. Enrollment was also open every Friday from December 2012 until January 2013. Upon enrolling in the study, participants received a packet and remained anonymous. The packet

contained an informed consent form, directions on how to complete the survey, and the complete, comprehensive study survey. The P.I. was the only person to hand out the packet and was available for any additional questions participants had while completing the survey. A translator, who was a mosque member, was readily available and signed a confidentiality agreement. Survey completion time ranged from 20 to 30 minutes. Participants who did not have their most recent health assessment measurements with them took the survey home to complete, and were asked to return it to the PI at the mosque within one week. Participants were asked to complete surveys in pencil; however, some used pen. Participants were supplied with an envelope in which they placed the completed survey and returned it to the Principle Investigator.

After the surveys were completed, the appropriate scale was used to determine if the participants were meeting the recommended guidelines for nutrition and physical activity. The surveys were also analyzed to determine each participants risk for heart disease based on their Framingham score. Finally, each participant's acculturation was determined using the SL-ASIA scoring system.

Survey Scoring

Completed surveys were scored by the P.I. Scoring of each part of the survey was completed, and a total score was determined. The cardiovascular assessment was initially intended to be scored using the Framingham Risk Assessment risk indicators as previously described. However, lack of data resulted in this score not being calculated. The Framingham Risk score would have been calculated using the Framingham Risk Assessment website. The data would have been inputted into the Framingham Risk Assessment scoring tool and a score would have been given. Data used to determine the Framingham risk score included age, tobacco use, treated or untreated systolic blood pressure, total cholesterol, most recent fasting HDL

(good cholesterol), and physician diagnosis of diabetes. Most participants did not complete this section so these scores were left out of the statistical analysis completely. Participants' surveys that indicated one of the cardiovascular risk predictors were analyzed to determine how many people within the study had a cardiovascular-related disease.

The physical activity and nutrition section were scored based on the recommendations made by the USDA and the CDC. Participants were able to give a number of minutes they exercised per day, their level of intensity of physical activity (low, moderate, high), and the amount of time they spent on weight bearing exercises each day. The responses were then grouped and analyzed.

The acculturation section was scored in accordance with the SL-ASIA scoring system. The final score of each questionnaire was determined by the combination of scores from each section. Surveys with lower scores were compared to those with higher scores to look at where differences existed in relation to risk factors.

Statistical Analysis

The total score was statistically analyzed using SPSS 18.0. An independent *t*-test was used to determine the differences between men and women in physical activity, level of acculturation, self-reported health, and self-reported ethnicity. Pearson correlations were conducted to determine relationships between multiple variables. These variables were: (a) years lived in the United States and rating of health, (b) age and physical activity per day, (c) age and calculated acculturation score, (d) smoking status and physical activity per day, (e) age and rating of health, (f) rating of health and weight, and (g) identity and level of acculturation. The level of significance for this study was set at α=.05.

The null hypothesis stated that lack of physical activity and acculturation did not contribute to a higher risk of cardiovascular disease among people from Indian and Pakistan. The purpose of this study was to determine what health behaviors contributed to cardiovascular disease among Indian and Pakistani people living in the United States.

Chapter Four: Results

Introduction

The purpose of this study was to determine what health behaviors lead to a higher risk of morbidity, mortality, and cardiovascular disease among people from India and Pakistan living in the United States for at least 10 years. The study consisted of members of one mosque in Oklahoma City, Oklahoma. All members of this mosque descended from Indian or Pakistan.

Hypothesis

The hypothesis of this study was that lack of physical activity and length of time living in the United States contributed to a higher risk of morbidity, mortality, and cardiovascular disease among from India and Pakistan living in the United States for at least 10 years. A Pearson correlation was used to assess the relationship between variables. An independent *t*-test was used to assess differences between variables. The level of significance was set at 0.05.

Descriptive Statistics

A total of 30 people completed the survey, 14 males and 16 females. Ages ranged from 43 to 75 years. All participants were first generation immigrants to the United States. Smoking was only reported by one person.

Correlation and Inferential Statistics

Analysis of data was completed using two types of tests: a Pearson's product moment correlation and an independent *t*-test. Two frequency analyses were conducted. The first was the frequency of daily physical exercise by number of years lived in the United States. The number of minutes spent daily on physical activity was categorized into four groups: no exercise, 1 to 15 minutes, 16 to 30 minutes, and 31 to 60 minutes of physical activity daily (Figure 1). The number of years lived was also categorized into five groups: 10-15 years, 16-20 years, 21-25

years, 26-30, and 31 or greater. Results indicated none of the participants who had lived in the U.S. more than 21 years exercised over 30 minutes per day. The analysis also indicated the category of 1-15 minutes of exercise had the greatest number of participants, five. The minutes per day for this group was less than the daily recommended value according to the Centers for Disease Control and Prevention (CDC, 2011c).

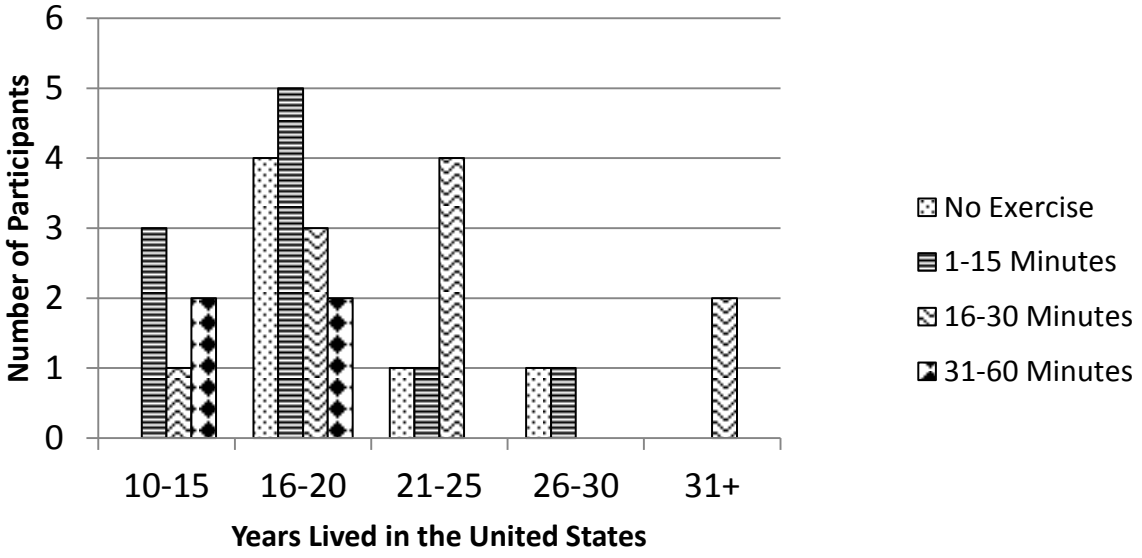

Figure 1. Bar graph depicting the frequency of physical activity according to years lived in the United States. The numbers of participants are categorized by the minutes of physical activity performed each day.

The second frequency analysis was based on the number of servings per day of each food group. The five food groups were fruits, vegetables, grains, protein, and dairy (Figure 2). The most frequently reported number of servings from each food group was one. The grains group had the least and greatest number of consumed servings, half of a serving and four respectively, these amounts were reported by one and three participants respectively.

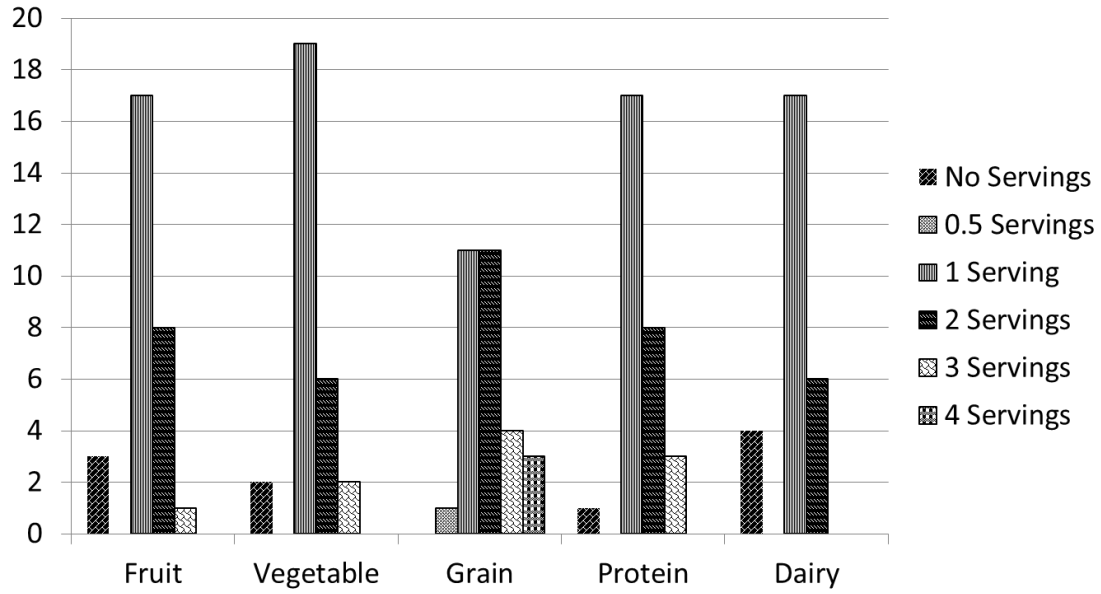

Figure 2. Bar graph depicting the frequency of servings eaten daily according to food group. The number of participants was based on the number of daily servings.

All survey questions that were scored were not statistically analyzed because of insufficient data obtained on certain questions. These questions included HDL (good), LDL (bad) cholesterol, triglycerides, and blood sugar. The partially-completed surveys were scored but due to lack of data regarding cholesterol, the statistical analyses conducted were used to determine correlations and differences between other variables such as acculturation, length of time living in the United States, physical activity, age, gender, and cultural identity. The hypothesis of this study was that lack of physical activity and length of time living in the United States contributed to a higher risk of morbidity, mortality, and cardiovascular disease among people from India and Pakistan.

Correlations

A Pearson's product-moment correlation coefficient was computed to assess the relationship between multiple sets of variables. These sets were: (a) years lived in the United States and rating of health, (b) age and physical activity per day, (c) age and calculated

acculturation score, (d) smoking status and physical activity per day, (e) age and rating of health, (f) rating of health and weight, and (g) identity and level of acculturation.

A Pearson's correlation was computed to assess the relationship between the number of years lived in the United States and self-reported health. There was a non-significant, weak, negative correlation between the number of years lived in the United States and self-reported health, (r = -.285, n = 29, p =.133) (Table 1).

Table 1

Correlation table representing the number of years lived in the United States (C) of survey participants and self-reported health (D).

Measure	*Number of years lived in the U.S.*	*Self-reported Health*
1. C	1	-.285
2. D	-.285	1
P-value	.133	.133

A Pearson's correlation was computed to assess the relationship between age and physical activity per day. There was a non-significant, moderate, negative correlation between age and physical activity performed per day, (r = -.057, n = 28, p =.772).

A Pearson's correlation was computed to assess the relationship between age and calculated acculturation score. There was a non-significant, strong, negative correlation between age and the calculated acculturation score, (r = -.088, n = 28, p =.655).

A Pearson's correlation was computed to assess the relationship between smoking status and physical activity per day. There was a non-significant, weak, positive correlation between smoking status and physical activity performed each day, (r =.387, n = 30, p =.034).

A Pearson's correlation was computed to assess the relationship age and self-reported health. There was a non-significant, weak, negative correlation between the age and self-reported health, (r = -.230, n = 27, p =.249).

A Pearson's correlation was computed to assess the relationship between self-reported health and weight. There was a non-significant, moderate, negative correlation between self-reported health and weight, (r = -.062, n = 29, p =.750).

A Pearson's correlation was computed to assess the relationship between identity and level of acculturation. There was a non-significant, weak, positive correlation between the identity and level of acculturation, (r =.204, n = 30, p =.280) (Table 2).

Table 2

Correlation table representing acculturation score (AS) and self-reported identity (ID) of participants.

Measure	*Acculturation Score*	*Self-reported Identity*
1. AS	1	.204
2. ID	.204	1
P-value	.280	.280

Independent- Samples *t*-tests

An independent-samples *t*-test was conducted to determine differences in the amount of physical activity performed each day between men and women. There was not a significant difference in the amount reported for men (M = 18.00, SD = 20.98) and women (M = 21.88, SD = 18.55; t (28) = -.537, p =.595) (Table 3).

An independent-samples *t*-test was conducted to determine differences in acculturation scores between men and women. There was not a significant difference in the amount reported for men (M = 2.35, SD =.31) and women (M = 2.12, SD =.35; t (28) = 1.937, p =.063) (Table 3).

An independent-samples *t*-test was conducted to determine differences in self-reported health between men and women. There was not a significant difference in the amount reported for men (M = 2.57, SD =.76) and women (M = 2.67, SD =.49; t (27) = -.406, p = .688) (Table 3).

Table 3

Comparison of Male and Female Participants on Physical Activity Performed Each Day, Acculturation Score, and Self-Reported Health (n= 14 males, 16 females on physical activity and acculturation score, and 15 females on self-reported health).

Variable	*M*	*SD*	*t*	*df*	*p*	*d*
Physical Activity			-.54	28	.595	-.2
Males	18.00	20.98				
Females	21.88	18.55				
Acculturation Score			1.94	28	.063	.7
Males	2.35	.31				
Females	2.12	.35				
Self-reported Health			-.41	27	.688	-.2
Males	2.57	.76				
Females	2.67	.49				

Note. Physical activity is expressed as minutes per day; acculturation score is expressed as a number ranging from one to five with five being most acculturated. Self-reported health is expressed as a number from one to four with four being excellent. Acculturation score is adapted from "The Suinn-Lew Asian Self-Identity Acculturation Scale: An Initial Report," by R.M. Suinn, K. Rickard-Figueroa, S. Lew, and P. Vigil, 1987, Educational and Psychological Measurement, 47(2), p. 401-407.

An independent-samples *t*-test was conducted to determine differences in the level of self-reported physical activity between men and women. There was not a significant difference in the amount reported for men (M = 1.33, SD = .65) and women (M = 1.27, SD =.46; t (25) = .312, p = .757).

An independent-samples *t*-test was conducted to determine the differences in self-reported ethnicity among Asians and those who identified as bi-cultured. There was not a significant difference in the amount reported for Asians (M = 3.14, SD =.96) and bi-cultured (M = 3.56, SD = .88; t (28) = -.101, p = .280).

Chapter Five: Discussion, Conclusions, and Recommendations

Summary of Findings

The purpose of this research study was to determine what health behaviors lead to a higher risk of morbidity, mortality, and cardiovascular disease among Indian and Pakistani people living in the United States for at least 10 years. During the study, participants (N=30) were administered a questionnaire assessing their cardiovascular health, nutrition, physical activity, and level of acculturation. The findings and conclusions were based on data that was gathered from December, 2012 to January, 2013.

The following research hypothesis was tested at the .05 level of significance: Lack of physical activity and length of time living in the United States contributed the most to a risk of morbidity, mortality, and cardiovascular disease among people from India and Pakistan living in the United States for at least 10 years. Due to insufficient data for cardiovascular health (cholesterol, glucose, and blood pressure values), the effect of physical activity on cardiovascular risk could not be measured. Differences in physical activity performed each day between men and women were measured, and statistical significance was not reached (p = .595). Differences in the level of acculturation between men and women were, measured and statistical significance was not reached (p = .063) however, there was a trend towards significance. Correlations in age and acculturation score were measured, and statistical significance was not reached (p = .655). Correlations in physical activity and age were measured, and statistical significance was not reached (p = .772). These data do not support the research hypothesis.

Discussion and Conclusions

This study was designed to test the relationship between variables that could affect cardiovascular risk and to test the differences between men and women and levels of physical

activity and acculturation scores. While the studies about lack of physical activity and acculturation in the literature review seemed to defend the belief that these factors greatly affected cardiovascular risk, this study yielded no statistical significance to support those previous findings. The lack of significance could have been caused by insufficient data reported on cholesterol, blood pressure, glucose, and weight.

It is also important to note that members of this cohort live in Oklahoma City where few sidewalks are present for walking. Many of the participants were over the age of 60 years, did not drive, and resided with their children, limiting their ability to leave their home for physical activity.

Many people reported fair to good health, but several cardiovascular disease conditions were reported; females reported slightly better health (M= 2.67, SD= .49) than males (M= 2.57, SD= .76). The highest reported condition was hypertension (30%), followed by diabetes (20%), and high cholesterol (13%). The cause of these conditions could have been related to the low consumption of fruits and vegetables and lack of physical activity. The number of fruits and vegetables consumed on a daily basis was reported as being lower than the USDA recommended daily amount. These results could have been due to several factors. The first could have been a misperception of one's own health. The second could have been a lack of knowledge of the necessary or recommended daily amounts of fruits and vegetables needed. Finally, the inability to travel due to lack of transportation may have led to a variety of fruits and vegetables being unavailable. These issues may have affected fruit and vegetable consumption, but because cholesterol values were unreported, it was difficult to determine a relationship or difference to the reported disease conditions.

Immigrants who have lived in the U.S. for longer periods of time and with higher degrees of acculturation may have different lifestyles than those who reported fewer years of residence or lesser degrees of acculturation (Kalra, Srinivasan, Ivey, & Greenlund, 2004). There was no evidence of the previous statement in the current research study. All statistical analyses resulted in no significant differences or relationships. The independent *t*-test conducted to determine if a difference existed between acculturation scores of men and women demonstrated a value of $p = .068$; this was the only test conducted that was trending towards significance. It is important to recognize that although not statistically relevant, the high level of physical inactivity in the cohort. Males in this group averaged 18.0 to 20.0 minutes per day while females averaged 18.6 to 21.9 minutes per day of physical activity. These values are far less than what is necessary to complete the recommended 150 minutes per week (Garber et al., 2011).

There was also a difference in acculturation score between the genders. The slightly higher acculturation score for men ($M= 2.35$, SD= .31) could have been due to men having more exposure to other cultures through work and more time spent away from home. Women of this culture tend to spend more time in the home and often do not work.

The lack of significance in each test conducted resulted in the null hypothesis failing to be rejected; for this cohort and with the available data, lack of physical activity and acculturation did not lead to a higher risk of morbidity, mortality, and cardiovascular disease among people from Indian and Pakistan living in the United States for at least 10 years.

Limitations

Multiple limitations were present in the current study. The first limitation was the lack of participation which could be attributed to cultural differences. The cultural differences observed during the time with participants included lack of understanding of the research process and use

of a paper survey to collect information. The second limitation was from the participants not completing the survey in its entirety causing a deficiency in complete data. Missing data included blood cholesterol, glucose, most recent weight, nutritional information, and blood pressure measurements. This data was pertinent because these biometrics were to be used to determine cardiovascular disease risk. Deficiency in data could be due to participants not having results from prior health screenings or the desire not to disclose their results. The inability to conduct research at more than one mosque, with more than one group or having a control group from the area of India and Pakistan was also a limitation.

Recommendation for Future Studies

To address limitations of the current study, researchers conducting future studies may consider one-on-one interviewing with a translator present as a method for data collection. This method would be useful because participants would not have to complete a paper survey and may be more comfortable disclosing information to someone in a conversational format. It would also be useful for researchers conducting future studies to perform a health screening which should include lipid and glucose panels, blood pressure, and weight. The results of a screening could then be used to determine the effects of reported physical activity and calculated acculturation score on cardiovascular risk. Another helpful change to implement would be to provide an incentive for participation. An incentive could not be provided for this study because of grant regulations. Finally, it is imperative that researchers gather information from several different mosques throughout the United States in an effort to look at regional effects on health behaviors for those that have migrated to the United States within the last 10 years.

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Appendix A
Informed Consent

Informed Consent Form

Research Project Title: Health Behaviors Leading to a Higher Risk of Morbidity, Mortality, and Cardiovascular Disease among People from India and Pakistan Living in the United States for at least 10 years.
Researcher: Amreen Alisha Hemani

Purpose of this research:

The purpose of this research is to determine what health behaviors contribute the most to cardiovascular disease among Indian and Pakistani people living in the United States.

Procedure:

Upon enrolling in the study, you will receive a packet of information with a designated number. The packet contains two informed consent forms and a survey. One consent form will be returned to the P.I. and the participant will keep one. After reading and signing one Informed Consent Form, the survey can be started. The survey can be completed at one's own pace. After the survey is complete, it is to be placed in the envelope in which it was given to you and returned to the researcher in the provided envelope at the mosque. You are to keep the other informed consent form for your own records. All surveys are anonymous, therefore a name is not to be placed anywhere on the envelope or questionnaire. Results of this study will be shared with the Ismaili Religious Center in the form of a poster presentation. Results will also be shared in completed version of the thesis as well as during the thesis defense.

Expected Length of Participation

The questionnaire should take 20 to 30 minutes to complete.

Potential Benefits

While there is no direct benefit to participating in this study, your participation will add to your knowledge regarding the reasons for cardiovascular disease and related conditions in the Indian and Pakistani (Indo-Pak) community living in the United States. The Indo-Pak community is growing rapidly in the United States, and the

rate of cardiovascular disease in the community is increasing; however, there is very little research on the reasons why. Results of this study can increase the knowledge about the reasons why cardiovascular disease is increasing and may help in developing prevention and wellness program tools and information.

Potential Risks or Discomforts

The information being collected is of a sensitive nature; therefore, you may feel some psychological discomfort or anxiety while completing the survey. You will be asked to share personal health information for the purpose of determining how certain health values such as blood pressure, cholesterol, and glucose affect risk of cardiovascular disease. Please keep in mind that all of the data collected will be kept anonymous, and in no way can identify a participant in this study. If you experience any discomfort or anxiety while completing the survey, you may discontinue at any time. There will be no penalty for not completing the questionnaire. Participation in the study is completely voluntary.

Contact information for the researcher

Please feel free to contact the researcher, Amreen Alisha Hemani, at any time following the survey by email or phone. The phone number is (405) 812-5029, and the email address is: ahemani@uco.edu

Contact information for UCO Institutional Review Board

Dr. Jill A. Devenport
ADM 216, Box 159
Phone: (405) 974-5497
Email: irb@uco.edu

Explanation of Confidentiality and Privacy

Your responses will be kept confidential. Only the researcher will see your responses. Your surveys will be individually numbered used only for identification in the computer database used for analysis. The number will be placed on your survey form as well. The Principle Investigator will not be able to determine what number belongs to you as the surveys are anonymous. Your surveys will be kept in a locked file cabinet that can only be accessed by the researcher.

Assurance of Voluntary Participation

Your participation in this study is completely voluntary, and you are free to withdraw your participation at any time. If you choose to no longer participate, please place your survey back in the envelope and return it to the researcher. You may also skip any questions that you do not want to answer.

Affirmation by Research Subject:

I hereby voluntarily agree to participate in the above listed research project and further understand the above listed explanations and descriptions of the research project. I also understand that there is no penalty for refusal to participate, and that I am free to withdraw my consent and participation in this project at any time without penalty. I acknowledge that I am at least 35 years old. I have read and fully understand this Informed Consent Form. I sign it freely and voluntarily. I acknowledge that a copy of this Informed Consent Form has been given to me to keep.

Name (please print): _____

Signature: _____

Date: _____

Appendix B
IRB Approval Letter

UNIVERSITY OF Central Oklahoma

October 17, 2012 IRB Application #: 12115

Proposal Title: Health Behaviors Leading to a Higher Risk of Morbidity, Mortality, and Cardiovascular Disease among People from India and Pakistan Living in the United States for at least 10 Years

Type of Review: Initial-Expedited

Investigators:

Ms. Amreen Alisha Hemani
Dr. Diane Rudebock
Department of Kinesiology and Health Studies
College of Education and Professional Studies
Campus Box 189
University of Central Oklahoma
Edmond, OK 73034

Dear Ms. Hemani and Dr. Rudebock:

Re: Application for IRB Review of Research Involving Human Subjects

We have received your revised materials for your application. The UCO IRB has determined that the above named application is APPROVED BY EXPEDITED REVIEW. The Board has provided expedited review under 45 CFR 46.110, for research involving no more that minimal risk and research category 7.

Date of Approval: 10/17/2012
Date of Approval Expiration: 10/16/2013

If applicable, informed consent (and HIPAA authorization) must be obtained from subjects or their legally authorized representatives and documented prior to research involvement. A stamped, approved copy of the informed consent form will be sent to you via campus mail. The IRB-approved consent form and process must be used. While this project is approved for the period noted above, any modification to the procedures and/or consent form must be approved prior to incorporation into the study. A written request is needed to initiate the amendment process. You will be contacted in writing prior to the approval expiration to determine if a continuing review is needed, which must be obtained before the anniversary date. Notification of the completion of the project must be sent to the IRB office in writing and all records must be retained and available for audit for at least 3 years after the research has ended.

It is the responsibility of the investigators to promptly report to the IRB any serious or unexpected adverse events or unanticipated problems that may be a risk to the subjects.

On behalf of the UCO IRB, I wish you the best of luck with your research project. If our office can be of any further assistance, please do not hesitate to contact us.

Sincerely,

Jill A. Devenport, Ph.D.
Chair, Institutional Review Board
Director of Research Compliance, Academic Affairs
Campus Box 159
University of Central Oklahoma
Edmond, OK 73034
405-974-5479
jdevenport@uco.edu

Appendix C

Approval Letter for Use of Facility

September 16, 2012

To Whom It May Concern:

Please note that Ms. Amreen Alisha Hemani, University of Central Oklahoma Graduate Student, has the permission of the Ismaili Religious Center to conduct research at our Oklahoma facility for her study, "Health Behaviors Leading to a Higher Risk of Morbidity, Mortality, and Cardiovascular Disease Living in the United States for at least 10 Years."

Ms. Hemani will attend various health education sessions to obtain participants for her study. She will offer enrollment in her study by explaining the meaning of conducting and participating in a research study, and the specific purpose of her study. She will also explain any risks and benefits to participating in her study. All participants who decide to participate will receive a numbered envelope containing an informed consent to be signed and the study survey. Participants will be able to take the survey in our center or may take the survey home and return it to Ms. Hemani any time before the study period ends. Ms. Hemani's on-site research activities will be finished by December 15, 2012.

Ms. Hemani will be able to enter the sanctuary and any of the rooms within the religious center. Ms. Hemani has agreed to provide a copy of the University of Central Oklahoma IRB-approved, stamped consent document before she recruits participants, and will also provide a copy of any aggregate results. I have reviewed the survey and consent forms Ms. Hemani will use for this study and approve of the use of these documents.

If there are any questions, please contact me at 405-720-2461.

Sincerely,

Shireen Mohammad, MD, MPH

Appendix D

Survey Instrument

Survey

INSTRUCTIONS: The following questions have been created to determine information about your current nutrition, exercise, and cardiovascular status. Questions are also included regarding your historical background and most recent behaviors which may be related to your cultural identity. Please choose the one answer which best describes you.

The following questions relate to your health history.

A. How old are you? _____

B. Are you male or female? Please circle one.

Male
Female

C. How long have you lived in the United States? Please answer this question based on years you have lived here.

_____years

D. How would you rate your health? Circle the answer that describes you best.

1. poor
2. fair
3. good
4. excellent

E. Do you smoke? (please answer yes or no) _____

F. If you answered yes to question E, please specify how many cigarettes you smoke per day?

_____

G. If you answered no to question E, did you:

1. quit more than 6 months ago
2. quit within the last 6 months
3. never smoked

H. Do you use any form of tobacco such as chewing tobacco or cigars? (please answer yes or no)

_____

I. What is your weight in pounds?

Weight: _____ lbs.

J. What is your most recent blood pressure reading (mm/Hg)?

Systolic:
Diastolic:

K. What is your most recent cholesterol reading? Please provide total cholesterol, HDL(good), LDL (bad), and triglycerides (fatty acids).

Total CHO: _____ HDL: _____ LDL: _____ Triglycerides:_____

L. What is your most recent blood sugar reading?

Blood sugar (glucose):_____

M. Have you ever had a heart attack, coronary artery bypass surgery, balloon angioplasty, atherectomy, or stent? (please answer yes or no) _____

N. Have you ever been told by a medical doctor or health care professional that you had a stroke or transient ischemic attack (TIA or mini stroke)? (please answer yes or no)_____

O. Have you ever been told by a medical doctor or health care professional that you have any of the following: (circle all that apply)

a. blockages in arteries to your legs or blockages in your carotid arteries (arteries in your neck)
b. High blood pressure
c. High or abnormal cholesterol or triglycerides
d. diabetes

P. Do you take medication for any of the following conditions: (circle all that apply)

a. Controlling your blood cholesterol or triglycerides
b. diabetes for high blood sugar
c. high blood pressure
d. chest pain (angina)
e. any other heart condition

The following questions relate to nutrition and exercise.

Q. How many servings of fruit do you eat each day? (Example: half of a large apple, or 1 cup of grapes, or 1 small banana= 1 serving).

_____

R. How many servings of vegetables do you eat each day? (Example: 1 cup of baby carrots, or 1 cup of cooked leafy vegetables=1 serving)

_____

S. How many servings of grain do you eat each day? (Example: ½ cup of cooked rice, or 1 slice of bread, or 1 packet of instant oatmeal=1 serving)

_____

T. How many servings of protein do you eat each day? (Example: 1 small chicken breast, or 1 small lean hamburger patty, or 1 egg, or 12 almonds=1 serving)

_____

U. How many servings of dairy do you eat or drink each day? (Example: 1 cup of milk, or 1 cup of yogurt, or 1 slice of cheese, or 1 scoop of ice cream= 1 serving)

_____

V. Do you eat fried foods often (at least twice a week)? Please answer yes or no

_____

W. Do you eat foods cooked in ghee often? Please answer yes or no

_____

X. How often do you eat sweets (mithai)? (often would be twice per week)

1. Yes
2. No

Y. How much physical activity do you perform each day? (Example: 30 minutes a day, one hour a week)

_____

Z. How would you rate your level of physical activity? (Example: low=light walking, moderate=enough to break a sweat but still hold a conversation, high=vigorous walking and intense sweating) Circle the answer that describes you best.

1. low
2. moderate
3. vigorous

A1. How often do you perform weight bearing exercise? (Lifting weights, using exercise bands)

1. not at all
2. once a day
3. twice per week
4. 3-4 times per week

The following questions relate to your cultural identity.
Circle the answer that describes you best.

1. What language can you speak?

1. Asian only (for example, Urdu, Gujrati, Hindi)
2. Mostly Asian, some English
3. Asian and English about equally well (bilingual)
4. Mostly English, some Asian
5. Only English

2. What language do you prefer?

1. Asian only (for example, Urdu, Gujrati, Hindi)
2. Mostly Asian, some English
3. Asian and English about equally well (bilingual)
4. Mostly English, some Asian
5. Only English

3. How do you identify yourself?

1. Oriental
2. Asian
3. Asian-American
4. Indian-American, Pakistani-American
5. American

4. Which identification does (did) your mother use?

1. Oriental
2. Asian
3. Asian-American
4. Indian-American, Pakistani-American
5. American

5. Which identification does (did) your father use?

1. Oriental
2. Asian
3. Asian-American
4. Indian-American, Pakistani-American
5. American

6. What was the ethnic origin of the friends and peers you had as a child up to age 6?

1. Almost exclusively Asians, Asian-Americans, Orientals
2. Mostly Asians, Asian-Americans, Orientals
3. About equally Asian groups and Anglo groups
4. Mostly Anglos, Blacks, Hispanics, or other non-Asian ethnic groups
5. Almost exclusively Anglos, Blacks, Hispanics, or other non-Asian ethnic groups

7. What was the ethnic origin of the friends and peers you had as a child from 6 to 18?

1. Almost exclusively Asians, Asian-Americans, Orientals
2. Mostly Asians, Asian-Americans, Orientals
3. About equally Asian groups and Anglo groups
4. Mostly Anglos, Blacks, Hispanics, or other non-Asian ethnic groups
5. Almost exclusively Anglos, Blacks, Hispanics, or other non-Asian ethnic groups

8. Whom do you now associate with in the community?

1. Almost exclusively Asians, Asian-Americans, Orientals
2. Mostly Asians, Asian-Americans, Orientals
3. About equally Asian groups and Anglo groups
4. Mostly Anglos, Blacks, Hispanics, or other non-Asian ethnic groups
5. Almost exclusively Anglos, Blacks, Hispanics, or other non-Asian ethnic groups

9. If you could pick, whom would you prefer to associate within the community?

1. Almost exclusively Asians, Asian-Americans, Orientals
2. Mostly Asians, Asian-Americans, Orientals
3. About equally Asian groups and Anglo groups
4. Mostly Anglos, Blacks, Hispanics, or other non-Asian ethnic groups
5. Almost exclusively Anglos, Blacks, Hispanics, or other non-Asian ethnic groups

10. What is your music preference?

1. Only Asian music
2. Mostly Asian
3. Equally Asian and English
4. Mostly English
5. English only

11. What is your movie preference?

1. Asian-language movies only
2. Asian-language movies mostly
3. Equally Asian/English English-language movies
4. Mostly English-language movies only
5. English-language movies only

12. What generation are you? (circle the generation that best applies to you)

1. 1st Generation = I was born in Asia or country other than U.S.
2. 2nd Generation = I was born in U.S., either parent was born in Asia or country other than U.S.
3. 3rd Generation = I was born in U.S., both parents were born in U.S, and all grandparents born in Asia or country other than U.S.
4. 4th Generation = I was born in U.S., both parents were born in U.S, and at least one grandparent born in Asia or country other than U.S. and one grandparent born in U.S.
5. 5th Generation = I was born in U.S., both parents were born in U.S., and all grandparents also born in U.S.
6. Don't know what generation best fits since I lack some information.

13. Where were you raised?

1. In Asia only
2. Mostly in Asia, some in U.S.
3. Equally in Asia and U.S.
4. Mostly in U.S., some in Asia
5. In U.S. only

14. What contact have you had with Asia?

1. Raised one year or more in Asia
2. Lived for less than one year in Asia
3. Occasional visits to Asia
4. Occasional communications (letters, phone calls, etc.) with people in Asia
5. No exposure or communications with people in Asia

15. What is your food preference at home?

1. Exclusively Asian food
2. Mostly Asian food, some American
3. About equally Asian and American
4. Mostly American food
5. Exclusively American food

16. What is your food preference in restaurants?

1. Exclusively Asian food
2. Mostly Asian food, some American
3. About equally Asian and American
4. Mostly American food
5. Exclusively American food

17. Do you

1. read only an Asian language
2. read an Asian language better than English
3. read both Asian and English equally well
4. read English better than an Asian language
5. read only English

18. Do you

1. write only an Asian language
2. write an Asian language better than English
3. write both Asian and English equally well
4. write English better than an Asian language
5. write only English

19. If you consider yourself a member of the Asian group (Oriental, Asian, Asian-American, Indian-American, etc., whatever term you prefer), how much pride do you have in this group?

1. Extremely proud
2. Moderately proud
3. Little pride
4. No pride but do not feel negative toward group
5. No pride but do feel negative toward group

20. How would you rate yourself?

1. Very Asian
2. Mostly Asian
3. Bicultural
4. Mostly Westernized
5. Very Westernized

21. Do you participate in Asian occasions, holidays, traditions, etc.?

1. Nearly all
2. Most of them
3. Some of them
4. A few of them
5. None at all

22. What personal values do you have that relate to your level of fitting in with other Asians and/or Americans?

_____

This completes the questionnaire, thank you for your participation!

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Appendix E

Oral Script-Pre-Questionnaire

Oral Script-Pre-Questionnaire

Hello, my name is Amreen Alisha Hemani and I am a graduate student in the Wellness Management Health Studies program at the University of Central Oklahoma. I have asked a member of your mosque to translate what I am going to be saying to help those of you who do not understand. I am currently conducting research as a part of my master's thesis. I would like to invite you to participate in this research study which is being conducted to determine the health behaviors that lead to a higher risk of cardiovascular disease, morbidity, and mortality among Indian and Pakistani people who have lived in the United States for at least 10 years.

Before we begin, I want to explain more about being a part of a research study means and what we will be doing so that you know what to expect.

Research is used to learn something that a person or group of people may want to know. It also used to gather evidence. It can be used to learn about any area where there is little to no data available or about an area where there is data available but more research is needed. The data gathered helps to show causes, explanations, or reasons why something happens. Being a participant in a research study allows you to assist the researcher in gathering data to determine a possible answer to the research question. Sometimes, there can be a risk associated with being a part of a research study. I will go over the risk and benefits that you may possibly experience if you decide to enroll in this research study. Please keep in mind that participation in this research study is voluntary.

First, we will go over the informed consent form, and if you are willing to participate, then you will need to sign and date the back of the form. An announcement was made for those that would like to participate to bring previous health screening results. These results are self-reported and there will be no actual blood, weight, or blood pressure testing conducted as part of this research study. For those who are participating, you will be asked to complete the questionnaire, which will take about 20 to 30 minutes and provide those results within the questionnaire. For those of you who did not bring your results, you may bring your previous health screening results to prayer service on any Friday before the end of December and complete the survey at that time. Each envelope and survey has a number placed on it. The purpose of this identification number is for the researcher to keep track of all of the data sheets that are collected. The questionnaire does ask for your most recent weight, blood pressure, cholesterol, and glucose measurements however, all of the information you provide will be kept confidential. The study will last until the end of December 2012.

There are no additional risks or discomforts that you will encounter psychologically, socially, physically, or legally, any greater that those ordinarily encountered in daily life. Your questionnaire responses will remain anonymous. The purpose of asking for your personal health information is to use the data to determine what health behaviors lead to a higher risk of cardiovascular disease.

There will be no direct compensation or benefit to you other than the study may improve your understanding of cardiovascular risk factors. If you would like to participate in this study, please read and

sign the informed consent form and keep one copy for yourself. By signing the informed consent form, you agree to voluntarily take part in the study. However, you have the right to terminate the study at any time and withdraw your questionnaire.

What questions do you have?

Now please take out your survey and begin it and if you have any questions please ask me or the translator. After completing the survey please return the survey to the envelope and return the whole packet to me.